

# **2001 Annual Report**

**of the**

**California Department of Food and  
Agriculture's**

**Plant Health and Pest Prevention Services  
Division**

**April 2002**

# PLANT HEALTH AND PEST PREVENTION SERVICES

## ADMINISTRATION

The California Department of Food and Agriculture's (CDFA) Plant Health and Pest Prevention Services (PHPPS) mission is legislatively mandated and clearly articulated within the California Food and Agricultural Code. The California Legislature, in enacting this mandate, also recognized that pest prevention is uniquely positioned to protect California's urban and natural environments as well as its agriculture. It specifically instructs the CDFA to protect ornamental and native plantings as well as agricultural crops from the harm caused by exotic pest invasions. These mandates serve as the basis for the pest prevention program's mission, vision, values, and goals statement:

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

Source – California Food and Agricultural Code, Sections 24.5, 403, 5006, 5301, 5322, 5761

**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. "Find the big problems and fix them."

### 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;

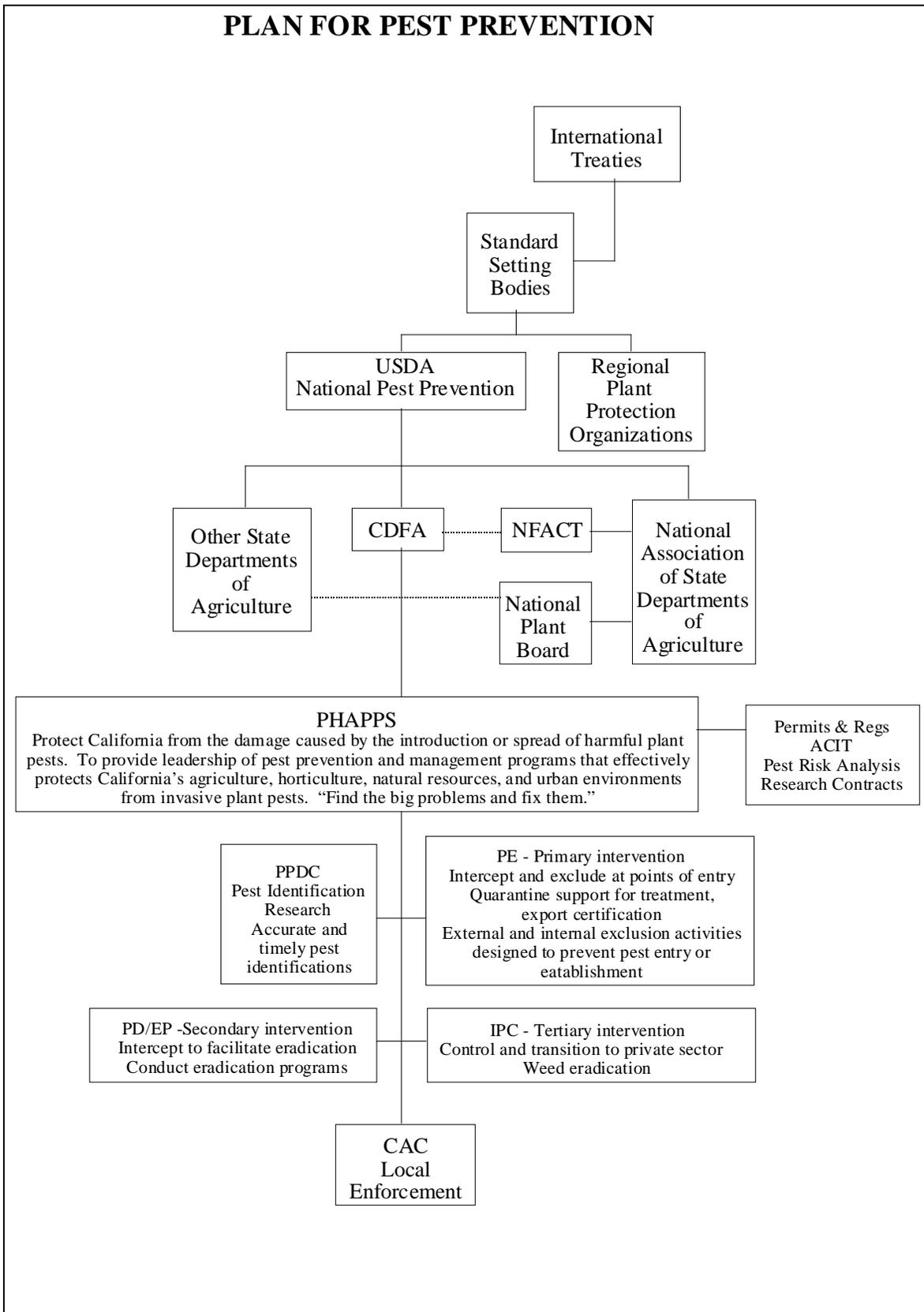
- Early detection of plant pests before they become well established;
- Timely and effective eradication actions to eliminate new pest infestations;
- Control and containment systems for plant pests that have become widely established;
- Research, information technology, and pest risk analysis systems 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; and
- Development of division employees, foster teamwork and a sense of accomplishments and enjoy our work.

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 the 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. PHPPS is currently reviewing its strategic plan and our entire pest prevention program to enable their continual improvement and ensure their relevance to the pest prevention mission.

Along with the USDA, PHPPS actively participates in the development of standards for pest prevention under the International Plant Protection Convention. The PHPPS 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 US, Canada, and Mexico. California industry representatives are active participants in NAPPO panel committees and its Industry Advisory Group.

California's pest prevention system is composed of a continuum of program elements and activities. The chart on the following page shows how these pest prevention elements are organized:

# PLAN FOR PEST PREVENTION



The four major components of the pest prevention system are pest exclusion, pest detection, pest eradication/control, and pest diagnostics. These elements are described as follows.

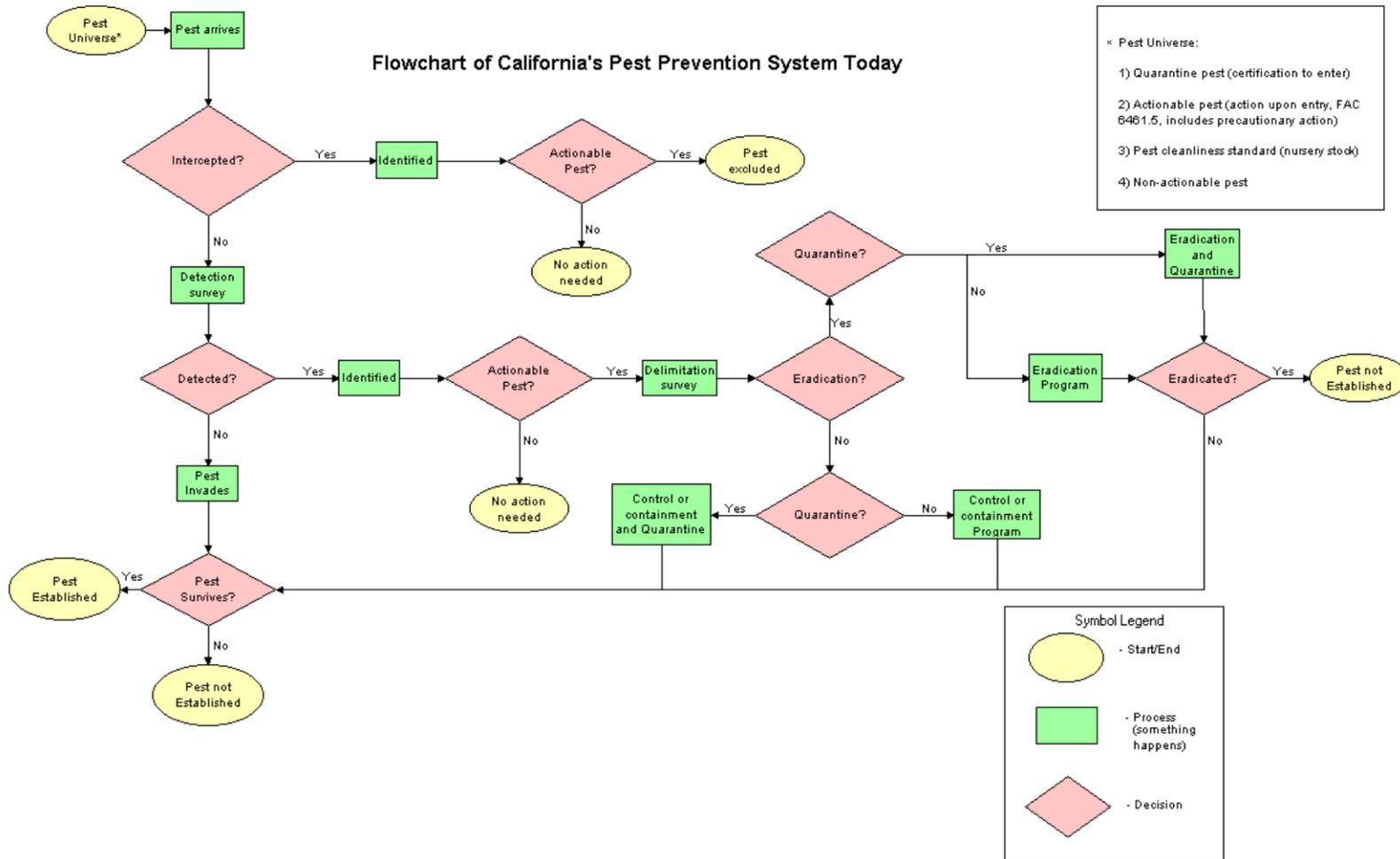
- I. Pest exclusion is responsible for the enforcement of these plant quarantine laws and regulations. This is accomplished by:
  - o working with other state departments of agriculture, foreign plant protection agencies, and industry to ensure that agriculturally-regulated products entering the State are in compliance with the requirements of our laws and regulations;
  - o providing training and direction to the county agricultural commissioners who inspect products at terminal destination points and certify products for export; and
  - o conducting maritime inspections for state level quarantine pests following clearance by the USDA.

In addition, the Pest Exclusion Branch administers the federal export certification program under a memorandum of understanding with the USDA, and the county agricultural commissioners provides oversight and direction to county staff who in turn provides compliance certification for domestic export and oversees the nursery regulatory, seed, and quality cotton programs.

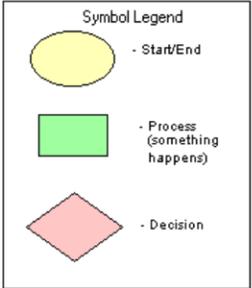
- II. The pest detection program was established to detect and intercept plant pests that evade the exclusion net early enough to facilitate eradication. The goal is to detect insect and weed populations before the infestation exceeds one square mile and for disease pathogens, one half mile. Detection program activities are conducted by the county agricultural commissioners under contract with PHPPS. Trapping to delimit a detected pest population may be performed by PHPPS or county staff, or both, depending on the particular situation.
- III. Eradication and control programs are conducted to eradicate new pest infestations, limit the spread of quarantine pests that cannot be eradicated, and develop biological control or integrated pest management systems for pests that cannot be either eliminated or contained.
- IV. Plant pest diagnostics, information technology, and research and development support pest prevention activities and ensure that the prevention program remains relevant and scientifically based.

The flowchart on the next page illustrates the role of each of these elements:

### Flowchart of California's Pest Prevention System Today



\* Pest Universe:  
 1) Quarantine pest (certification to enter)  
 2) Actionable pest (action upon entry, FAC 6461.5, includes precautionary action)  
 3) Pest cleanliness standard (nursery stock)  
 4) Non-actionable pest

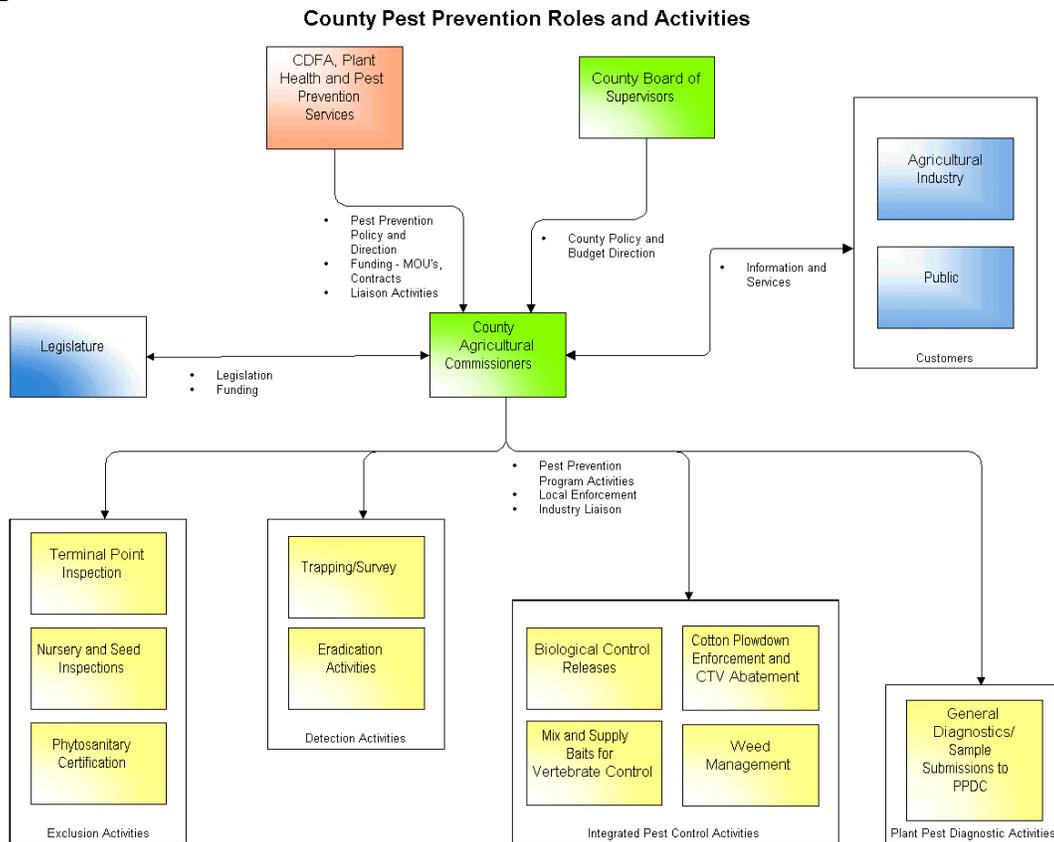


## Role of the County Agricultural Commissioners in Pest Prevention

The Secretary of the California Department of Food and Agriculture and the county agricultural commissioners are jointly responsible for the enforcement of pest prevention laws and regulations. The Secretary is responsible for the overall statewide enforcement and provides direction and recommendations to the commissioners. The commissioners are responsible for local administration of the program. The Secretary also provides assistance in planning and otherwise developing county programs to ensure statewide uniformity in enforcement and coordination of program activities. The PHPPS provides training, special services, special equipment, statewide public outreach, statewide planning, and emergency assistance. As the local enforcing officer of all laws and regulations pertaining to pest prevention, the county agricultural commissioner is under the supervision of the Secretary of the Department.

Under the direction of PHPPS, the county agricultural commissioners perform the following pest prevention activities: terminal point inspections, nursery and seed inspections, issue export certificates, conduct trapping and other survey and eradication activities, make biological control releases, enforce cotton plowdown and curly top virus abatement requirements, administer weed management programs, mix and supply pesticide baits for vertebrate pest control, and take and submit for identification any necessary diagnostic samples to the CDFA's Plant Pest Diagnostics Center.

The following illustrates where these activities fit within the overall pest prevention program:



Other division level programs that service both our internal and external stakeholders include: Permits and Regulations, Agricultural Commodities Investigations, and Environmental Compliance. Their 2001 activities are summarized as follows:

## **PERMITS AND REGULATIONS**

The Permits and Regulations Program provides the legal basis for program activities, legal authority for its safe movement of plants and plant pest policy, procedural guidance for pest prevention programs and regulatory and statutory consulting for the Division. It develops all regulations administered by the Division and develops associated, legally required documents such as notices, statements of reason, orders, and certificates of compliance. Regulations administered by the program include pest eradication, plant quarantine (exterior and interior), insect pest control, nursery stock inspection and standards, host-free districts and periods, plant pathology, vertebrate and weed control, cotton quality, seed inspection and noxious weeds. The Special Assistant serves as regulatory coordinator for the Division and as a 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. USDA permits concern movement into California of 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 US.

## **ACCOMPLISHMENTS**

The primary activities of the Permits and Regulations Program during the 2001 calendar year were:

**State permits.** A total of 385 state permits were issued including:

- 162 plant pest permits (71 for pathogens, 91 for arthropods)
- 202 quarantine commodities permits
- 13 biotechnology authorizations
- 8 approved laboratory permits.

**Federal (USDA) permits.** A total of 722 applications for federal permits were reviewed and processed including:

- 56 post-entry quarantine agreements,
- 47 soil permits, 298 plant pest permits (157 for pathogens, 141 for arthropods), 292 biotechnology permits,
- 29 permits for federally prohibited plant material.

**Regulations.** There were 62 regulatory actions (including 11 quarantine and 13 eradication) completed in 2001 that included adoption, repeal, or amendment of 41 regulations; 6 certificates of compliance; and 15 notices of changes in the regulations.

## AGRICULTURAL COMMODITIES INVESTIGATIONS TEAM

The Agricultural Commodities Investigative Team (ACIT) exists to prevent exotic pest introductions into the state by, investigating identifying and eliminating smuggling pathways. To accomplish this, the team:

- Evaluates referrals of alleged smuggling of agricultural products
- Monitors wholesale and retail markets
- Conducts investigations
- Coordinates activities with other regulatory agencies, e.g. USDA's Smuggling Investigation and Trade Compliance, IES, and Office of Inspector General.
- Pursues administrative, civil or criminal prosecution
- Identifies smuggling pathways
- Collects, analyses, and disseminates pertinent data
- Trains other regulatory staff

### ACCOMPLISHMENTS

In 2001, the team took the following actions:

Total Cases	Criminal Action	Administrative Action	No Action	Pending Action
24	1	11	11	1
<b>Total fines</b>	<b>\$7,800</b>	<b>\$4,325</b>		

A summary description of some of the violations and actions take in 2001 follows. These summaries illustrate the close working relationship of the team and the county agricultural commissioners.

- **Case adjudicated in 2001. Seized 24,000 pounds of infested fresh longans from Thailand manifested as frozen. Action taken: Charged with criminal misdemeanors through District Attorney fined \$7,800.00, ordered to pay investigative costs of \$5,000.00 and three years informal probation. Federal prosecution is pending on felony conviction**
- **Prohibited movement of nursery stock from a glassy-winged sharpshooter (GWSS) infested county to non-infested county. Action taken: Administrative fine through county agricultural commissioner for \$1,000.00 and a year probationary period with any additional violations resulting in a \$10,000.00 fine**
- Altered Certificate of Quarantine Compliance for plant material. Action taken: Administrative fine through county agricultural commissioner for \$1,000.00
- Misuse of a Master Permit for cut flowers. Action taken: Administrative fine through the county agricultural commissioner of \$75.00
- County staff with the assistance of canine located plant material in an unmarked box at a UPS facility containing prohibited citrus plants from a mail order catalog. Action taken: Warning letter issued by the county agricultural commissioner

- Lack of inspection for cut flowers and altered Certificate of Quarantine Compliance. Action taken: Administrative fine through the county agricultural commissioner for \$1,500.00
- Seized 180 pounds of avocados no proof of ownership. Action taken: Warning letter issued by the county agricultural commissioner
- 1,000 pounds of avocados intercepted with no certification, proof of ownership or origin. Proof of ownership provided and avocados sent for certification. Action taken: None
- Prohibited movement of nursery stock from a glassy-winged sharpshooter (GWSS) infested county to non-infested county. Action taken: Administrative action by the county agricultural commissioner still pending
- Rejected container of irradiated guavas. Shipment lacked proper screening, identification stamps, and proper notification. Live “Q” rated pests were found. Action taken: Shipment rejected
- No proof of ownership or origin for 38 bundles of garlic stems. Action taken: Administrative fine through the county agricultural commissioner for \$750.00
- Shipment of infested nursery stock. Action taken: county agricultural commissioner is pursuing, civil action still pending
- Three seizures of tropical pitahaya totaling 63 pounds and on seizure of guava, 34 pounds. No proof of ownership or origin. Action taken: county agricultural commissioner issued a letter of warning
- Possible importation of uncertified citrus trees from South Africa. Action taken: Pending
- Facilitated USDA recall activities for Spanish clementines

## **ENVIRONMENTAL COMPLIANCE**

The Environmental Compliance Program exists to ensure that all PHPPS pest prevention programs are in compliance with all applicable environmental protection laws and regulations. It does this by:

- Keeping abreast of environmental mandates
- Preparing and/or reviewing scientific and legal documents
- Facilitating scientific debate of environmental issues
- Developing and defending environmental compliance strategies
- Representing PHPPS with other governmental agencies
- Advising PHPPS division on environmental compliance mandates

## **ACCOMPLISHMENTS**

- Managed the development of an Environmental Impact Report for the Pierce’s Disease Control Program. This process included review of all previous environmental analysis prepared by CDFA on exotic pest control, direct interaction with CDFA professional staff and review of new technical analysis prepared by staff, coordination with consultants, participation in a working group to compile the report and production of the final report.
- Participated in the preparation of an Environmental Assessment for the Curly Top Virus Control Program, including review of background material, site evaluation,

- development of support documentation, preparation of the final document and coordination of the final approval process with federal and state agencies.
- Participated in the preparation of a Water Monitoring Plan for the Hydrilla Eradication Program. This included analysis of recent legal decisions and review of previous environmental analysis similar to program treatment methods, such as the use of Fluoridone and copper in lakes. Participated in determining the requirements of the Regional Water Control Board permitting process for the Program.
  - Began the environmental compliance process for the Red Imported Fire Ant Control Program, including interaction with project management, background review, and preliminary site evaluation.
  - Reviewed and commented on, when needed, other environmental documents of concern to the Department and Division, including environmental impact reports for the proposed UC California Merced campus and adjoining campus community, proposals involving agricultural issues in Sacramento and Plumas counties and the Sacramento Delta and federal projects including the Fruit Fly Cooperative Program and Rangeland Insect Pest Suppression Program.
  - Represented the Department and Division at meetings with other agencies regarding requirements for environmental compliance and permits, policy on agricultural land and water quality issues.
  - Provided information about environmental compliance and environmental law to individuals and groups in the Division.

## **PLANT PEST DIAGNOSTICS BRANCH**

The Plant Pest Diagnostics Branch (PPDD) plays a critical scientific support role for the Division and indeed the entire Department. Core activities support all pest prevention activities and include nursery regulatory and plant registration and certification; seed regulatory programs; the agricultural industry and general public. Scientific support services provided currently include diagnostics, scientific consultation, and training. The timely and accurate identification of plant pests is the cornerstone of the Department's pest prevention system.

The primary mission of the Plant Pest Diagnostics Branch (PPDB) is to provide timely and accurate diagnostics in support of the CDFA pest prevention programs. The Branch also serves as a scientific resource for a number of clients in addition to CDFA, including the USDA, other federal and state agencies, county agricultural commissioners, University of California Cooperative Extension, the agricultural industry, and the public. The scientific and technical staffs contribute to global scientific knowledge in plant pest diagnostics and biosystematics.

The PPDB's clientele is diverse including departmental program managers and supervisors; agricultural commissioners and their staffs; the USDA; other state and federal agencies both within and outside of California; universities, colleges and museums; agricultural producers and exporters; and private citizens. The PPDB provides the information required by our clients to make regulatory, detection and delimitation trapping, survey, eradication, treatment, and other major business decisions.

It accomplishes this by:

- Providing timely and accurate plant pest diagnostics
- Acting as sole source of official identification determinations for regulatory action
- Consulting on pest issues (etiology, epidemiology, and pest risk analysis)
- Providing scientific education, training, and outreach
- Providing a key link to world experts in diagnostics
- Conducting and publishing research on pest and disease etiology, diagnostics, taxonomy, and methodology
- Data Collection/Information analysis and dissemination

**Mission:** *To serve as an official scientific resource, providing timely and accurate plant pest diagnostics, quality control services, and professional expertise to our clients.*

**Vision:** We will continually enhance our professional expertise as an internationally recognized service and research center committed to meeting future plant pest science challenges and client needs.

**Core 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, honesty, and the constructive exchange of ideas
- **Empowerment** through an organizational culture that promotes delegation of authority, creativity, and celebration of accomplishments
- **Mutual respect, cooperation and communication** through partnerships and teamwork

## ACCOMPLISHMENTS

The number of routine diagnostic samples processed in 2001 in the PPDB include:

Nematology	6,728
Plant Pathology	63,000 (with an additional 543,000 plum pox virus survey samples processed)
Entomology	42,354
Seed Sciences	4,304
Botany	2,817

**New staff.** A number of new scientists and technical personnel joined the staff of PPDB during 2001. These include Dr. Steve Gaimari (Diptera), Dr. Charles Bellamy (Coleoptera), Dr. Barry Hill (Pierce's Disease), Dr. Cheryl Blomquist (Oak Mortality Program), Dr. Tongyan Tian (Plant Virology), and technicians Joyce Tuttle (molecular lab), Sean Veling (entomology), Rene Luna (nematology), Constance Weiner (seed science), Johanna Naughton (botany), and Rajinder Randhawa and Terra Irving (plant pathology).

**Facility changes.** A major renovation project was initiated to adapt existing laboratory space to accommodate new molecular technology needs. PPDB has made a major commitment to expand molecular biological techniques to all levels of diagnostics in the five laboratories in the branch. As part of this commitment, new equipment and computer capabilities have also been added.

**Collections.** Secretary Bill Lyons formally dedicated the PPDB insect collection as the California Collection of Arthropods as proclaimed by the State Legislature to house California's official arthropod collection. This collection of approximately 1.8 million labeled specimens has an estimated value of over \$10 million. Other collections in the PPDB are also expanding with new additions. These include the literature collection (approximately 60,000 volumes), the plant herbarium (35,000 specimens), and the seed collection (over 50,000 specimens).

**Research.** Part of the ongoing mission of the branch is the research and publication of scientific papers by the professionals in the five laboratories. In the past year the scientific staff published 16 peer reviewed papers and eight non-peer reviewed publications on topics ranging from nematode, plant, and insect systematics to reports of new plant diseases to basic biology. Current projects include major revisions of Coleoptera taxonomy and complete descriptions of moths of Mexico. In addition, PPDB scientifics participated in a number of professional scientific meetings and symposia including the IXth International Symposium on Scale Insects held in Italy.

**Projects.** A number of new scientific endeavors were initiated in 2001 and are ongoing. These include:

- A pilot program to speed identification of insects intercepted at border stations using digital technology
- A new web-based system to track Plant Pest and Disease Reports and provide public access to diagnostic databases
- Development of molecular techniques to distinguish and identify leafhoppers
- Development of diagnostic techniques for identifying *Phytophthora ramorum*, the cause of sudden oak death disease
- A collaboration project with USDA's Animal and Plant Health Inspection Service (APHIS) to develop on-line seed keys for identification of federal noxious weeds
- Catalogue of non-native vascular plants occurring spontaneously in California beyond those addressed in the Jepson Manual

## PEST EXCLUSION BRANCH

The Pest Exclusion Branch prevents the artificial introduction of new and injurious plant pests into California. Pest exclusion aims to prevent the introduction of a pest into an area where it does not already occur or out of an area where legally established suppression or eradication activities are being conducted. The Branch does this by regulating and monitoring the movement of target pests that may be associated with vehicles, air, or maritime traffic, US Postal centers and private carriers, and hay and grain terminals.

**Mission:** *To serve the citizens of California by preventing the entry and spread of harmful plant 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:**

We Value:

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

Although not included within this section of the report, it is important to note here that a critical pest *exclusion* strategy is one that is known as the Mediterranean Fruit Fly Preventative Release Program. This program was developed in 1996 as a supplemental exclusion strategy to deal more effectively with the unrelenting invasions of Mediterranean fruit fly that had begun in 1987. The program cost of \$15 million is borne equally by the USDA and the State's general fund. Because the capability to carry out program activities are housed within the Pest Detection/Emergency Projects Branch, its accomplishments can be found within that part of this report beginning on page 37.

## **EXTERIOR PEST EXCLUSION PROGRAM**

The Exterior Program was established to mitigate the risk of actionable pest introductions via the entry of private and commercial vehicles at California's land borders. To accomplish this program staff enforces federal and state laws and plant quarantines to exclude pest introductions via the geographic land boundaries by:

- Performing *commercial vehicle* and *private vehicle* inspections to ensure quarantine compliance and to intercept any exotic pests
- Providing quarantine consultations
- Enforcing other government agency laws and regulations
- Assisting other agencies at the border stations regarding public safety services
- Collecting, analyzing, and disseminating data

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

Authority – California Food and Agricultural Code, Chapter 5, Article 3; Plant Quarantine Inspection Stations

**Vision:** To be an integral part of California's first line of defense in its pest prevention system. We enforce quarantine laws and regulations through the use of

the best available technology and biologically sound inspection methods at California's agricultural inspection stations.

**Values:**

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

**Goals:** To accomplish our mission by:

- Inspecting all 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; and
- Continuously striving to expand and improve our service to the citizens of California.

At its 16 border agricultural inspection stations, Exterior Pest Exclusion personnel enforce the Food and Agricultural Code, federal and state quarantines, and county enforcement policies. In addition, the program has cooperative working relationships with several other branches of the Department: Fruit and Vegetable Quality Control Standardization; Animal Health; Egg Quality Control; Feed, Fertilizer and Livestock Drugs; and Agricultural Statistics. It also cooperates with other federal and state agencies such as the US Department of Agriculture (USDA), US Forest Service, US Immigration and Naturalization Service, US Bureau of Land Management, California Public Utilities Commission, California Parks and Recreation, California Department of Fish and Game, California Water Resources Agency, California Department of Transportation, California's Department of Pesticide Regulation, California Board of Equalization, and the California Highway Patrol and other state departments of agriculture.

At the local level, border station personnel assist the county agricultural commissioners, county sheriff/city police, and fire departments. Staff provides information to the Arizona, Nevada, and Oregon departments of agriculture and the Oregon-Washington-Idaho Potato Commission, as well as assist with emergencies that arise at or in the vicinity of the stations. The [California Travel Ideas Map](#) and other public education materials are distributed to private and commercial vehicles entering the State.

## ACCOMPLISHMENTS

**Inspections.** The number of vehicles monitored at the California border agricultural inspection stations in the 2001 calendar year totaled 33,831,537, and included 26,092,307 automobiles, 6,929,861 commercial trucks, 767,285 recreational vehicles, and 42,084 commercial buses. These figures represent an eight percent increase in total traffic from last year.

Truck shipments of feed grain totaled 5,327. Of these, 4,473 were inspected and released, and 854 were sent to approved-mills under Warning-Hold Inspection Notices.

Truck shipments of hay totaled 41,147. Of these, 40,576 were inspected and released, and 571 were sent to approved-mills under Warning-Hold Inspection Notices.

There were 345,562 shipments of fruits, vegetables, nursery stock, seeds, and other items regulated by plant quarantines that entered the State in 2001. Of these, 312,039 were inspected and released, 25,642 were sent to destination for inspection by the county agricultural commissioners under Warning-Hold Inspection Notices, and 3,433 were permitted to transit through the state for export. There were 1,395 shipments rejected and returned out-of-state. A total of 48,114 shipments had origin certificates and 19,591 were accompanied with treatment certification.

**Plant materials intercepted.** There were 64,063 lots of prohibited plant material intercepted at the border inspection stations. These lots were either infested with plant pests or were not properly certified for entry into California.

**Samples submitted for identification.** A total of 3,534 samples were submitted to the Division's Plant Pest Diagnostics Branch for identification in 2001. These consisted of 2,922 insects, 61 root and soil samples suspected of containing nematodes, 11 suspect disease samples, and 265 weed seed samples. The following is a partial list of selected, serious pests confirmed by the laboratory:

gypsy moth	pecan weevil	vanda orchard scale
Mexican fruit fly	zebra mussel	musk thistle
western cherry fruit fly	burrowing nematode	halogeton
Mediterranean fruit fly	sweet potato weevil	diffuse knapweed
Imported fire ant	Japanese beetle	spotted knapweed
apple maggot	European corn borer	

**Animal rejections.** A total of 275 animal interceptions were made in accordance with Department of Fish and Game regulations. The following is a partial list of animals rejected:

ferret	monk parakeet	snapping turtle	African frog	marmoset
gerbil	prairie dog	wallaby	cougar	hedgehog

**Citrus inspections.** A total of 9,749 commercial shipments of citrus entered California in 2001 from locations such as the Bahamas, Mexico, Spain, Florida, Texas, and Arizona. From these shipments, border station personnel sampled 5,670 containers of fruit. There were 91 shipments rejected due to lack of proper certification.

**Mango inspections.** In 2001, a total of 7,151 hot-water treated commercial shipments of mangoes were permitted to enter California from Haiti, Mexico, and other Central and South American countries. From these, 40 shipments were rejected for various violations of the entry requirements--usually lack of proper certification. Border station personnel cut and inspected 18,419 containers of mangoes to ensure that the fruit was pest-free. Only dead fruit fly larvae were discovered.

**Cherry fruit fly origin sampling and certification.** Five states along with British Columbia, Canada participated in the 2001 Origin Sampling and Certification Program. A total of 1,596 commercial cherry shipments entered the State through the border stations under this program. Of these, 1,465 shipments were destined to California markets. The remainder was transiting the State for foreign export.

Border station personnel sampled all shipments entering California under special permit. There were 101 shipments that failed to meet these special permit requirements. Those shipments were either shipped out-of-state or released after the requirements were met. No shipments were rejected for live cherry fruit fly larvae at the border stations.

<b>Cherry Shipments Entering Under Special Permit</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>
British Columbia	0	0	0	0	0	4
Idaho	17	23	10	16	24	8
Montana	1	0	0	0	0	0
Oregon	92	304	410	161	207	228
Utah	0	0	12	0	6	1
Washington	720	1,244	1,793	651	1,172	1,355
<b>TOTALS</b>	<b>830</b>	<b>1,571</b>	<b>2,225</b>	<b>828</b>	<b>1,411</b>	<b>1,596</b>

### Commercial Cherry Shipments Converted to Pounds

	1996	1997	1998	1999	2000	2001
British Columbia	0	0	0	0	40,000	38,690
Idaho	25,935	330,656	301,000	279,684	684,710	145,360
Oregon	2,046,456	0	0	0	0	4,374,793
Montana	39,600	0	0	0	0	0
Utah	0	0	48,000	0	240,000	40,000
Washington	10,828,220	14,582,722	23,167,353	12,501,628	20,840,906	21,509,324
<b>TOTALS</b>	<b>12,940,211</b>	<b>20,260,456</b>	<b>30,113,447</b>	<b>15,858,687</b>	<b>26,336,725</b>	<b>26,108,167</b>

**Gypsy moth inspections.** Border station personnel issued 91 citations for lack of proper certification to drivers carrying high-risk gypsy moth shipments. A summary of activities is as follows:

Recreational Vehicles Entering California  
Queried Regarding Potential of Harboring Gypsy Moth

767,285

Confirmed Border Station  
Gypsy Moth Finds from RVs

29

Recreational Vehicles Determined to Require Physical  
Inspection for Gypsy Moth Live Stages

5,764

Warning Notices on  
Household Goods

3,789

**California Travel Ideas Magazine/Map.** Under an agreement with the California Department of Commerce's Division of Tourism, the border stations distributed 1.2 million California Travel Ideas Maps, which provides a detailed map of California as well as information on California's pest prevention system.

### INTERIOR PEST EXCLUSION PROGRAM

Interior Exclusion Biologists train and direct county agricultural commissioner staff in the enforcement of both state and federal plant quarantines and conduct second port-of-call (previously inspected by the USDA) maritime inspections. The county agricultural commissioners provide the staff necessary to perform inspections at many locations called terminal points within California. Interior Pest Exclusion biologists provide training to the county agricultural commissioners' staff in order to ensure uniform inspection procedures throughout the State. Operationally, the field staff is divided into three districts--northern, central and southern in order to best provide specific guidance and instruction at the local level. District headquarters offices are located in Sacramento, Fresno and Lemon Grove, respectively.

Interior Biologists work cooperatively with the USDA, other state departments of agriculture, and the State's county agricultural commissioners to accomplish the pest exclusion mission. The Interior Program staff members also cooperate with other governmental agencies such as the US Department of the Interior, US Customs Service, and the California departments of Fish and Game, Forestry and Fire Protection, Public Health, and Pesticide Regulation in the enforcement of their respective regulations.

Interior Exclusion Biologists enforce federal and state plant quarantine laws and regulations through five main activities:

- Providing training and direction to county agricultural commissioner staff
- Managing the Origin Inspection Program
- Directing the County High-Risk Exclusion Program
- Conducting quarantine response activities
- Providing commodity treatment support
- Conducting second port-of-call inspections at major maritime ports
- Providing export certification services

## ACCOMPLISHMENTS

### Regulatory Activities

**Pest Prevention University.** Recently, the Interior Program designed the Pest Prevention University which encompasses topics such as nematode sampling procedures, exotic fruit identification, procedures for parcel inspection and specialty market inspections, etc. Topics covered in each training session may vary for different regions of California with different training needs.

In 2001, 24 training sessions were held, and a total of 585 county inspectors were trained.

District	Sessions	Participants
Northern	8	98
Central	4	31
Southern	12	228

**Origin inspection.** The Origin Inspection Program is a cooperative program between CDFA and regulatory officials in other states to establish and maintain pre-inspection agreements with out-of-state shippers. Regulatory officials in other states certify that qualifying agricultural commodities (produced or inspected in the origin state) meet all of California's entry requirements. Agricultural commodities shipped to California under the Origin Inspection Program need not be held for inspection at the border stations or other terminal inspection locations within California. This program is an integral part of California's pest prevention system because it mitigates the pest risk at origin. Additionally, the program reduces the necessary quarantine inspection workload in California. Commodities currently covered under the Origin Inspection Program include fruits and vegetables, cut flowers and cut greens, canola pellets, bulbs, seed, and nursery stock.

There are 136 companies participating in the Origin Inspection Program. One new company entered into the program in 2001, and two companies that had been previously removed for non-compliance reentered. Four companies left the program in 2001 because they went out of business or for other reasons.

State/Country	OIP Participants
Arizona	1
Canada	2
Colorado	1
Hawaii	35
Mississippi	1
Nevada	1
New Mexico	1
Ohio	1
Oregon	63
Utah	1
Washington	29
<b>TOTAL</b>	<b>136</b>

### County High-Risk Pest Exclusion Program

The County High Risk Pest Exclusion Program (CHRPEP) was established in December 1998 by urgency legislation to augment county terminal point inspections. 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 CDFA.

Under this program, county agricultural inspectors conduct inspection activities at terminal points and other high-risk entry points throughout California. Terminal points include airports, nurseries, US postal and private parcel facilities. Other high-risk entry points include specialty markets, swap meets and flea markets, locations where household goods from gypsy moth infested areas were delivered, locations where material in post-entry quarantine is held, rail yards, and feed/seed mills.

**Inspections.** In 2001, a total of 123,150 terminal points and other high-risk entry points were visited, with a total of 770,205 shipments inspected.

ACTIVITY	PEST FINDS	REJECTIONS	PREMISE VISITS	SHIPMENTS
Post Office	60	503	9,337	64,640
United Parcel Service	52	1,202	13,904	82,989
Federal Express	333	1,691	17,267	293,402
Air Freight	574	558	25,967	39,403
Air Freight Forward	61	51	2,788	5,404
Gypsy Moth	48	83	2,196	2,034
Trucks (Plant Material)	369	450	17,076	91,067
Trucks (Other Material)	222	4,605	3,563	162,995
Specialty Markets	49	128	11,644	10,666
Swap Meets	5	14	2,662	2,667
Post Entry	0	0	135	113
Other High Risk	65	341	16,611	14,825
<b>TOTALS</b>	<b>1,838</b>	<b>9,626</b>	<b>123,150</b>	<b>770,205</b>

**Pest interceptions.** County inspectors intercepted a total of 1,841 significant pests through high-risk inspection activities.

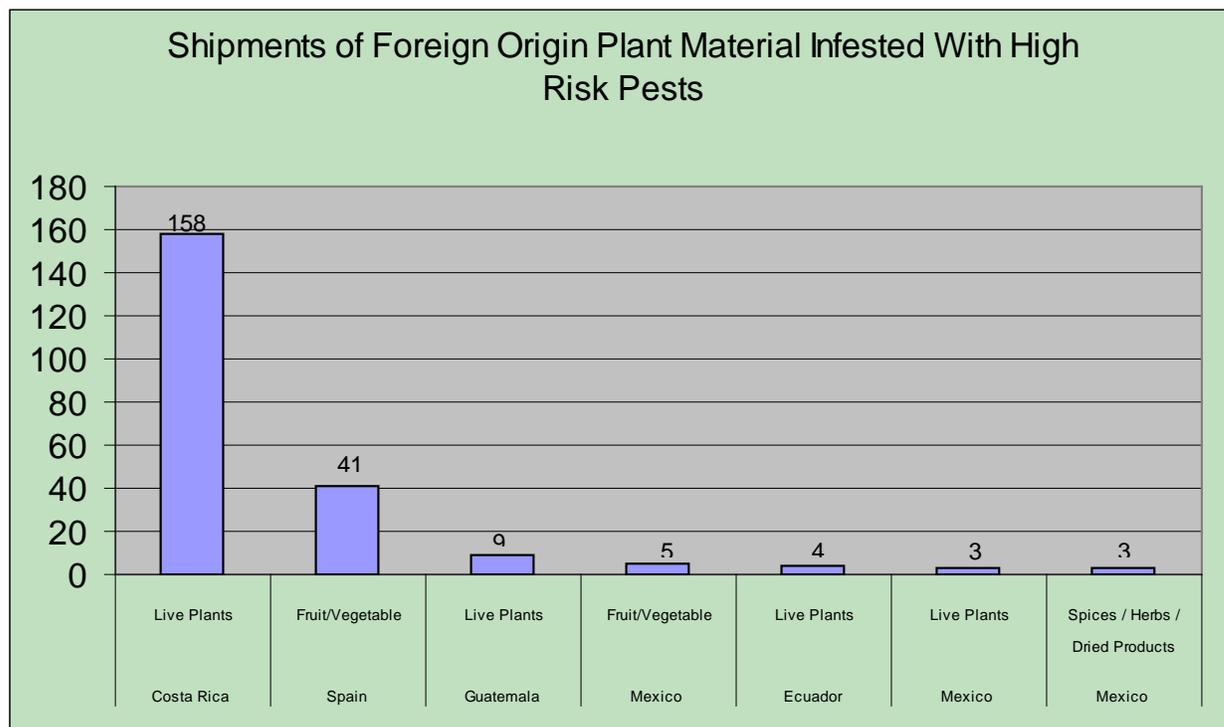
COUNTY	PEST FINDS	COUNTY	PEST FINDS	COUNTY	PEST FINDS
Los Angeles	444	Alameda	31	Tehama	6
San Mateo	331	San Luis Obispo	25	Marin	5
Stanislaus	205	Fresno	24	Yuba	4
Orange	152	Tulare	20	Inyo/Mono	3
San Joaquin	100	Sonoma	17	Mendocino	3
San Diego	79	Humboldt	16	Sutter	2
Sacramento	71	Santa Barbara	15	Calaveras	2
Shasta	59	San Bernardino	12	Ventura	2
Contra Costa	58	Kern	11	Monterey	2
San Francisco	46	Riverside	10	El Dorado/Alpine	1
Merced	35	Placer	10	Madera	1
Santa Clara	33	Yolo	6		

**Quarantine actionable interceptions.** County inspectors intercepted 602 “A”-rated pests and 1086 “Q”-rated pests. “A”- and “Q”-rated pests are subject to quarantine regulation and rejection when intercepted on incoming shipments.

A-RATED PESTS INTERCEPTED	No.	Q-RATED PESTS INTERCEPTED	No.
Scale – magnolia white, lesser snow, mining, green, boxwood, red wax, coconut, tropical palm, fig wax, white peach	334	Ants - big-headed, carpenter, longlegged, Florida carpenter and others	301
Beetle – Japanese, Asiatic garden, Colorado potato	98	Whiteflies – spiraling, croton, palm, anthurium	194
Fruit fly (Larvae) – Mediterranean, Caribbean, Oriental, melon	55	Leafhopper, planthopper, treehopper, grasshopper	150
Red imported fire ant	32	Aphids	93
Gypsy Moth	21	Moths – tent, noctuid, tiger, gracilariid, pyralid, cossid, sphinx	66
Green garden looper	13	Snails and slugs	55
Raspberry root gall wasp	10	Mealybugs – root, soil, club moss, palm, Mexican giant	54
Eastern tent caterpillar	10	Scales – unilobed, wax, armored, soft	53
Whitemarked tussock moth	7	Beetles – may, longhorned, scarab, bark, small hive, leaf, ambrosia, false powderpost	43
Thrips	7	Bugs, stink, spittle, plant, lygaeid, burrowing, seed, lygus	22
Weevil	7	Katydids	21
European chafer	3	Thrips	13
Burrowing nematode	2	Weevils	10
Sugarcane borer	1	Wasps	9
European corn borer	1	Nematodes – lesion and others	2
Giant African snail	1		

**Foreign-origin interceptions.** Plant material of foreign origin comprises a portion of the material rejected in the County High Risk Pest Exclusion Program. In 2001, a total of 583 shipments of foreign plant material were rejected.

MATERIAL	ORIGIN	SHIPMENTS REJECTED
Fruit/Vegetable	Spain, Puerto Rico, Chile, Belize, Thailand, Mexico, France, Korea, Japan	288
Live Plants	Costa Rica, Netherlands, Canada, Israel, Ecuador, South America, China	134
Cut/Dry Flowers	Ecuador, Columbia, Netherlands, Costa Rica, Malaysia, Israel	121
Spices/Herbs/Dried Products	Thailand, China, Ecuador, Israel, South America, Columbia, Dominican Republic	32
Miscellaneous	Taiwan, New Zealand, Laos, England, Israel	5
Meat Products	Spain, Mexico	3



### Quarantine Responses

In response to the detection of significant or economically important pest interceptions within California, the Interior Program coordinates quarantine and commodity treatment activities to prevent the further spread of the pests when quarantine breaches occur and in support of eradication and suppression activities. A summary of these activities conducted in 2001 follows.

**Spanish clementines.** In December, the US Department of Agriculture suspended the entry of Spanish clementines after the discovery of live, Mediterranean fruit fly larvae,

*Ceratitidis capitata*, in clementine tangerines being sold in retail markets in the eastern US. Interior and Exterior Pest Exclusion staff mobilized to close the border stations to Spanish clementines and to inspect all major wholesale and retail produce outlets, as well as small, locally-owned stores for any infested fruit. A statewide recall went into effect and more than 50,000 cartons of Spanish clementines were confiscated throughout the State. Fruit was collected and sampled and ultimately 209 (11 live, 198 dead) Mediterranean fruit fly larvae were detected from over 240,000 pounds of confiscated fruit taken from 38 counties. Live larvae were intercepted from Santa Clara, Riverside and San Diego counties. Confiscated fruit was either buried, frozen, sterilized, or, in three instances, allowed to be shipped back to the northeastern US.

**Chrysanthemum white rust.** In December, during the annual county survey of chrysanthemum production areas, chrysanthemum white rust fungus (CWR) *Puccinia horiana*, a federal quarantine action pest, was detected in a nursery in Ventura County. In response, Interior Exclusion Biologists, county agricultural commissioners' staff, and the USDA conducted a survey of that 16-acre chrysanthemum nursery which resulted in several greenhouses being placed under quarantine. The chrysanthemum stock was subjected to an approved CWR treatment regime and had to undergo 100 percent inspection prior to movement.

All chrysanthemum nurseries in California known to have supplied plant material to the infested greenhouse were completely (100 percent) surveyed, as well as chrysanthemum nurseries in California known to have received material from the infested greenhouse. The USDA coordinated inspections in Florida in a nursery that supplied propagative material to the infested greenhouse. Results for all trace-forward and trace-back inspections were negative.

**Oak mortality disease control.** In May, the Oak Mortality Disease Control Program was initiated in order to control the artificial spread of *Phytophthora ramorum*, the causal agent of sudden oak death (SOD). State restrictions were placed on the movement of nursery stock, unprocessed wood, bark, firewood, and cut greens of fifteen different types of host plants from 10 counties: Alameda, Marin, Mendocino, Monterey, Napa, San Mateo, Santa Clara, Santa Cruz, Solano, and Sonoma. The Oak Mortality Disease Control Program was implemented as part of a comprehensive plan developed by the California Oak Mortality Task Force (COMTF) to address the multiple impacts of SOD. The COMTF, a multi-agency task force, has implemented a comprehensive and unified approach for research, management, regulation, education, and public policy. The CDFA is the lead agency for the COMTF Regulations Committee and also has a representative on the COMTF Executive Board.

During 2001, the Interior Program developed a compliance agreement for regulated entities (nurseries, compost facilities, tree-trimmers, etc) operating in the SOD regulated areas. The Interior staff also developed enforcement guidelines for use by the county agricultural commissioners. County work plans were developed by the Interior staff that designated specific areas of responsibility to different agencies in the regulated areas. Contracts with the agencies (US Forest Service, California Department of Forestry and Fire Protection, and the county agricultural commissioners) were developed.

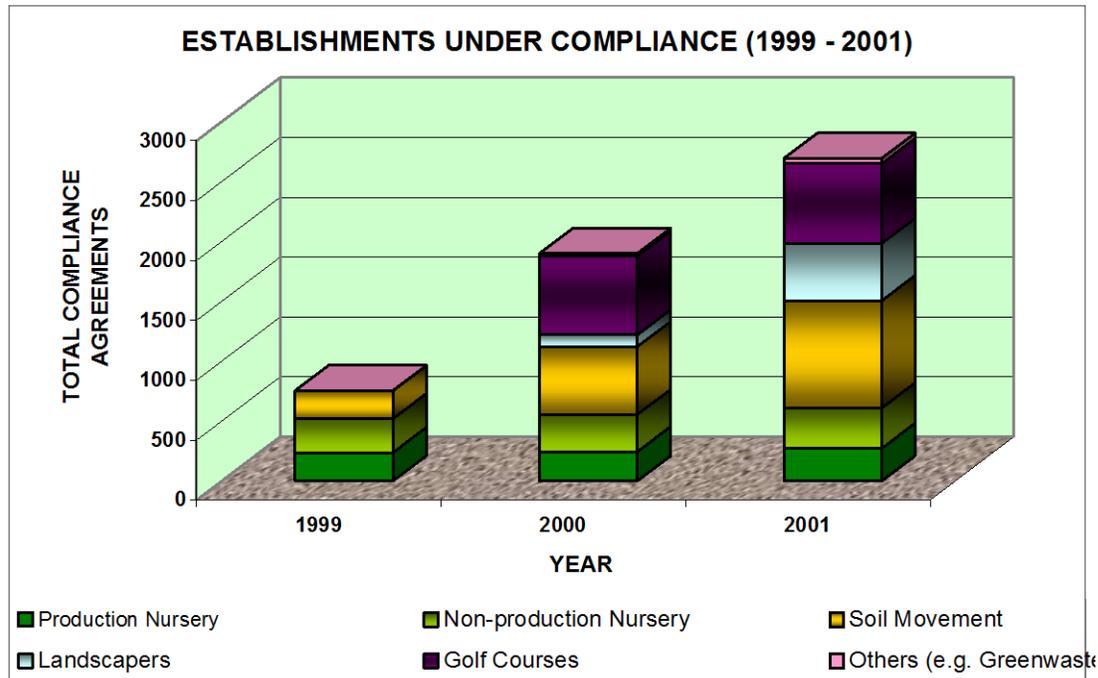
**Red Imported Fire Ant Program.** Following the detection of red imported fire ant (RIFA), *Solenopsis invicta* (Buren), in Orange, Riverside and Los Angeles counties in October 1998, CDFA established an interior quarantine for RIFA encompassing all of

Orange and parts of Riverside and Los Angeles counties. In 2001, Interior Exclusion Biologists took regulatory action to contain small RIFA finds in Fresno, Kern, Los Angeles, Madera, Merced, Riverside, Sacramento, San Bernardino, San Diego, Santa Barbara and Stanislaus counties.

All commercial growers, businesses or individuals within the quarantine areas that grow, produce, propagate, handle, store, ship, transport or process regulated articles or commodities are monitored for RIFA under compliance agreements. Staff signed 793 compliance agreements in 2001, bringing the total establishments monitored to 2,694 (Figure 1).

The highest enforcement priority is compliance of production nurseries in order to ensure the movement of RIFA-free nursery stock. In 2001, 1,280 of 1,778 SPAM™ bait surveys (excluding 2,099 construction/swimming pool installation site inspections) were conducted in production nurseries. To ensure compliance, biologists inspect 100 percent of production nurseries inside the quarantine areas each quarter. In 2001, 51 nurseries were found infested with RIFA; 66 percent have completed the required treatments followed by four consecutive negative surveys, including one re-infested nursery. Twelve nurseries were treated for first-time RIFA infestations, and five RIFA re-infested nurseries continued treatment in 2001.

**Figure 1. Total Establishments under RIFA Compliance Agreements**



In addition, two golf courses completed treatment requirements and were found free of RIFA for four consecutive quarterly surveys. Eighteen other golf courses were confirmed to be infested with RIFA and began treatment programs. A total of 12 soil-movement related sites tested positive for RIFA and were treated.

The Arizona Department of Agriculture (ADA) and CDFA continue to operate under a master permit agreement to facilitate the movement of nursery stock from California to Arizona. There are 17 nurseries (approximately 1,178 acres) that participate under the terms of this master permit. One nursery was suspended from the master permit program last year when it was found infested with RIFA.

### **Commodity Treatment Program**

Although housed within the Interior Program of the Pest Exclusion Branch, the Commodity Treatment Program ensures that the pest prevention program has adequate treatment tools and is in compliance with all applicable pesticide laws and regulations. This function serves Pest Exclusion, Pest Detection/Emergency Projects, and the Pierce's Disease Control Program by:

- Developing and maintaining necessary pesticide registrations (third party) for various programs
- Advising programs on commodity treatment options and pesticide label availability
- Maintaining and updating the commodity treatment manual
- Evaluating alternate commodity treatment options
- Working with research, industry, USDA, DPR, and other stakeholders to identify new treatment candidates
- Facilitating new registrations (first party)
- Providing consultation services on commodity treatment to stakeholders
- Acting as a liaison with field staff and industry to identify treatment needs

The majority of consultation is provided to CDFA field staff and county agricultural commissioner staff throughout the State to facilitate the safe and appropriate treatment of quarantined commodities.

### **ACCOMPLISHMENTS**

In addition to its regular consultation and analyses in 2001, the program staff facilitated achievement of the following:

- Section 18 registration for Spinosad for certain eradication treatment applications against several tephritid fruit fly species
- Special Local Need registration for the insecticidal soap, M-Pede, for use against Africanized honeybee
- Re-registration of diazinon to comply with requirements found within the Food Quality Protection Act

### **Port Activities**

Interior Exclusion Biologists conduct inspections at the maritime ports of Los Angeles/Long Beach and San Francisco/Oakland on second port-of-call foreign and domestic vessels, crew quarters, passenger baggage, and cargo shipments. They enforce aircraft and vessel garbage regulations; issue permits to remove food stores from vessels, seal vessel stores where high pest-risk food items are contained on board to prevent crew members from taking these food items ashore while on leave; and

monitor shipments of commodities transiting California to foreign destinations. Port staff also issue and administer compliance agreements for aircraft owners/operators, catering facilities, vessel dry docks, and vessel/aircraft garbage handling facilities and monitor these activities as needed. They supervise treatments of commodities that are found to be infested with quarantine pests. In the performance of their duties, port staff work closely with other agencies, both public and private, including the US Customs, USDA, US Food and Drug Administration, CDFA's Animal Health Branch, the county agricultural commissioners, agricultural officials of other states, plus representatives from the trucking, airline, and shipping industries.

Activities	San Francisco/Oakland	Los Angeles/Long Beach	TOTALS
Warning/Hold Notice Issued by Port Inspector	51	730	<b>781</b>
Storage Facility Inspections	15	25	<b>40</b>
Export Transit Shipments	153	572	<b>725</b>
Port Operations Coordination Contacts	1,450	1,350	<b>2,800</b>
Vessel Stores Sealed	4	11	<b>15</b>
Africanized Bee Trapped	0	0	<b>0</b>
Gypsy Moth Trapped	0	0	<b>0</b>
Steamship Line Manifests Read	56	189	<b>245</b>
Lumber Shipments Inspected	4	21	<b>25</b>
Hawaiian Vehicles Inspected	400	0	<b>400</b>
Dunnage	31	25	<b>56</b>
Biotechnology/Soil Labs	19	0	<b>19</b>
Ethnic Markets (Cooperation with Counties)	65	110	<b>175</b>

**Vessel inspections.** In 2001, a total of 1,095 shipments were inspected on 110 vessels arriving at major California seaports. A total of 69 pests were intercepted and 119 shipments were rejected. A total of 57 rejected shipments were treated under CDFA supervision and released. These rejected shipments originated from foreign countries and Hawaii for quarantine violations or the presence of prohibited pests.

Types of pests intercepted include: *Dasineura mali* (apple leaf-curling midge) on apples from New Zealand, *Sinoxylon anale* (dunnage beetle) on tile from India, *Sinoxylon conigerum* (false powderpost beetle) on wooden crates from Asia, and armored scale on bananas from Ecuador and Guatemala.

Port Area	Vessels	Shipments	Rejections	Total Pest Interceptions	Treatments Supervised
San Francisco/Oakland	45	560	44	14	5
Los Angeles/Long Beach	65	535	75	55	52
<b>TOTALS</b>	<b>110</b>	<b>1,095</b>	<b>119</b>	<b>69</b>	<b>57</b>

### Phytosanitary Export Certification Program

Certification of agricultural products for export is a service provided by the Interior Program to industry to verify compliance with plant quarantine requirements of importing countries and other states, and to ensure compliance with interior quarantine regulations. The USDA is the federal agency responsible for the overall nationwide implementation of the international phytosanitary certification program. Interior Exclusion Biologists work closely with industry, federal, state and county personnel to coordinate certification activities and provide training to county agricultural commissioners' staff on the issuance of both federal phytosanitary and state quarantine compliance certificates.

In 2001, a total of 194,224 certificates were issued and a total of 154,573 inspections were performed.

County Certification Activities		
Type of Certificate	Inspections	Certificates Issued
Federal Phytos	101,669	127,422
State Phytos	8,737	12,126
Compliance Certificates	21,422	45,372
Quick Decline Permits	3,509	3,340
Compliance Agreements	4,102	843
Others	15,134	5,121
<b>TOTALS</b>	<b>154,573</b>	<b>194,224</b>

**Phytosanitary training.** In cooperation with the USDA, the Interior Program staff conducts phytosanitary training of new county biologists and phytosanitary refresher courses for current county biologists. A total of 36 new county inspectors were trained and 128 county biologists attended refresher courses statewide.

**Phytosanitary seed field inspection.** The export certification program includes phytosanitary seed field inspections. These inspections are conducted during the growing season for diseases of concern to importing countries. Growers in California submit applications to the Pest Exclusion Branch each year to enter their crops into this inspection program in anticipation of foreign export following harvest. In 2001, a total of

2,560 applications for crop inspections were received. The following tables indicate the top five counties of origin and the top five crops entered into the Phytosanitary Seed Field Inspection Program (PSFIP).

Top Five Counties of Origin	
Yolo	363 applications
Colusa	361 applications
Fresno	281 applications
Imperial	231 applications
Monterey	277 applications

Top Five Crops in the PSFIP	
Beans	299
Watermelon	234
Alfalfa	224
Onion	210
Sunflower	206

## NURSERY, SEED, AND COTTON PROGRAMS

### Nursery Program

The nursery program fulfills two separate roles. The first is to coordinate nursery inspection and regulatory activities performed by the county agricultural commissioners. The second is to provide the agricultural industry with registration and certification services for plant materials.

California's nursery program was established to ensure the movement of quality, pest-free nursery stock. It serves the nursery industry by:

- Licensing nurseries
- Administering contracts for nursery inspection
- Inspecting nurseries (under the Registration and Certification program)
- Training and oversight
- Registering and certifying nursery stock for farm planting.

**Mission:** *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.*

### ACCOMPLISHMENTS

**Nursery regulatory and inspection activities.** This function is financed primarily through nursery license and acreage fees. Nursery regulatory activities conducted by the county agricultural commissioner and their staffs 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 2001, there were 10,106 licensed sales locations with 775 production (growing grounds) locations. The county agricultural commissioners were contracted \$400,000 of the annual nursery license and acreage fees to conduct nursery inspection and regulatory activities.

**Registration and certification services for plant materials.** The California Food and Agricultural Code authorize CDFA to establish plant registration and certification programs. These programs are established by the California Code of Regulations and enforced by the Secretary. The registration and certification service is provided by CDFA staff and in close communication and cooperation with the county agricultural commissioners. The latter is essential because registered and certified nursery stock must also meet general nursery regulatory standards.

The registration and certification programs were developed at the request of various segments of the agricultural industry for the exclusion of specific plant pests which are not readily detected by ordinary inspections. Participation is voluntary. These programs are the result of close working relationships between the University of California, the USDA, and CDFA with the added support of the agricultural industry. Specific viruses, viroids, soil-borne pathogens, and nematodes are the targeted pests.

The criteria for establishing these programs are: 1) the need is established; 2) technical information is available; 3) a source of "clean" propagating stock has been established; and 4) methods to ensure the continued pest cleanliness of the stock are available.

California presently has eight registration and certification programs and a nematode certification program available for use by the various segments of the agricultural industry

**Table 1. Registration and Certification Programs**

PROGRAM	PLANTING TYPE (BLOCKS)	TARGET PEST	TESTING OR TREATMENT REQUIRED
Avocado Certification	Certified	<i>Phytophthora cinnamomi</i>	Hot water treatment of seed and soil fumigation
Avocado Registration	Registered tree and Increase block	Sun Blotch Viroid	Foundation tree index-testing for sun blotch viroid (UC)
Citrus Registration and Certification	Foundation, Increase and Certified	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, Registered, Certified, Increase, and seed	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 and Certified	Fanleaf, fleck, asteroid mosaic, leafroll, yellow vein (Tomato ring-spot), corky bark virus	Nematode sampling (CDFA)
Seed Garlic Certification	Increase and Certified	Stem and bulb nematode ( <i>Ditylenchus dipsaci</i> ) and white rot	Nematode sampling (CDFA)
Pome Fruit Tree Registration and Certification	Foundation, Mother, Increase and Certified	Various virus diseases	Index-testing (USDA & UC) fumigation
Strawberry Certification	Foundation, Increase, and 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	Plant-parasitic nematodes	Nematode sampling, fumigation supervision, and commodity treatment (COUNTY AGRICULTURAL COMMISSIONER & CDFA)

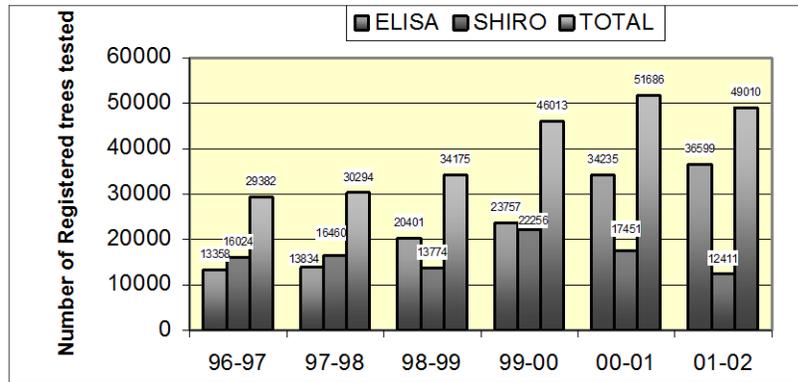
The primary tools developed for maintaining the pest cleanliness of the stock in these programs are: 1) biological indexing (use of indicator plants which exhibit symptoms of virus or virus-like diseases) and enzyme linked immunosorbent assay (ELISA); 2) soil treatment, sampling and laboratory techniques for the detection of nematodes; and 3) eradication treatments (thermotherapy, fumigation, and hot water treatments).

**Deciduous Fruit Tree, and Nut Tree Registration and Certification.** Legislation enacted in 1988, and renewed in 1998, provided for establishment of a fund from

revenue collected by an assessment of one percent on the sales of fruit tree, nut tree, and grapevine nursery stock produced in the State. This fund was established to provide support for the department's fruit tree, nut tree, and grapevine registration and certification programs, support development of virus-tested foundation planting stocks at the University of California, and support research and development of planting stock.

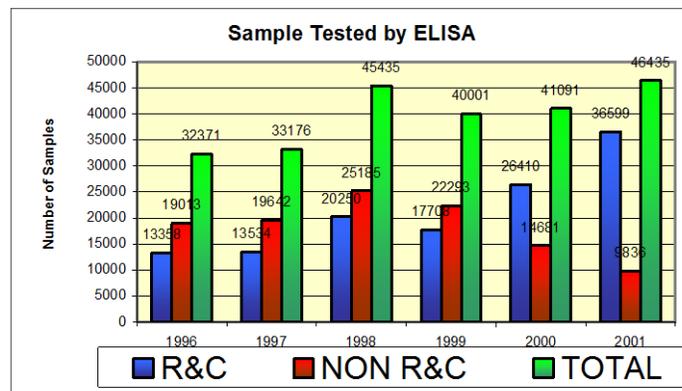
As part of the Registration and Certification program for fruit and nut trees, all trees in a registered mother block, registered scion block, as well as seed block, is tested for viruses annually. The testing for viruses may be done by indexing in Shirofugen cherry or by ELISA for *Prunus* necrotic ring-spot virus and prune dwarf virus. Trees are tested by indexing at least once every five years and by ELISA testing in the other four years. These tested trees may be used as a source of certified propagative material in the year following testing.

In 2001-02, there were 19 participating nurseries. The total number of registered trees tested in 2001-02 was 49,010 (36,599 by ELISA and 12,411 by Shirofugen indexing). This total is 2,676 trees less than the previous year (2000-01).



The total number of samples tested by ELISA was 46,435 (36,599 R&C and 9,836 non-R&C). This represents 5,344 more total samples tested by ELISA than the previous year. The non-R&C samples are tested as a service to the industry.

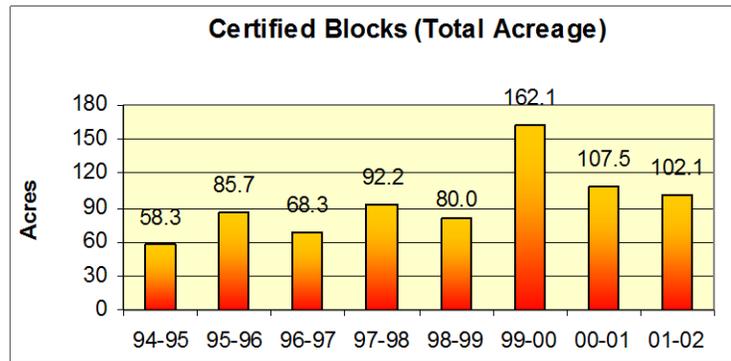
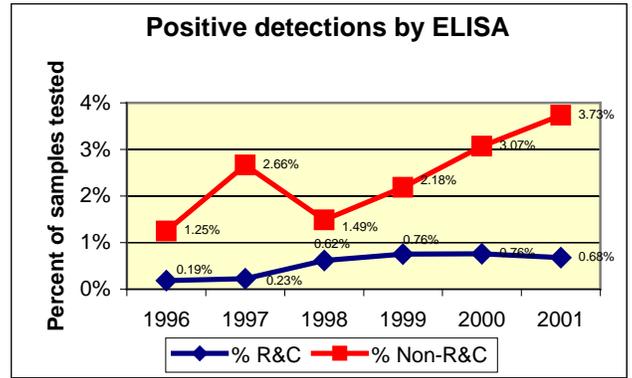
Of the total 46,435 samples tested by ELISA, 614 (1.32 percent) were positive for viruses. However, only 247 (0.67 percent) of the R&C samples were positive for viruses. Among the non-R&C samples, 367 (3.73 percent) were positive for viruses. Sixty-one samples (0.49 percent) tested positive for viruses by Shirofugen indexing.



**Positive Detections**

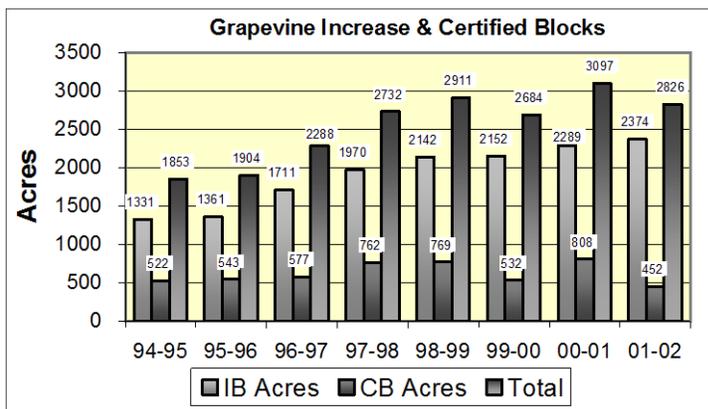
**R&C (Percent)      Non-R&C percent**

1996	0.19 percent	1.25 percent
1997	0.23 percent	2.66 percent
1998	0.62 percent	1.49 percent
1999	0.75 percent	2.18 percent
2000	0.76 percent	3.07 percent
2001	0.67 percent	3.73 percent



The certified nursery plantings acreage remained about the same as the previous year. In 2001-02, 102.06 acres were entered into the program for certification and were inspected by the CDFA nursery biologists. This is 5.44 acres (5.1 percent less than the previous year (2000-01)).

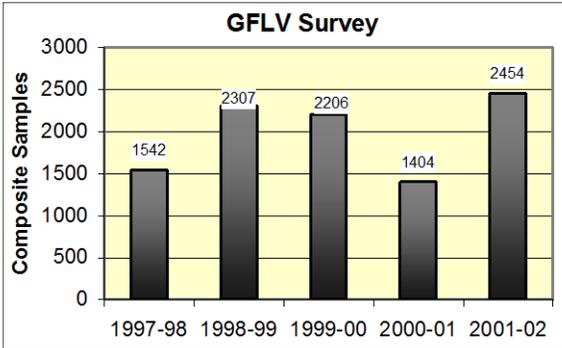
**Grapevine Registration and Certification.** There were 78 nurseries participating in the program. The acreage in the grapevine registration and certification increase blocks has been increasing steadily over the last few years. In 2001-02 there were 2,734 acres and two greenhouses of primary increase blocks. This is 445 acres (19.4 percent) more than last year. The acreage of grapevine certified blocks (nursery plantings) was 642 acres and three greenhouse blocks. This is a decrease of 166 acres (20.5 percent) from the previous year.



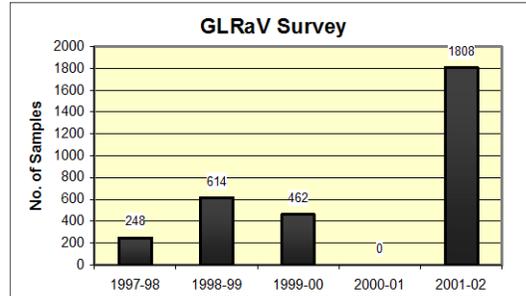
The nursery program has continued the survey for grapevine fan leaf virus (GFLV), and grapevine leafroll associated virus (GLRaV).

We collected and tested 2,454 composite samples (12,270 vines), a 74.7 percent increase from the previous year. Plants were selected randomly for testing. However, if plants with

grapevine fanleaf virus symptoms were seen, those plants were included in the survey. Of the total samples tested, two were positive for GFLV.



In 2001, 1808 vines were sampled and tested for (GLRaV). All the samples were negative for GLRaV.



**Citrus Registration and Certification.** In 1992 the California citrus nursery industry sponsored legislation to establish the California Citrus Nursery Advisory Board. This legislation was renewed in 2000 for a five-year period. Through a one percent assessment on citrus nursery stock produced and sold in the State, the Board funds research projects to improve the quality of citrus trees. The Board also sponsors educational programs to increase awareness of the citrus nursery industry and the important role it plays in the nursery industry.

In 2001, there were 33 citrus nurseries participating in the program. 2,243 citrus seed and scion trees were sampled and tested for tristeza and other viroids. The assessment for 2001 was set at zero percent (no assessment) due to sufficient reserve in the budget.

**Strawberry Plant Registration and Certification.** There were 11 participating nurseries in 2001 with 3,044 foundation plants that were biologically indexed by nursery program staff in the greenhouse at Meadowview Road. 623 registered and certified acres were inspected and 810 nematode samples were collected.

### Seed Services Program

The Seed Services Program was established to provide for the orderly marketing of seed by ensuring seed quality, including freedom from noxious weed contamination and to provide a timely and inexpensive alternative to litigation of seed disputes. It does this by enforcing both California and federal seed laws and regulations while:

- Providing training and consulting services to labelers
- Providing dispute resolution of seed complaints
- Providing contract oversight for the seed biotechnology center
- Acting as a conduit between the Seed Advisory Board and the Department

The value of seed sold for planting in California exceeded \$317 million in 2001, which is 6 percent less than the all-time high of \$337 million in 2000. The total number of firms

registered to sell seed in California decreased to 391. Company consolidations are the primary reason why the number of registrants has decreased.

Seed Services administers the State's seed law enforcement program that is funded entirely through an annual assessment on the value of seed sold in California by seed labelers and others. The county agricultural commissioners enforce the program requirements. The CDFA staff evaluates seed enforcement workload, provides information, assistance and training on the program to the counties. Additionally, the CDFA staff works with the seed industry to determine the effectiveness of the program and interacts with other states, the USDA, and the California Crop Improvement Association (the State's seed certification body). An advisory board of nine seed industry members and two public members provides oversight of the program.

Program expenditures for the year were \$966,418, up twenty-five percent over the previous year. The increase was due to the \$150,000 provided as a research contract to fund the new Seed Biotechnology Center at the University of California in Davis. The center has wide support in the seed industry and the contract was recommended and approved by the Seed Advisory Board. Other significant program expenditures were the 50 percent funding of the Seed Laboratory (\$278,878) and the county agricultural commissioners (\$120,000). To fully fund the new seed biotechnology research contract, the Seed Advisory Board recommended that the assessment rate be increased from \$0.20 to \$0.25 per hundred dollars gross annual sales in California for the reporting period.

Subvention of county agricultural commissioners for enforcement of the California Seed Law remains at the maximum of \$120,000 annually, as provided by law. The voluntary program has established annual performance measures as the basis for funding county seed law enforcement workload. By contract, the commissioners have to maintain an 85 percent compliance level of all seed offered for sale or labeled in their respective counties. The performance measures, which were introduced in 1999, resulted in a substantial increase in the number of official samples collected. In 2001, county personnel collected 1,054 official samples for analysis of seed lots being offered for sale. This is 25 percent more than 1998 and almost double the number of samples collected in 1997. In addition, a total of 102 "stop-sale" orders were written on 327,089 lbs. of seed in violation. A majority (49) of the "stop-sale" orders were placed on vegetable seed that was "out of date" at the time of inspection.

## **ACCOMPLISHMENTS**

**TEAM SEED.** Program staff continued to promote TEAM SEED activities. The TEAM SEED concept developed in 1997 recognizes the many groups, which play a vital role in providing the highest quality seed to California agriculture and the public. As part of this effort, six workshops were presented by staff from Seed Services, the State Seed Laboratory, and the California Crop Improvement Association. Workshop participants included 63 county staff from 22 counties and 31 representatives from 20 seed companies. The workshops provide county personnel training on enforcement of the California Seed Law while providing valuable training to the industry on labeling requirements and on the county's role.

In addition to enforcement activities, the California Seed Law provides an alternative dispute resolution procedure to assist farmers and labelers to settle disputes through

conciliation or mediation when seed planted in California fails to perform as represented. Last year, two complaints were investigated and reviewed by appointed investigative committees. In both cases, the disputing parties were unable to resolve their differences; one mediation hearing was conducted but without settlement. In addition, seven complaints were filed during the year which were investigated by field staff. Four of the complaints have been resolved through conciliation (withdrawal or settlement). The remaining three disputes are pending further investigation, grow-out tests, and appointment of Investigational Committees. Except for an initial filing fee, the cost of procedures is borne by the program. These procedures provide an economical alternative to litigation when the dispute can be resolved, and are a mandatory prerequisite to pursuing the matter in court.

## **Quality Cotton Program**

The Quality Cotton Program was established to ensure quality, uniformity, and marketable cotton for premium price and to prevent the introduction of bacterial blight of cotton into the protected area. It does this by 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 a 40-member San Joaquin Valley Cotton Board composed of cotton growers, cotton industry representatives, and public members. Cotton grower and industry members are elected by their peers. One of the Board's major duties is to establish quality standards for San Joaquin Valley Acala and Pima varieties. To accomplish this, the Board has an extensive multi-location variety testing program. The Board meets at least five times a year to review the progress of its variety-testing program and determines which new varieties meet or exceed existing quality standards and are superior in some meaningful respect, such as improved yield or resistance to disease. The exceptional quality and yield of the cottons in the District are a reflection of the Board's sound decisions. Throughout the year, numerous Board committees examine major cotton issues in order to make well-researched recommendations to the full Board. Enforcement activities include:

- Requiring specific labeling of non-approved cotton varieties
- Approving new and improved varieties for quality cotton district
- Tracking all cotton seed delinted and sold in quality cotton district
- Administering contracts with growers and the University of California, Davis for variety approval
- Processing imported cotton seed samples for evidence of bacterial blight

This past year 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 even though the season got off to a rough start due to cool and wet weather in March and early April so a large amount of acreage had to be replanted. Cotton acreage overall was also lower due to an uncertain water supply and high energy costs. Favorable weather conditions for the remainder of the growing season and manageable insect pressure resulted in exceptional yields for 2001. The USDA estimated that Upland cotton yields (including Acala) averaged a near record setting 1,361 pounds per acre; Pima yields were an amazing 1,300 pounds per acre, nearly 8 percent above 2000. Acreage of Upland cotton decreased to 601,000, 18 percent lower than 2000. However, acreage of Pima cotton increased significantly to 229,000, nearly 63 percent higher than 2000.

The year 2001 is the third 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 CDFA with the responsibility of adopting regulations to ensure that the growing of non-approved varieties does not adversely affect the quality of Acala and Pima approved by the Board. Regulations to implement this law were developed by CDFA in conjunction with the cotton industry. Program personnel are responsible for enforcing these regulations. Also added to the law was the authority allowing the Secretary to increase the district assessment to meet additional regulatory costs of enforcement.

## **ACCOMPLISHMENTS**

In 2001, approximately 80,597 acres of non-approved varieties were harvested in the District. This is significantly less than the 216,000 acres that were planted in 2000. The non-approved cotton was marked at harvest and ginning with tags supplied by the CDFA with one of the following designations: California Pima, California Upland, or SJV (San Joaquin Valley) Experimental. Non-approved acreage is projected to decrease slightly in 2002 due to: 1) the shift of three experimental varieties to approved status; and 2) the increased market demand for high quality approved cotton lint.

There was considerable interest on the part of researchers to develop new cotton varieties in 2001. Twelve cotton breeders received approval by the Board this past year to conduct research on non-approved cotton in the District. Genetically-enhanced varieties were widely grown in researcher's test plots and for seed increases. Program staff supervised the monitoring and planting, harvesting, ginning, delinting, and marketing of all of the experimental cotton. After extensive testing by private breeders and the Board, three Acala and two Pima cultivars were approved for commercial release in 2001, increasing the number of approved cotton varieties to 51 that are available to area cotton growers.

In 2001, the Secretary set the assessment rates, as recommended by the Board, at \$3.75 per hundredweight of undelinted approved seed and at \$5.50 per hundredweight of undelinted, non-approved seed for commercial planting 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/EMERGENCY PROJECTS BRANCH

The Pest Detection/Emergency Projects Branch detects and eradicates new infestations of exotic and harmful plant pests. The Branch manages an exotic insect pest trapping program that deploys close to 108,000 traps statewide during peak summer months. It has conducted over 60 successful eradication projects in California against serious pests such as Mediterranean fruit fly, gypsy moth, and Japanese beetle.

## MEDITERRANEAN FRUIT FLY PREVENTATIVE RELEASE PROGRAM (PRP)

The Medfly (Mediterranean fruit fly) Preventative Release Program (PRP) was designed to prevent the establishment of wild Mediterranean fruit flies in the Los Angeles Basin, through aerial release of millions of sterile Mediterranean fruit flies. The following is done weekly:

- Releasing 62,500 sterile male Mediterranean fruit flies per square mile over 2,250 square miles
- Releasing 100,000 temperature sensitive lethal male Mediterranean fruit flies per square mile over 250 square miles

Since its implementation, no wild Mediterranean fruit flies were detected in the Los Angeles Basin between July 10, 1994 and September 25, 1997. In 1997 and again in 2001, very small Mediterranean fruit fly infestations were discovered and quickly eradicated within the PRP release area by increasing the sterile release levels around those infested areas to eradication levels for a period of two fruit fly life cycles. In 1998, a single mated female Mediterranean fruit fly was trapped, while in 1999 two wild Mediterranean fruit flies were found in the PRP area. In these situations, no additional flies were trapped and sterile release levels are once again at the preventative release rate.

Although no wild Mediterranean fruit flies were trapped in California in 2000, in November 2000, the PRP expanded the size of the sterile release area into adjacent areas of southern Orange County and the Lake Elsinore Valley portion of Riverside County to encompass areas where infestations of Mediterranean fruit fly had been detected in 1998, just outside of the PRP at that time.

The PRP has led to a reduction in the number of wild Mediterranean fruit flies caught in the treated area by 96 percent and the number of Mediterranean fruit fly infestations by over 97 percent. The PRP has also reduced public anxiety about State-run eradication programs and the attendant pesticide use. It is clear that the basinwide preventative sterile Mediterranean fruit fly releases are biologically efficacious, environmentally sound, and cost-effective in protecting California.

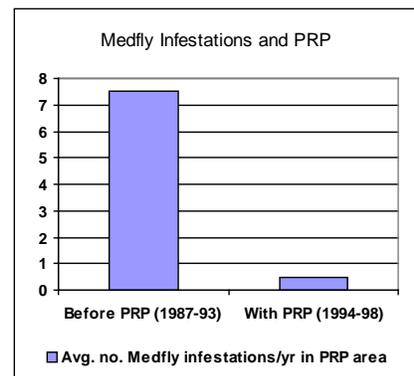


Figure 4. Note: The PRP officially began July 1996 but was preceded by a similar basinwide sterile release program that began in 1994.

## **PEST DETECTION PROGRAM**

We define “pest detection” as the systematic search for pests outside of known infested areas and pests not known to occur in California. It is our intent to detect incipient infestations of new pests before eradication becomes biologically or economically infeasible. This program is operated as a cooperative effort between CDFA, the county agricultural commissioners, and the USDA. All three agencies participate in the planning, evaluating, scheduling, and training.

During 2001, the detection trapping program intercepted 667 specimens of six different fruit fly species. The large number is due primarily to the 526 olive fruit flies that were detected this year (see Table 1).

**Table 1: Exotic Fruit Flies Detected in California During 2001**

PEST (Fruit Fly)	COUNTY	NUMBER FOUND	TOTAL BY SPECIES
Guava Fruit Fly	Los Angeles	8	15
	Riverside	1	
	San Diego	2	
	Santa Clara	4	
Mediterranean Fruit Fly	Los Angeles	2	2
Mexican Fruit Fly	Los Angeles	4	7
	Orange	2	
	San Diego	1	
Olive Fruit Fly	Alameda	20	526
	Butte	8	
	Calaveras	22	
	Contra Costa	52	
	Fresno	17	
	Glenn	6	
	Imperial	14	
	Kern	17	
	Kings	26	
	Madera	4	
	Marin	8	
	Merced	1	
	Monterey	1	
	Napa	6	
	San Benito	3	
	San Bernardino	2	
	San Luis Obispo	1	
	San Mateo	4	
	Santa Clara	243	
	Santa Cruz	1	
Sonoma	6		
Tehama	29		
Tulare	35		
Oriental Fruit Fly	Contra Costa	3	110
	Los Angeles	10	
	Marin	1	
	Orange	7	
	San Bernardino	68	
	San Diego	20	
	Santa Clara	1	
Peach Fruit Fly	Riverside	3	7
	Santa Clara	4	
<b>TOTAL</b>			<b>667</b>

**Olive Fruit Fly.** Olive fruit fly (OLFF) was initially detected in October 1998 in West Los Angeles, Los Angeles County. This find was the first record of this pest in the Americas. In 1999, the OLFF was detected in seven counties, primarily in Southern California (Santa Barbara, Los Angeles, Orange, San Diego, Riverside, and San Bernardino). One fly was found in Tulare County (Southern San Joaquin Valley). Expanded surveys in

2000 found OLFF widely distributed in the following counties: Tulare, Kern, Madera, Fresno (San Joaquin Valley), Alameda, Monterey, San Luis Obispo, Santa Clara (Coastal Counties), Sutter, Tehama, and Yuba (Northern Counties). The survey was continued in 2001, with first time finds in Calaveras (Foothill County), Glenn (Northern County), Imperial (Southern County), Santa Cruz, Sonoma, San Benito, and San Mateo (Coastal Counties). This represents a large and rapid expansion of the known infested areas within California (see Table 2).

The CDFA continues to work with commercial olive producers to implement olive management programs in California, modified from similar programs currently in use in Europe. During the 2001 season, CDFA funded trapping in five northern counties, where traps were placed at a rate of one trap per 40 acres of olives in production and processing areas. The CDFA will continue to support management research programs as funding allows.

**Table 2: 2001 Olive Fruit Fly Detections**

<b>County</b>	<b>Cities with Captures</b>	<b>Number of Finds</b>	<b>Number of Traps</b>
Alameda	3	20	0
Butte	1	8	200
Calaveras	6	22	28
Contra Costa	12	52	0
Fresno	5	17	0
Glenn	2	6	602
Imperial	3	14	0
Kern	1	17	0
Kings	2	26	58
Madera	1	4	0
Marin	1	8	5
Merced	1	1	6
Monterey	1	1	0
Napa	2	6	92
San Benito	2	3	6
San Bernardino	1	2	0
San Luis Obispo	1	1	0
San Mateo	2	4	0
Santa Clara	7	243	0
Santa Cruz	1	1	0
Sonoma	2	6	0
Tehama	3	29	481
Tulare	8	35	0
<b>TOTALS</b>		<b>526</b>	<b>1,478</b>

**Japanese Beetle.** The Japanese beetle (JB) is an insect that does not occur in California and that has a long history of being a serious pest of turf, crops and ornamental plants in the eastern US. First found in California in 1961, the Japanese beetle has been detected periodically since then. The first California infestation was

found in Sacramento in 1961 and eradicated. Since that time, two other infestations (1972 and 1983) have been delimited and successfully eradicated.

The Japanese beetle detection program has two major components: statewide trapping and aircraft detection. During 2001, over 11,000 JB traps were deployed throughout the urban and high-risk areas. The trap density for JB detection is two traps per square mile. There were 14 JBs trapped in the urban/residential area of the State during the 2001 season (see Table 3).

**Table 3: Japanese Beetles Detected in California in 2001**

COUNTY	CITY	BETTERLES TRAPPED	COMMENTS
Alameda	Oakland	1	Oakland International Airport, Fed Ex
Los Angeles	City of Industry	3	Airborne Express sorting facility
	Los Angeles	1	Airborne Express sorting facility
San Bernardino	Ontario	2	Residential, one mile from Ontario International Airport
San Diego	Mission Gorge	6	Airborne Express sorting facility
	Mira Mesa	1	Residential, 1.5 miles from Airborne Express sorting facility

On-board inspections of aircraft from high-risk areas of the eastern US resulted in the collection of 708 specimens (with 178 alive) from major airports. Large numbers of live and dead beetles were collected from Airborne Express and Fed Ex aircraft this year--due primarily to the very heavy JB populations at the Wilmington, Ohio Airborne Express hub and the Indianapolis, Indiana FedEx hub (see Table 4).

**Table 4: Number of Aircraft Inspected and Beetles Collected by Airport**

COUNTY	AIRPORT	AIRCRAFT INSPECTED	BETTERLES COLLECTED	
			DEAD	ALIVE
Alameda	Oakland International	278	78	15
Fresno	Fresno/Yosemite International	34	73	20
Los Angeles	Burbank	9	0	0
	Long Beach	99	65	16
	Los Angeles International	4,409	395	112
Yolo	Sacramento International	43	12	1
Sacramento	Mather Airport	49	48	0
San Bernardino	Ontario International	51	3	1
San Diego	San Diego International	1,286	238	7
San Mateo	San Francisco International	521	8	0
Santa Clara	San Jose International	553	112	16
	Moffett Federal Airfield	0	0	0
Solano	Travis AFB	27	8	0
<b>TOTALS</b>		<b>7,359</b>	<b>1,040</b>	<b>188</b>

## Disease Surveys

During 2000, no significant plant diseases were discovered through detection activities. The CDFA participated in several surveys, including citrus canker, Karnal bunt, plum pox, and citrus canker.

**Citrus Canker.** The statewide citrus canker survey for 2001 was conducted as a continuation of an annual survey, which targets twenty-five percent of the total citrus acreage present in the State on a rotation basis. This year, a total of 16 counties were surveyed. No citrus canker was found in California for 2001. The results for the 2001 survey are outlined in Table 5.

**Table 5: Citrus Canker Survey Results**

County	Acres Surveyed by Citrus Variety						Total Acres by County
	Orange	Grapefruit	Lemon	Tangelo	Mandarin	Various	
Butte	21				39		60.0
Fresno	1,352				23		1,375.0
Glenn	73				10	8	95.0
Imperial							453.0
Kern	1,003	80		20	20		1,123.0
Madera	547			26	24.5		597.5
Orange *							27.8
Placer					5	20	25.0
Riverside *							3,099.5
San Bernardino *							848.8
San Diego *							2,144.8
Santa Barbara *							743.7
Solano					12	4.25	16.25
Tulare	1,980						1,980.0
Yolo	5	22					27.0
Ventura	3,014	12	3,248				6,274.0
<b>TOTALS</b>							<b>18,890.35</b>

\* Individual citrus acreage breakdown for these counties will be available next year.

**Karnal Bunt.** The California portion of the Karnal Bunt National Survey was run according to the USDA protocol for CY 2000: those California counties producing one million bushels or more of wheat annually were to be surveyed. In California, there are 10 counties that meet this protocol: Colusa, Fresno, Imperial, Kern, Kings, Riverside, San Joaquin, Solano, Tulare, and Yolo. The results for the 2001 survey are outlined in Table 6.

**Table 6: Karnal Bunt Survey Results**

<b>County</b>	<b>Samples Required</b>	<b>Samples Taken</b>	<b>Confirmation</b>
Colusa	2	2	Negative
Solano	3	3	Negative
Yolo	3	3	Negative
Fresno	5	5	Negative
Kern	2	2	Negative
Kings	5	5	Negative
San Joaquin	2	2	Negative
Tulare	3	0	*
Imperial	6	6	Negative
Riverside	1	1	Negative
<b>TOTALS</b>	<b>32</b>	<b>29</b>	<b>All Negative</b>

\* No samples taken; harvested before survey implemented

**Plum Pox Virus Survey.** A plum pox survey was conducted in *Prunus* species greenhouse and growing areas throughout the State in 2001. Survey goals were to: 1) complete testing of stonefruit trees used as budwood sources for the production of nursery stock, 2) continue to survey orchards used as the source of budwood for the production of common nursery stock, 3) continue commercial orchard survey, and 4) identify and test high-risk plant material.

The survey was scheduled to run from April 1 through June 30. Because of unusually high temperatures in May and June, survey activities were occasionally paused and survey plans altered to adapt to the weather conditions (the virus is reported to be undetectable during periods of high temperature). Survey for plum pox virus was conducted in El Dorado, Fresno, Kern, Los Angeles, Merced, Placer, Solano, Stanislaus, Sutter, Tulare, and Yolo counties (see Table 7). All survey results for plum pox virus were negative for 2001.

**Table 7: Plum Pox Virus Survey Results**

COUNTY	VARIETIES	# OF SAMPLES	# OF TREES	RESULTS
El Dorado	Peach, Nectarine, Plum	1,638	3,276	Negative
Fresno	Peach, Nectarine, Plum	392	764	Negative
Kern	Peach, Nectarine	1,200	2,400	Negative
Los Angeles	Peach, Nectarine, Plum, Apricot	1,524	3,048	Negative
Merced	Peach, Nectarine, Plum, Almond, Cherry	4,493	8,986	Negative
Placer	Prune, Peach, Cherry, Plum, Almond	543	1,086	Negative
Solano	Peach, Apricot	2,039	4,078	Negative
Stanislaus	Peach, Nectarine, Plum, Almond, Apricot, Cherry	7,573	15,146	Negative
Sutter	Peach, Almond, Nectarine, Plum	4,402	8,804	Negative
Tulare	Peach, Nectarine, Plum, Almond, Apricot, Cherry	943	1,886	Negative
Yolo	Peach, Apricot, Almond, Nectarine, Cherry	1,446	2,892	Negative
<b>TOTALS</b>		<b>26,193</b>	<b>52,386</b>	<b>Negative</b>

**Africanized honeybee.** The Africanized honeybee (AHB) first migrated into California during 1994, arriving at Blythe, Riverside County. This year AHB found its way into Tulare County for the first time. The total number of California square miles colonized with AHB is 55,900--an increase of 4,860 square miles from last year. The AHB currently colonizes the entire Counties of Imperial, Riverside, San Diego, San Bernardino, Orange, Los Angeles, Kern, Tulare, Ventura, and portions of San Luis Obispo.

## **ERADICATION PROGRAMS**

We define “pest eradication” as the activities to exterminate a pest population from a defined area. CDFA has emergency action plans for a number of targeted pests. Emergency Projects develops operational plans for eradication under joint county and state, and federal cooperation where applicable and feasible.

**Peach Fruit Fly.** Peach fruit fly was first detected in California in 1985, in Los Angeles County. This detection led to the first in a series of successful eradication projects.

Two peach fruit fly eradication programs occurred in two counties during 2001. In Riverside County, an additional peach fruit fly was trapped in Palm Desert, expanding the treatment area to 13 miles. In Santa Clara County, an additional Peach fruit fly was trapped in San Jose, expanding the treatment area to 20 square miles. The treatment protocol for peach fruit fly specifies the male annihilation technique, utilizing a mixture of a pesticide (Dibrom), a lure (methyl eugenol), and a gelling agent (and Min-U-Gel), which is applied to utility poles and tree trunks at a rate of 600 bait stations per square mile. The Santa Clara County infestation has been eradicated, while the Riverside County program is ongoing, to be completed in early 2002.

**Table 8: 2001 Peach Fruit Fly Eradication Information**

County	City	Number Trapped	Last Find Date	Treatment Sq. Miles	Quarantine Sq. Miles	Eradicated
Riverside	Indian Wells	2	11/28/01	13	N/A	In Progress
Santa Clara	SantaClara/ San Jose	4	9/05/01	20	N/A	Yes

**Guava Fruit Fly.** The first Western Hemisphere infestation of guava fruit fly was detected in Garden Grove, Orange County, California in 1986. This and subsequent infestations have been successfully eradicated in the State.

Five guava fruit fly eradication programs were undertaken in Los Angeles, San Diego, and Santa Clara counties in 2001. The treatment protocol for guava fruit fly includes the standard male annihilation program. This program consists of the establishment of 600 bait stations per square mile. The male annihilation bait stations, small amounts of the pesticide/lure/gel mixture, are applied to utility poles and tree trunks along public roads. In Los Angeles County, additional guava fruit flies were trapped in Boyle Heights/Maywood, expanding the treatment area to 17 square miles. In San Jose, Santa Clara County, additional guava fruit fly finds brought the treatment area up to 34 square miles. All of these infestations have been eradicated.

**Table 9: 2001 Guava Fruit Fly Eradication Information**

County	City	Number Trapped	Last Find Date	Treatment Sq. Miles	Quarantine Sq. Miles	Eradicated
Los Angeles	Echo Park	2	6/15/01	9	N/A	Yes
	Long Beach	2	7/12/01	10	N/A	Yes
	BoyleHgts/Maywood	3	7/13/01	17	N/A	Yes
San Diego	San Diego	2	8/24/01	10	N/A	Yes
Santa Clara	San Jose	4	9/12/01	34	N/A	Yes

**Oriental Fruit Fly.** The Oriental fruit fly, first found in California in 1960, has been detected in the State every year since 1966. The first California outbreak occurred in San Diego in 1974, and since that time, numerous major infestations have been delimited and successfully eradicated.

Six Oriental fruit fly eradication programs occurred in six counties during 2001. In San Bernardino County, additional Oriental fruit flies were trapped in Ontario/Chino, expanding the treatment area to 23 square miles. A quarantine area of 59 square miles was established for this program, as the number of adult flies trapped met the quarantine trigger. In San Diego County, additional Oriental fruit flies were trapped in El Cajon/Spring Valley, expanding the treatment area to 34 square miles. A quarantine area of 67 square miles was established for this program. The treatment protocols were the standard Oriental Fruit Fly Male Annihilation Program. The Ontario program also incorporated malathion and protein bait applications in a 200 meter radius around a larva find site, as well as diazinon soil drench treatment within the drip line of host trees on the larva find property and adjacent properties. The following table provides additional details.

**Table 10: 2001 Oriental Fruit Fly Eradication Information**

County	City	Number Trapped	Last Find Date	Treatment Sq. Miles	Quarantine Sq. Miles	Eradicated
Contra Costa	Concord	3	7/20/01	9	N/A	Yes
Orange	Placentia	3	8/23/01	9	N/A	Yes
San Bernardino	Ontario/Chino	67	10/17/01	23	59	In Progress
San Diego	El Cajon/Spring Valley	5	11/02/01	28	67	In Progress
	San Diego	10	9/25/01	10	N/A	Yes
	Rancho Penasquitos	3	8/30/01	9	N/A	Yes

**Mediterranean Fruit Fly.** The Mediterranean fruit fly is widespread throughout Central and South America, Australia, Europe, and Africa. Its distribution in the US is restricted to the Hawaiian Islands, where it was discovered in 1910. This pest has been introduced into the State periodically since 1975. Several infestations have been eradicated successfully since that time.

A single, small Mediterranean fruit fly eradication program was undertaken in Hyde Park, Los Angeles County in 2001. The detection of two adult Mediterranean fruit flies triggered the program, which incorporated pesticide (malathion)/protein bait treatments within 200 meters of adult fly finds and pesticide (diazinon soil drench treatments within the drip line of host trees) on the larva find and adjacent properties. The release of sterile Mediterranean fruit flies was continued in the area, part of the Mediterranean Fruit Fly Preventative Release Program.

**Gypsy Moth.** The European gypsy moth is an exotic insect that has a long history of being a serious forest and urban pest in Europe and Eastern North America. The gypsy moth is currently the most destructive insect attacking hardwood forest and shade trees in the US. First trapped in California in the early 1970's, the gypsy moth has been detected every year since 1977. The first California infestation occurred in San Jose in 1977, and since then at least 19 localized infestations have been detected and successfully eradicated.

The eradication procedure for gypsy moth involves treating the foliage of susceptible hosts with an insecticide to kill the feeding caterpillars. Multiple treatments using the biological insecticide Bt (*Bacillus thuringiensis*) with ground or aerial application equipment are applied in the vicinity of gypsy moth finds. Using this technique, all infestations detected in California have been eradicated.

San Diego County Program. Single male moths were trapped in the Fallbrook area in 1998 and 1999. During this time, detection trapping was increased to delimitation levels, and egg mass surveys were conducted around each find site, all with negative results. In the summer of 2000, seven male moths were trapped within a one-month period, all in proximity to the 1998 and 1999 finds. Subsequent egg mass surveys detected viable gypsy moth egg masses on a single property. Additional properties adjacent to this site were surveyed with negative results.

Treatment activities took place over a 24-acre area which encompassed five properties. A total of eight treatments were performed using a Bt product from ground based hydraulic spray rigs. The viable egg masses found were used to help determine when applications were to be initiated.

Post-treatment monitoring using detection traps deployed at delimitation protocol levels detected a single moth within the treatment area during the 2001 trapping season. Additional treatments with Bt are planned for the 2002 season in a five acre focused area around the find site. Post-treatment monitoring will be done during the 2002 season.

Contra Costa County. In the summer of 2000, a total of 19 moths were trapped over a five-week period. An egg mass survey was conducted in the area, and a property purchased and occupied in January 2000 by a family from Connecticut was found to have hatched egg masses, cast skins, pupal cases, and a dead female from the 1999 gypsy moth season found in a birdhouse which had been placed on a fence at the back of the property.

An eradication program using Bt was undertaken during the spring of 2001. The treatment area consisted of approximately three square miles and included 195 properties and surrounding oak woodland. The terrain surrounding the homes rose from 400 feet to 1800 feet at the surrounding ridges. This varied terrain called for both ground treatment of the residential area and aerial treatment using a helicopter over the oak woodland area. A total of six ground and five aerial applications were made starting March 22, 2001 and ending May 22, 2001.

Post-treatment monitoring was done at protocol levels surrounding the treatment area during the 2001 season, with negative results. Additional post-treatment monitoring will be done during the 2002 season.

**Table 11: 2001 Gypsy Moth Finds**

COUNTY City	ADULTS TRAPPED		TOTAL ADULTS	PROPERTIES W/ VIABLE EGG MASSES/PUPAL CASES*
	DETECTION	QUARANTINE		
ALAMEDA Berkeley	1	0	1	N/A
MADERA Oakhurst	1	0	1	N/A
ORANGE Cypress	1	0	1	N/A
SAN DIEGO Fallbrook	1	0	1	Taken from treatment area where egg masses were found during the 2000 season
Oak Park	1	0	1	N/A
SISKIYOU Lava Beds National Park	1	0	1	N/A
<b>TOTALS</b>	<b>6</b>	<b>0</b>	<b>6</b>	<b>0</b>

## **RED IMPORTED FIRE ANT PROGRAM**

In 1997, red imported fire ant (RIFA) was discovered in an almond orchard in Kern County, having arrived there on a shipment of honeybees from Texas. During 1998, RIFA was found infesting large urban areas of Orange County. Subsequent surveys and public notifications discovered a major infestation in Southern California with Orange County as the major infested area. An interior quarantine was established to stop the artificial spread of the pest while allowing the nurseries in the infested areas to ship plants that were treated and certified free of this pest. Currently, all of Orange County (790 square miles), parts of Riverside County (67 square miles), and Los Angeles County (9 square miles) are under quarantine for RIFA.

Based on the RIFA Science Advisory Panel (RIFA SAP) recommendations and input from various stakeholders, the CDFA developed the California action plan to contain and eradicate this pest. The plan provides funding and direction for local agencies in Southern California to develop local RIFA survey, control, and treatment programs. The plan also includes statewide survey, public outreach, and quarantine enforcement of the infested areas and strengthened surveillance for RIFA at California's border inspection

stations. In the San Joaquin Valley counties, almond orchards are the primary infested sites. In that area, eradication activities are being undertaken by the CDFA.

Surveys are conducted both visually and by using SPAM™ bait. Granular bait treatments using a metabolic inhibitor (MI) such as AmdroPro® (hydramethylnon) and insect growth regulator (IGR) such as Distance® (pyriproxyfen) are the treatment methods of choice for RIFA.

During 2001, there was an overall 75 percent increase in the number of RIFA treatment locations in Southern California and a 68 percent decrease in the Central Valley (Table 12). While continuing surveys have discovered new sites infested with RIFA, by and large, the infestations are within the same generally infested areas. It should be noted that the percent increase in RIFA treatment locations is primarily due to the finding of new mounds within existing sites. New sites have been found in Los Angeles (140), Riverside (365), San Bernardino (11), San Diego (13), Merced (2) and Sacramento (1) counties.

**Table 12: 2000 and 2001 Red Imported Fire Ant Information**

<b>SOUTHERN CALIFORNIA</b>				
<b>County</b>	<b>Entity</b>	<b>Treated Sites</b>		<b>Remarks</b>
		<b>2000</b>	<b>2001</b>	
Los Angeles	County Ag. Dept.	253	393	New infested areas
Orange	Orange Co. Vector Control	8,895	11,000	New sites within generally infested areas
Riverside	Coachella Valley Vector Control	759	1,707	New sites within generally infested areas
	County Ag. Dept.	189	352	New infested areas
San Bernardino	County Ag. Dept.	35	46	Few new sites
San Diego	County Ag. Dept.	18	31	Few new sites
<b>SAN JOAQUIN VALLEY</b>				
Fresno	CDFA	8	4	No new sites
Kern	CDFA	4	0	No new sites
Madera	CDFA	2	2	No change
Merced	CDFA	0	2	Two new sites
Sacramento	CDFA	0	1	One new site/localized infestation
Stanislaus	CDFA	5	4	No new sites

# INTEGRATED PEST CONTROL BRANCH

The Integrated Pest Control Branch conducts a wide range of pest management and eradication projects as part of the Division of Plant Health and Pest Prevention Services Pest Prevention Program. Assessments and fees are collected for some program activities and services. The Branch cooperates with other California state agencies, federal and county agencies; research institutions; agricultural industries and other non-governmental organizations.

**Mission:** *We 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 diseases 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

## BIOLOGICAL CONTROL PROGRAM

The primary objective of the Biological Control Program is to implement biological control strategies by finding, introducing, distributing, and evaluating new natural enemies of insect and weed pests in California. The Biological Control Program is divided into two working groups: one for insect pests and one for weeds. Deliverables include; the number of appropriate new biocontrol species introduced and established, number of release sites for bioagents and bioagents released, and the number of training workshops and publications (annual report, brochures) produced.

## ACCOMPLISHMENTS

### Insect Pest Programs

**Silverleaf Whitefly.** Until recently, the silverleaf whitefly caused widespread damage to a variety of field and vegetable crops in Imperial and San Joaquin valleys. Over the last six years, growers in these regions have utilized highly specific insecticides. These insecticides, along with changes in cultural practices and the introduction of new parasites, have greatly reduced the problem. To date, six different species of exotic Aphelinidae (*Encarsia* and *Eretmocerus*) parasites have been reared and released by the CDFA in conjunction with the USDA's Animal and Plant Health Inspection Service

and the county agricultural commissioners in the Imperial and San Joaquin valleys. Crops receiving these parasites included melons, cotton and a variety of cole crops. The last releases of exotic parasites were in the summer of 2000. Post-release monitoring in 2001 showed that at least two species of exotic parasites are persisting and spreading in both the Imperial and San Joaquin valleys.

**Glassy-winged Sharpshooter.** A major effort was initiated in 2000 to import and establish new, exotic parasites of the glassy-winged sharpshooter. The first exotic egg parasite was released in the summer of 2000. Efforts in 2001 were directed at building up mass production of the parasites at two rearing locations, one in the Riverside area and a second near Bakersfield. Foreign exploration for additional natural enemies continues, as does research into rearing technology and efficacy of the released natural enemies.

**Lygus bug (western tarnished plant bug).** Lygus bug, *Lygus hesperus*, is a serious pest of cotton, strawberries, and most other crops in California. Field surveys showed that this pest lacks nymphal parasites. The USDA, Agricultural Research Service (ARS) successfully imported a nymphal parasite into the east coast of the US that was collected from a related *Lygus* sp. infesting alfalfa in Europe. Reductions in levels of lygus bug infesting alfalfa from Delaware north to New York are attributed to the introduction of this parasite. The CDFA has spent the last three years importing and releasing similar parasites into central California. Over 20,000 were reared and released at five locations last summer. The parasites have successfully overwintered at one site and have been recovered within the same season of release at two other sites. Two new strains and one new species were released in the summer of 2001. These releases are now being monitored. Cotton Incorporated and the California Cotton Pest Control Board have funded part of this work.

**Olive Fruit Fly.** The olive fruit fly is specific to olives and recently invaded Southern California and portions of Mexico. Eradication was not feasible. While the USDA, ARS's European Biological Control Laboratory is performing foreign exploration for olive fruit fly parasites in eastern and southern Africa, in 1999 and 2000, the CDFA released 4,000 adults of the generalist fruit fly parasite, *Psytalia concolor*, in Southern California. This parasite was recovered in low numbers in 2001 at several release sites. Releases and follow-up monitoring will continue in 2002.

**Red Gum Lerp Psyllid.** The CDFA has initiated a parasitoid-rearing program in cooperation with Dr. Donald Dahlsten of the University of California, Berkeley to establish new, exotic parasitoids recently imported from Australia. To date, the parasitoid, *Psyllaephagus bliteus*, has been released and is now established in eight coastal counties. Initial difficulties in rearing this parasitoid have been greatly reduced by preparing a rearing facility with improved environmental controls: providing long day length and better control of temperature and humidity.

**Pink Hibiscus Mealybug (PHM).** The PHM, *Maconellicoccus hirsutus* (Green), is native within the area encompassing Southeast Asia and nearby Australia. Its host range is very large, exceeding over 200 plant species, many of which are important in agriculture and as ornamentals. It was first discovered in Imperial County, California in 1999. In response to this pest, a cooperative PHM management area has been formed, comprised of representatives from the USDA, APHIS and ARS, the University of California, CDFA, and the Imperial County agricultural commissioner. In addition, a

close line of communication with neighboring Mexico was facilitated by the attendance of officials from Mexico from Secretaria de Agricultura Ganaderia y Desarrollo Rural (SAGAR) and *Instituto Nacional de Investigaciones Forestales Y Agropecuarias* (INIFAP) at all workshops and at each quarterly meeting. Staff from the Arizona Department of Agriculture also attended quarterly meetings. Following training by USDA, APHIS, a parasite insectary was established and two parasite species, *Anagyrus kamali* and *Gyranusoidea indica*, were mass-reared and released. In all, over 390,000 parasitoids were produced and released in 2000 and well over 200,000 were produced in 2001 (much of the 2001 production was released in Mexicali Valley, Mexico). To date, *A. kamali* is well established, commonly reaching levels of parasitism exceeding 50 percent. PHM densities are a fraction of those found in September 1999, and evidence of spread by PHM has not been observed since 2000.

**Cotton Aphid.** In an attempt to enhance biological control, a critical management tactic for cotton aphid control was initiated in 1996, which consisted of a cooperative project involving the CDFA, USDA, ARS, and the University of California Cooperative Extension Service. The long-term goal of this project is to reduce densities of the cotton aphid by constructing a natural enemy complex that has more species richness than currently exists in the San Joaquin Valley. After extensive field-testing of five natural enemies at the Shafter Research and Extension Center, two parasites, *Aphelinus* near *paramali*, and *Aphelinus gossypii* Timberlake, were deemed appropriate for more wide-scale release. During 2001, 10 parasite nurseries were maintained in the San Joaquin Valley, and releases of the parasites were made. Recovery of one of the parasites has been made at one nursery over a two-year period, suggesting that the parasite is slowly becoming established in the San Joaquin Valley. Maintenance of the parasite nurseries will continue. A third natural enemy, *Aphidius colemani* Viereck, is currently being tested for inclusion in the introduced parasite complex. Attempts are also being made to import the parasites, *Lipolexis oregmae* (Mackauer) *Trioxys indicus* Subba Rao and Sharma, to establish lab colonies and begin to test the suitability of these two parasites for use in California.

**Citrus Peelminer.** In the past year, the citrus peelminer, *Marmara gulosa* Guillen and Davis, has caused extensive damage to citrus and other crops in the southern San Joaquin Valley. Unlike previous infestations in which this insect damaged predominantly citrus, it has been feeding upon a wide range of other crops, causing direct damage to many of the crops that must be marketed as fresh products. A consortium of researchers, pest control advisors, and growers in the effected crops has been formed in an attempt to construct an area-wide management program for this insect. The role of the CDFA is to assist in the distribution and conservation of natural enemies for this insect, and to clarify citrus peelminer inter-crop dynamics. The information generated by the CDFA will be combined with that generated by other members of the consortium to develop area-wide management plans for the citrus peelminer.

**Citrus Leafminer.** The citrus leafminer, *Phyllocnistis citrella* Stainton, began expanding its geographic range in Southern California in 2001. A cooperative project has been established among the CDFA, University of California, Riverside, and University of California, Cooperative Extension to educate growers on the proper response to this insect, to encourage and distribute biological control agents and to track the movement of the citrus leafminer infestation in California. The CDFA assisted in the production of educational materials for growers and helped establish a mechanism by which the spread of the infestation could be reported to growers in a timely manner. Once citrus

leafminer invades the southern coastal citrus growing areas, the parasite *Ageniaspis citricola* Logvinovskaya, will be imported from Florida for release. This parasite requires areas of high humidity to survive.

## Weed Pest Programs

**Yellow Starthistle (YST).** YST, *Centaurea solstitialis* L., is an annual Eurasian weed, which currently infests over 12 million acres in California. Its importance as a weed pest arises from its interference with agricultural productivity, particularly in rangeland, and its implication in a physiological chewing disorder in horses. The CDFA, in cooperation with USDA/ARS, has released five natural enemies against YST. These natural enemies comprise two tephritid flies [*Urophora sirunaseva* (Hering) and *Chaetorellia australis* (Hering)] and three weevils [*Bangasternus orientalis* (Capiomont), *Eustenopus villosus* (Boheman), and *Larinus curtis*]. The gall fly (*U. sirunaseva*), the bud weevil (*B. orientalis*), and the hairy weevil (*E. villosus*) have become well established.

**Squarrose Knapweed.** In addition to YST biocontrol agent releases, natural enemies were released on six other weed species: squarrose knapweed, diffuse knapweed, spotted knapweed, purple loosestrife, Klamath weed, and puncturevine. Of special importance is the release of two insects for control of squarrose knapweed. In cooperation with the Oregon Department of Agriculture and Montana State University, seedhead-feeding weevils, *Bangasternus fausti* and *Larinus minutus*, were released in selected Northern California sites. Follow-up monitoring was encouraging, as 96 percent of seedheads were attacked at one release site in Shasta County.

**Spotted Knapweed.** Six biological control insects have been released on spotted knapweed at one site in Shasta County: the gall flies, *Urophora quadrifasciata* and *U. affinis*; the seedhead fly, *Terellia virens*; the seedhead weevil, *Larinus minutus*; the root-feeding moth, *Agapeta zoegana*; and the root-boring weevil, *Cyphocleonus achates*.

The root-feeding insects have not fared well. *A. zoegana* continues to exist at very low numbers despite repeated release efforts. Adult moths are extremely rare and larval numbers have plummeted following the initial population surge in 1997. Field samples in 2000 showed infestation rates of three percent to six percent. The weevil, *C. achates*, now appears to be established and its infestation rate has increased to 24 percent to 60 percent for plants with roots greater than 1 cm in diameter. The gall fly, *U. quadrifasciata*, likely migrated to the site prior to 1995. Adults of the first generation are highly visible in the field but the seedhead weevils easily consume gall fly larvae and limit final infestation levels which range from six to 32 percent annually.

The gall fly, *U. affinis*, is still increasing in abundance, but feeding damage by the weevils limit the size of the overwintering population. The infestation level was estimated around 30 percent. The seedhead fly, *T. virens*, has remained at a low level (less than five percent) for several years and is hard to locate in the field. The weevil, *L. minutus*, is well established at this site. Adults are visible during most of the flowering season. Larvae appear to have a significant impact within infested seed heads, and most reach maturity, successfully producing visible exit holes. The infestation level in 2001 was over 50 percent.

**Diffuse Knapweed.** Two gall flies on diffuse knapweed, *Urophora quadrifasciata* and *Urophora affinis*, are established at several sites in Trinity County. In addition, the

seedhead weevils, *Bangasternus fausti*, and *Larinus minutus* are well established. The root-boring beetle, *Sphenoptera* “j” or “y” *jugoslavica* is established and occurs in high numbers (over 70 percent of the plants attacked).

**Purple Loosestrife.** Purple loosestrife, *Lythrum salicariae*, a serious invasive weed of wetlands in the northern US, is limited to relatively small acreages in northern California, although the number of reported sites has approximately doubled during the 1990's. In 2000, approximately 3,200 *Galerucella californiensis* and *G. pusilla* beetles were released at three sites in Shasta, Butte, and Kern counties and approximately 100 *Hylobius transversovittatus* were released at two sites in Shasta and Butte counties. All beetles were obtained from Basket Slough Wildlife Refuge near Salem, Oregon and collected in cooperation with the Oregon Department of Agriculture and the US Fish and Wildlife Service.

## **CURLY TOP VIRUS PROGRAM**

The Curly Top Virus (CTV) Control Program (CTVCP) exists to minimize the statewide impact of CTV and the sugar beet leafhopper (BLH) on California agriculture. The program accomplishes this goal through the following deliverables; the number of targeted BLH control sites evaluated and treated, the number of Russian thistle acres mapped, determination of the dollar value of statewide losses from CTV, the number of CTV samples tested, and the number of training and education events (seminars, brochures etc).

CTV is an extremely serious plant virus affecting several hundred varieties of ornamental and commercial crops in California. The only known vector of this virus is the sugar beet leafhopper, *Circulifer tenellus* (Baker). CTV 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 CTV in California. CTV also infects backyard gardens upon which many people in California depend to provide fresh table vegetables.

The 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:

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

The goals of the CTVCP for 2001 were to:

- Monitor and selectively suppress over-wintering female BLH populations on winter host plants prior to egg deposition.
- Locate, monitor and selectively suppress the spring hatch of BLHs to maturation and migration into susceptible crops.
- Assess the Program's success by surveying susceptible crops for CTV.
- Map all Russian thistle acreage and suppress high BLH populations prior to dispersal to over-wintering areas.
- Continue to support and solicit research that will improve control including the pursuit of identifying biological control agents that would enable the Program to use less insecticide while maintaining CTV damage below economic levels.

During 2001, a total of 97,473 acres was treated aerially with the pesticide malathion to control BLHs during the spring and fall treatment campaign. The increase in treatment acreage was attributed to late spring rains that revived host plants and precipitated the development of a second BLH generation in rangeland breeding grounds. By the third week of April, it was evident that earlier April rains had revived BLH host plants and allowed a second spring generation of BLHs to develop. Spring treatment areas were increased to meet the growing BLH populations. A second treatment was required over approximately 2,300 acres in Jacalitos Canyon. BLH populations were found to have migrated from untreated areas to revived host plants previously treated. Ground-rig spot treatments were performed during May to control the BLH migration along roadsides and ditch banks.

Symptoms of CTV infection in tomato fields started to be observed in the middle of May. While the infection rate in processing tomatoes was less than one percent statewide, there were individual fields, which showed higher rates of infection. In fact, symptoms of CTV in processing tomatoes in a number of fields increased to levels not seen since 1991. CTV symptoms were seen in tomatoes throughout most of the western San Joaquin Valley, but were highest in western Fresno and Kings counties. Very little CTV symptoms were observed in peppers, melons and other susceptible crops. Plant samples collected from various tomato fields revealed the presence of cucumber mosaic virus as well as plants infected with CTV. This was not unexpected, as many of the symptoms in tomatoes did not appear to be typical of CTV infection. Besides the development of a second generation of BLHs from winter breeding grounds, there was an increase in the development of weeds. Fallow areas adjacent to susceptible crops contained mustards, goosefoot, pigweed, Russian thistle, lambs'-quarter, and *Bassia*. BLH counts of over 100 per sweep were found in some of these weedy areas following the initial spring migration of BLHs from rangeland habitat. Growers discing these weedy fields, without first treating with insecticide, enhanced the spread of CTV to adjacent fields.

## **HYDRILLA ERADICATION PROGRAM**

The Hydrilla Eradication Program, a cooperative effort between the CDFA and the county agricultural commissioners, was established to prevent the establishment of the noxious aquatic weed, hydrilla, in California. Deliverables include; the number of prioritized water bodies surveyed, leads from outside agencies/individuals investigated, number of identified infestations evaluated and treated, the number of new infestations

detected, and the number of training and education events (seminars, brochures, etc.) given.

Hydrilla (*Hydrilla verticillata* Royal L. F.) is a submerged aquatic weed that is listed as noxious by the CDFA. The CDFA lists weeds as “noxious” under The California Food and Agricultural Code (Division 4, Chapter 1, Article 1, Section 5004) if it meets the following definition: “any species of plant which is, or is liable to be, detrimental or destructive and difficult to control or eradicate.” In addition to being listed as “noxious,” the California State Legislature has directed the Secretary of Agriculture to eradicate hydrilla wherever feasible (California Food and Agriculture Code Section 6048).

Hydrilla grows from the hydrosol to the water surface, branches out into large mats, and fills the entire water column. Once established, these dense mats of plant material have the ability to replace native aquatic vegetation, destroy fishery habitat, block or impede water delivery systems and ruin the recreational value of natural and man-made water systems.

During the last 26 years, the CDFA, Plant Health and Pest Prevention Services Division, Integrated Pest Control Branch has eradicated hydrilla from various water bodies in 14 California counties (Calaveras, Imperial, Los Angeles, Monterey, Riverside, Santa Barbara, San Bernardino, San Diego, San Francisco, Shasta, Sonoma, Sutter, Tulare and Yuba). Eradication activities continue in eight counties (Calaveras, Lake, Imperial, Madera, Mariposa, Tulare, Shasta and Yuba). Hydrilla Eradication Program funding and in-kind services are provided by various federal, state and county agencies.

The CDFA achieves eradication through an integrated program using physical and mechanical removal in conjunction with aquatic herbicides. In Imperial County, use of the triploid grass carp, an herbivorous fish, in conjunction with chemical and mechanical control methods, have dramatically reduced the infestation. In 1988, approximately 600 miles of canal, 72 ponds, 32 private delivery ditches, and 12 drains were infested with hydrilla. At the end of 2001, only four laterals or drains contained hydrilla.

The Lake County hydrilla eradication project continues to be the major component of the Hydrilla Eradication Program. Hydrilla was first detected in Clear Lake in August 1994. Clear Lake is a 43,000-acre lake known as the “Bass Capital of the West.” Because of its high recreational use, the potential spread of hydrilla to the rest of California and other western states via boat traffic and other human activity is extremely high. At the present time, approximately 1,000 acres along the shoreline are under eradication.

Hydrilla eradication activities in the remaining counties continue to progress well. Only scattered plants remain in the water bodies under treatment. However, continual physical removal or treatment is required due to the presence of dormant, reproductive structures (tubers and turions). For example, in Shasta County since 1985, 17 ponds have been found infested. In 2001, only two ponds were found infested.

# PINK BOLLWORM AND OTHER COTTON PEST PROGRAMS

## Pink Bollworm

The Pink Bollworm Program prevents the establishment of pink bollworm (PBW) in the San Joaquin Valley, through the following deliverables; the number of targeted PBW eradication sites evaluated and treated, the number of cotton acres mapped, the number of PBW traps deployed, the number of sterile PBW moths released, and the number of training and education events (seminars, brochures, etc.) held.

Pink bollworm, *Pectinophora gossypiella*, considered one of the world's most destructive pests of cotton, was first introduced into the US from Mexico in 1917. Heavy infestations developed in the southeastern states by 1963. This contributed to the western spread of the moth to Southern California by 1965. Despite intensive efforts to halt the spread of pink bollworm, outbreaks expanded across desert cotton-growing areas of Southern California during 1966. Moreover, by 1967 PBW threatened the San Joaquin Valley where more than 90 percent of California's cotton is grown.

Since 1967, a cooperative state-federal-county program has prevented damage to San Joaquin Valley cotton by the PBW. The Cooperative Pink Bollworm Program is funded almost entirely by the cotton growers of California through an assessment on each bale of cotton ginned in the State. The program interacts with the University of California, University of Arizona, Arizona Cotton Research and Protection Council, the cotton industry, and other governmental agencies.

The goal of the California PBW Program is to prevent incipient infestations of PBW from becoming established in the cotton-growing areas of the San Joaquin Valley. This is accomplished by maintaining a highly effective detection and control program. Detection methods primarily use pheromone (sex lure) traps to discover incipient infestations. Eradication efforts are made by the release of sterile PBW moths and by pheromone treatments. The moths are reared and sterilized at the CDFA/USDA rearing facility in Phoenix, Arizona, shipped to the PBW sterile release facility in Shafter, California, and then dispersed from aircraft over designated cotton fields in the San Joaquin Valley.

If PBW became established in the San Joaquin Valley, millions of pounds of pesticides would be introduced into the environment annually, just to control PBW. It is estimated that an additional seven pounds per acre or 5.7 million pounds of pesticides would have to be used every year to control PBW and related secondary pests in the San Joaquin Valley. Establishment of PBW in the San Joaquin Valley could increase cotton growers' pest control costs by \$90-100 per acre.

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

## ACCOMPLISHMENTS

A grand total of 869,980 acres of cotton was mapped in California during 2001. Southern California cotton acreage totaled 33,400 acres. The four cotton-growing counties of Northern California's Sacramento Valley had a total of 21,700 acres. PBW program personnel mapped 814,880 acres of cotton in six counties of the San Joaquin Valley. This acreage is down 5.3 percent from the 919,000 acres mapped in 2000. Pima cotton plantings in the San Joaquin Valley for 2001 amounted to 212,350 acres, up (47 percent) from the 144,275 acres in 2000.

Early detection trapping was done at selected San Joaquin Valley sites having 2000 native PBW moth catches, to detect possible over-wintering populations and monitor sterile release. The early detection trapping was conducted from April 16 through July 20. General detection trapping activities were matched to the bio-potential zones. The program also utilized different trapping ratios: 1) One trap per sixty acres, 2) One trap per eighty acres, and 3) One trap per 100 acres. The starting dates for each bio-potential zone were staggered to align with the PBW heat unit model. The earliest general detection trapping began in the southern San Joaquin Valley on June 25. The total number of traps deployed during the peak of the season was 9,962 traps. Traps were inspected weekly through October 5, and were removed by October 12.

The PBW Identification Laboratory in Visalia examined 20,387 traps containing suspect moths submitted by trappers. Totals of 566,635 sterile moths and 83 native moths were identified in the San Joaquin Valley traps. The sterile moth receipts from the PBW Rearing Facility in Phoenix, Arizona were consistent throughout the entire release period. Approximately 535,226,697 sterile moths, roughly 4.7 tons of moths, were released in the San Joaquin Valley.

PBW program personnel conducted trapping and boll collection in the cotton-growing areas of Southern California. Cooperating with the USDA, the Arizona Cotton Research and Protection Council, and the University of Arizona, PBW program staff conducted trapping and boll survey designed to evaluate PBW resistance to *Bt* cotton. Monitoring was done in Riverside and Imperial counties. Staff also conducted a project to measure the susceptibility (resistance) of beet armyworm to *Bt* cotton.

### Cotton Boll Weevil

Since November 19, 1990, no boll weevils, *Anthonomus grandis*, have been trapped in California. The declaration of eradication of boll weevil was issued December 1993. Program efforts continue to help keep the State free of boll weevil. Traps are deployed in Southern California cotton-growing areas to monitor any post eradication boll weevil activity. The Imperial County agricultural commissioner, under contract with CDFA, monitors boll weevil traps year round along the borders of Arizona and Mexico. No cotton boll weevils were detected in California.

## VERTEBRATE PEST CONTROL PROGRAMS

The primary objectives of the Vertebrate Pest Control Program are to maintain the CDFA's nine field-use rodenticide registrations, and to administer the Vertebrate Pest Control Research Program. These are accomplished through the development and

maintenance of a QA/QC program for rodenticide baits with the following deliverables: development of standardized protocols for bait formulation, implementation of standardized bait manufacturing, number of formulators trained in the standardized bait formulation protocol, and the number of bait formulation samples in compliance for our new program; the implementation of research studies to maintain rodenticide registrations and develop new pest control methods with the following deliverable; the number of research studies completed on-time to maintain Department rodenticide registrations; and the maintenance of nine rodenticide product registrations under Federal Insecticide Fungicide and Rodenticide Act (FIFRA).

The agricultural community and other stakeholders utilize the CDFA's rodenticides in order to prevent and control vertebrate pest damage to agricultural commodities, agricultural infrastructure, and water control and conveyance structures and to protect the public health and safety.

The rodenticide registrations are currently in the US Environmental Protection Agency's (USEPA) Reregistration Eligibility Decision (RED) process. In evaluating pesticides for reregistration, the USEPA obtains and reviews a complete set of studies from pesticide producers, describing the human health and environmental effects of each pesticide. The USEPA then develops any mitigation measures or regulatory controls necessary to effectively reduce each pesticide's risks. The USEPA reregisters pesticides that can be used without posing unreasonable risks to human health or the environment. The CDFA's rodenticide registrations are currently in complete compliance with the RED requirements and timelines.

In order to address issues outlined in the RED, the Vertebrate Pest Control Research Program funds 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 produce chemistry and residue data to support the expanded use of rodenticides on food crops. Since 1991, the Vertebrate Pest Control Research Program has funded 48 individual studies on efficacy, product chemistry, residues, and non-target hazards, totaling \$3.2 million to support reregistration and to expand the uses of the CDFA's rodenticides.

## **WEED PROGRAMS**

The Noxious Weed Eradication Program is a cooperative effort between the CDFA and the county agricultural commissioners. Its primary objectives are the early detection, containment and eradication of weeds listed as "noxious" and rated as quarantine significant by the CDFA and/or the USDA. Program deliverables for the detection, eradication or containment of high priority noxious weeds are the number of targeted weed eradication sites evaluated and treated, the number of surveys of identified high hazard and high priority areas/corridors, the number of follow-ups on all reports of high priority weeds from outside agencies/individuals, the number of training and education events (seminars, brochures, etc.) held, and the number of weed populations eradicated from targeted sites.

The CDFA classifies a weed as "noxious" if it meets the following definition established by The Food and Agricultural Code of California (Division 4, Chapter 1, Article 1, Section

5004): “any species of plant which is, or is liable to be, detrimental or destructive and difficult to control or eradicate.”

Noxious weed project activities are conducted by seven CDFA district associate agricultural biologists based at four district offices (Fresno, Sacramento, Redding and Riverside). The district biologists conduct surveys along roadsides, wild lands, creek beds, etc. for locating noxious weeds. They provide information on weed locations and weed eradication activities to a central database project which maps and tracks their activities. Approximately 7,600 infested acres at approximately 450 different sites in California are under eradication or containment. The district biologists use chemical, mechanical, and physical weed control methods. They work closely with the CDFA biological control group to release biological control agents in a few cases on a select number of noxious weed species. Biological control is being used to control populations of musk thistle, diffuse knapweed, spotted knapweed, and squarrose knapweed. In addition, the district biologists conduct public outreach and education activities to inform the public about noxious weeds and gain public support for the survey and eradication efforts.

Twenty-five weed species are currently under eradication, control, or containment within California. These are:

- 1) Bidy bidy - *Acaena anserinifolia*, *A. novae-zelandiae* and *A. pallida*
- 2) Punagrass - *Achnatherum brachychaetum*
- 3) Camelthorn - *Alhagi maurorum*
- 4) Alligatorweed - *Alternanthera philoxeroides*
- 5) Fertile capeweed - *Arctotheca calendula*
- 6) Plumless thistle - *Carduus acanthoides*
- 7) Musk thistle - *Carduus nutans*
- 8) Diffuse knapweed - *Centaurea diffusa*
- 9) Iberian starthistle - *Centaurea iberica*
- 10) Spotted knapweed - *Centaurea maculosa*
- 11) Squarrose knapweed - *Centaurea squarrosa*
- 12) Skeletonweed - *Chondrilla juncea*
- 13) Yellowspine thistle - *Cirsium ochrocentrum*
- 14) Wavyleaf thistle - *Cirsium undulatum*
- 15) Bearded creeper - *Crupina vulgaris*
- 16) Dudaim melon - *Cucumis melo* var. *dudaim*
- 17) Leafy spurge - *Euphorbia esula*
- 18) Halogeton - *Halogeton glomeratus*
- 19) Dalmatian toadflax - *Linaria genistifolia* spp. *dalmatica*
- 20) Scotch thistle - *Monopodium acanthi*
- 21) Illyrian thistle - *Monopodium illyricum*
- 22) Taurian thistle - *Onopordum tauricum*
- 23) Harmel - *Peganum harmala*
- 24) Wormleaf salsola - *Salsola vermiculata*
- 25) Golden thistle - *Scolymus hispanicus*

Fifteen weeds have been eradicated from the State by this program. These are as follows: whitestem distaff thistle, dudaim melon, giant dodder, serrate spurge, Russian salttree, blueweed, tanglehead, creeping mesquite, meadowsage, heartleaf nightshade, Austrian peaweed, wild marigold, Syrian beancaper, perennial sowthistle, and smooth

groundcherry. Weeds approaching eradication at the statewide level include camelthorn, golden thistle, and Illyrian thistle.

## **WEED MANAGEMENT AREAS**

In 1999 and 2000 new legislation amended and added to the Food and Agricultural Code Sections 7270, et. seq. designated CDFA as the lead agency for noxious weed management in California and established a Noxious Weed Management Account in the CDFA, allocating funds for each of three years to support work by established local weed management areas or the county agricultural commissioner. Senate Bill 1740, adopted in 2000, added \$5,000,000 to the Noxious Weed Management Account and extended the time over which funding will be available to WMAs throughout the State.

**Mission:** *The mission of the weed management area initiative is to demonstrate the power of local cooperative action in:*

- *Eradicating and controlling weeds in an integrated, strategic and prioritized fashion;*
- *Stopping the spread of noxious and invasive weeds on public and private lands;*
- *Educating people at all levels about the need and opportunities to control weeds.*

Weed Management Areas (WMA) are established when local working groups bring together interested landowners, land managers (private, city, county, state, and federal), and the public for the purpose of combining their actions and expertise to deal with local noxious weed control problems. This organizational concept originated with the federal government in the Greater Yellowstone region, resulting in increased weed control across the boundaries of three states. This type of collaborative weed control is widely recognized as an ideal way to implement weed management programs locally.

## **ACCOMPLISHMENTS**

The following highlights program progress in 2001:

- The number of countywide WMAs in California has grown from seven in early 1998 to 45 in 2001. The groups cover 54 out of 58 counties in the State.
- Over 2,009 individuals attended regular WMA meetings throughout California in 2001. New local partnerships have been created among public agencies, private landowners, agriculturalists, and conservationists.
- An estimated 29,000 landowners and citizens have participated in noxious and invasive weed education events statewide.
- Over \$1,360,000 has been distributed to 42 WMAs, resulting in over 13,517 acres of high priority weed infestations treated under this program in 2001. Most sites had close to 90 percent control. Additionally, at over 140 sites, 100 percent of targeted weeds were eradicated from the site and are not expected to return.
- This state seed money has been matched locally by a total of \$3,021,342 of "in-kind" resources (donated equipment or services) and matching cash dollars. Of these resources, \$756,034 is direct cash matches by county government and outside grants.

- On September 24 and 25, 2001, 152 WMA members attended the third Annual Statewide WMA Meeting in Woodland, California for training, exchange of information, to hear panels on WMA success stories, and to network with WMAs throughout the State.



California Department of Food and Agriculture

