Welcome to

PEST DETECTION / EMERGENCY PROJECTS

PHOTO CREDIT: CDFA CROP TOUR

INTRODUCTION

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

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

California is extraordinarily susceptible to invasive species with the increased risks associated with the number of international passengers and the amount of cargo entering the State. California maintains 11 seaports that handle over 32 percent of our nation's trade. Over the last 20 years, the ocean-going cargo container traffic at the Port of Los Angeles has increased more than 700 percent (from 1,300,000 containers per year to over 10,000,000 containers annually). Passenger traffic at Los Angeles International Airport has increased by 10,000,000 passengers over the last 10 years (Los Angeles Department of Airports website).

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

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

PEST DETECTION

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

Key Highlights in 2009

- Six infestations of exotic fruit flies were successfully eradicated.
- The white striped fruit fly (WSFF) was detected in Los Angeles County. This is the first time WSFF was detected in North America.
- The European grapevine moth (EGVM) was detected in Napa County. This detection represents the first detection in North America.
- The Asian citrus psyllid (ACP) was detected in Orange and Los Angeles counties for the first time.
- PD/EP hosted the Annual Western Region Gypsy Moth Review,

Pest Detection 61
Statewide Trapping 62
Exotic Fruit Fly Program 63
Gypsy Moth Program 67
Japanese Beetle Program 69
Additional Insect Surveys 70
Cooperative Ag Pest Surveys 72
Emergency Projects 76
Multi-Year Eradication Projects 81
Established Pest Prevention Programs . . 86

PEST DETECTION

wide variety of ecological niches where invasive pests can become quickly established.

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

Statewide Trapping

California's moderate, Mediterranean climate, coupled with the State's fertile soil and diverse land resources, allows year-round production of many commodities. A great number of crops in California would be threatened by the introduction of exotic pests. Additionally, California's climate is also very hospitable for many invasive pests because they are not known to be established in California and do not have any natural enemies to keep their population in check. Early detection is the key to preventing large infestations and possible establishment of exotic pests.

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

The statewide trapping network employs over 119,000 traps, targeting many federal-actionable pests, including exotic fruit flies, Japanese beetle and gypsy moth (Table 1 and Figures 1, 2 and 3).

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

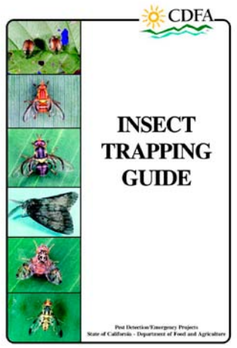


Table 1. Numbers of Exotic Insect Traps by Trap Type and Lure

Trap Type	Jackson	Jackson	Jackson	McPhail	ChamP	Gypsy Moth	Japanese Beetle
Targeted Pest	Mediterranean Fruit Fly	Oriental Fruit Fly	Melon Fly	Exotic Fruit Flies	Exotic Fruit Flies	Gypsy Moth	Japanese Beetle
Number of Traps	24,836	20,550	20,502	19,846	2,527	17,177	13,578

Exotic Fruit Fly Program

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

The development of species specific lures allows for a variety of trap types in combination with different attractants. During the 2009 trapping season, there were over 88,000 exotic fruit fly traps in place for detection monitoring (Table 1).

Exotic Fruit Fly Detections in 2009

In 2009, there were 84 exotic fruit fly adults representing eight species captured in 10 California counties (Table 2 and Figures 4 through 7). These detections triggered 29 delimitation trapping programs and 11 eradication projects.

PEST DETECTION

Table 2. Exotic Fruit Flies Detected

Pest	County	Number Detected	Total by Species
Anastrepha ludens Mexican fruit fly	Sacramento	1	1
Bactrocera albistrigata White striped fruit fly	Los Angeles	8	8
Bactrocera correcta Guava fruit fly	Los Angeles	6	16
	Orange	7	
	San Mateo	1	
	Santa Clara	1	
	Ventura	1	
Bactrocera dorsalis complex Oriental fruit fly	Alameda	1	25
	Los Angeles	14	
	Orange	2	
	Riverside	1	
	Sacramento	4	
	San Bernardino	2	
	Santa Clara	1	
Bactrocera scutellata Striped fruit fly	Los Angeles	9	9
Bactrocera zonata Peach fruit fly	Orange	1	1
Ceratitis capitata Mediterranean fruit fly	Los Angeles	3	24
	San Diego	21	
		Total	84

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

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

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

Figure 4. Exotic Fruit Flies Detected in the Los Angeles Basin

PEST DETECTION

Figure 5. Exotic Fruit Flies Detected in the Bay Area

Figure 6. Exotic Fruit Fly Detections in Northern California

Figure 7. Exotic Fruit Flies Detected in San Diego County

GYPSY MOTH PROGRAM

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

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

Gypsy Moth Detection

During the 2009 season, 17,177 traps were deployed to monitor gypsy moth (GM) and Asian gypsy moth (AGM) introductions as part of California's program to detect and delimit new GM and/or AGM infestations. Traps are placed in urban and in rural residential areas of the State where there are 300 or more homes per square mile. Trap density is three traps per square mile in 19 coastal counties, and two traps per square mile in the remaining 39 counties. California ports receiving shipments from Russia, the Far East and Japan have traps deployed at the rate of 25 traps per square mile in a one-mile buffer around each port.

During the 2009 season, three gypsy moths were trapped (Table 3, Figure 8) in two counties. All specimens were analyzed for possible AGM identification using the mitochondrial DNA test as well as the FS1 Nuclear DNA test. There were two AGM detected in 2009.

Table 3. Gypsy Moths Detected

County	City	Number Trapped	Determination
Los Angeles	San Pedro	1	AGM
	Wilmington	1	AGM
Santa Clara	Los Gatos	1	GM

For European gypsy moth (GM) detections, additional traps were placed at the rate of 25 per square mile in a four square mile area surrounding the detection sites. For the AGM detections, 49 traps were placed in the core square miles and 25 traps per square mile were placed in the remaining 4.5 mile radius around the detection sites.

PEST DETECTION

Figure 8. Gypsy Moth Trap detections

Figure 9. Asian Gypsy Moth Detections

2009 Delimitation Trapping

Due to the life cycle of the GM, two years of negative trapping for the adult moth is required to declare an area free from GM. Therefore, GM detections from the 2008 season were delimited again in 2009.

Table 4. Gypsy Moth Delimitation Trapping Results from Detections in 2008

County	City	2008 Detection Results	2009 Detection Results
Alameda	Oakland	1	0
Los Angeles	Carson	1	0
Orange	Irvine	1	0
Placer	Dutch Flat	1	0
Ventura	Ojai	7	0
	Total:	11	0

JAPANESE BEETLE PROGRAM

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

Japanese Beetle

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

Japanese Beetle Detection

In 2009, there were 13,578 JB traps deployed throughout the urban and high-risk areas of the State. Of these, 4,424 were deployed at the 14 airports where inspections were performed.

The trap density for statewide JB detection is two traps per square mile (Figure 3). A high-density trapping array is deployed in a one-mile buffer around each airport and at transfer/sorting facilities used by air cargo and express mail carriers. There was one JB trapped in proximity to the Los Angeles International Airport, with no JB trapped in residential areas.

PEST DETECTION

Aircraft Inspections

During the summer when adult JB are active, an intensive aircraft inspection program is implemented. The program is designed to find and remove JBs hitchhiking in aircraft before they escape from the aircraft and enter the surrounding environment. Inspections yielded the interception of 56 JBs, of which five were alive (Table 5).

Table 5. Number of Aircraft Inspected and Beetles Collected by Airport

County	Airport	Number of Aircraft Inspected	JB Collected		
			Alive	Dead	Total
Alameda	Oakland International	346	2	12	14
Los Angeles	Burbank	157	0	8	8
	Long Beach	226	0	4	4
	Los Angeles International	2,481	2	3	5
Orange	John Wayne	250	0	4	4
Sacramento	Mather	240	0	2	2
	Sacramento International	85	0	0	0
San Bernardino	Ontario	822	1	14	15
San Diego	Lindbergh Field	1,904	0	4	4
San Francisco	San Francisco International	198	0	0	0
Santa Clara	San Jose International	69	0	0	0
	Total:	6,778	5	51	56

ADDITIONAL INSECT SURVEYS

County Commitment

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

European Corn Borer

European corn borer (ECB) is a major pest of corn and can infest a wide variety of herbaceous plants. European corn borer is known to feed on 250 plants. Since its introduction, it has become established in most of the states east of the Rocky Mountains. Typical damage to corn plants caused by this insect is reduced plant vigor, leading to subsequent ear drop and stalk lodging. The 2009 survey was negative for ECB in California.

European Pine Shoot Moth

European pine shoot moth is a destructive pest of ornamental, Christmas tree and timber pines. In the United States, this insect pest currently infests Connecticut, Delaware, Illinois, Indiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, New Hampshire, New Jersey, New York, Ohio, Oregon, Pennsylvania, Rhode Island, Washington, West Virginia and Wisconsin. As a result of the feeding damage, trees will have dead and stunted shoots. Infested trees are bushy and distorted. The 2009 survey was negative for the presence of European pine shoot moth in California.

Khapra Beetle

Khapra beetle (KB) is the world's most destructive pest of many stored grains and grain products. The KB is not known to occur in the United States. If left uncontrolled, the insect can make the surface of a grain storage facility appear alive with crawling larvae. They not only consume the grain, but may also contaminate it with body parts, which are known to cause adult and especially infant gastrointestinal irritation. Branch entomologists, in conjunction with county staff, deployed and inspected 2,434 traps in 26 counties to guard against an introduction of this pest. The 2009 survey was negative for the presence of KB in California.

The United States Department of Agriculture and United States Customs and Border Protection Service at the Port of Oakland intercepted a KB from a shipment of coriander seed from India. The coriander seeds and all the other contents of the container were secured and were shipped out of California by sea carrier. In response to this detection, Branch staff deployed KB traps at the port facility to determine if any KB escaped into the environment. No Khapra beetles were detected and the traps were removed in December.

Spotted Wing Drosophila

In May, the University of California Extension Service submitted a sample of a *Drosophila* species larvae found in the flesh of cherries. The reports noted that the larvae were found in ripe but undamaged fruit. Infestation of undamaged fruit is unusual for this genus, and is not known to occur in native species. Larvae were reared to adults and were identified as *Drosophila suzukii*, spotted wing drosophila (SWD), by CDFA Insect Biosystematist, Dr. Martin Hauser. The identification of adults was corroborated by the Systematic Entomology Laboratory in Washington, D.C.

Spotted wing drosophila (SWD) damage occurs when female flies deposit eggs into the fruit, which hatch into maggots that feed on the fruit. In California, damage has been reported on cherries, strawberries, raspberries and blueberries.

This was the first reported detection of this fly in the continental United States. Staff that monitor

PEST DETECTION

exotic fruit fly traps were instructed to look for SWD in their traps. SWD was confirmed from 23 counties. In the United States, SWD has been detected in Hawaii, Washington, Oregon and Florida.

European Grapevine Moth (EGVM)

In October 2009, the EGVM was detected in Napa County. This detection represents the first detection of EGVM in North America. The United States Department of Agriculture (USDA), Plant Protection and Quarantine (PPQ) has listed EGVM as reportable/actionable and is also listed on their Regulated Plant Pest List. According to the USDA, EGVM has two main hosts, grapes and olives, as well as many other minor hosts. EGVM is an important pest of grape, in which losses of 80 percent have been reported. Young larvae can penetrate grape berries; hollows them out leaving the skin and seeds. This causes direct damage to the berry and predisposes the grape clusters to fungus infection (mold).

European Grapevine Moth Larval Damage

Following the detection of the EGVM, additional traps were placed throughout the Napa area in the fall. A visual survey was also initiated. Additional EGVM were detected at over 30 locations; because EGVM diapauses during the winter, the traps were removed and will be re-deployed in early spring of 2010.

COOPERATIVE AGRICULTURAL PEST SURVEYS (CAPS)

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

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

Asian Gypsy Moth (AGM) and Other Exotic Moths

High Risk Port Trapping

Eight deep water ports in Alameda, Humboldt, Los Angeles, Sacramento, San Diego, San Francisco, San Joaquin (delta) and Ventura counties were trapped in a one-mile radius surrounding the ports at a density of 25 traps per square mile. Deep water ports present a high risk for AGM introduction, as ships from Asian and Russian ports frequently carry AGM egg masses. These egg masses can hatch at or near United States ports, allowing larvae to be blown onshore. There were 1,809 traps placed in the aforementioned counties. In Los Angeles County, two AGMs were detected near the Port of Los Angeles. All traps were negative for any other exotic moths.

AGM Delimitation Activities

In response to AGM detections in 2007 and 2008, delimitation trapping for AGM occurred in the cities of San Pedro, Long Beach, Rolling Hills Estates and Los Angeles. Traps were deployed at a rate of 49 traps in the core square mile surrounding the detection site, and 25 traps per square mile in a 4.5-mile radius around the detection site square mile. Two AGM were detected near the Port of Los Angeles (see High Risk Port Trapping). Trapping will continue in 2010.

Cereal Leaf Beetle Survey

Cereal leaf beetle (CLB) can cause considerable damage to barley, oats, wheat and rye. The CLB feeds on plant foliage, resulting in elongated, slender slits in the upper leaf surface. This damage can significantly reduce grain yield and quality. This beetle infests a number of other states. Branch entomologists conducted sweep net surveys at 1,651 sites in 56 counties to monitor for this pest. The 2009 survey was negative for the presence of CLB in California.

False Codling Moth

The false codling moth (FCM) is one of the most important pests of citrus and cotton in sub-Saharan Africa. The larvae of this moth infest a wide variety of fruits, vegetables and forest trees, but cause the most damage to citrus and cotton. The citrus industry alone in California produces in excess of $1.8 billion in agricultural value for the State, and citrus is widely planted at residences throughout the State. Detections in 2002 and 2005 of live larvae entering California via citrus imported from South Africa demonstrate a continuing pathway for entry.

One FCM was trapped on July 24, 2008, in Port Hueneme in Ventura County. This discovery was a new record for the Americas. In response to this detection, a delimitation trapping array consisting of 481 traps was deployed around the detection site. The traps were inspected every

PEST DETECTION

two weeks. This delimitation trapping array remained in place for three generations of the pest with no additional adult moths detected.

In 2009, a detection survey occurred in 33 counties. There were 933 traps placed in host trees from June through December. All traps were negative for FCM.

Citrus Commodities

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

Sweep Netting for Citrus Pests

This survey occurred in 35 counties throughout the State. Entities that are surveyed include commercial citrus groves, nurseries that sell citrus plants or *Murraya paniculata*, citrus production nurseries, retail stores, ethnic grocery stores that sell curry leaves and high risk urban areas (Table 6).

In 2009, 1,533 samples were submitted for HLB, citrus canker and citrus variegated chlorosis. All samples were negative for these diseases.

Table 6. Statewide Citrus Commodities Survey Summary

District	Commercial Citrus (Acres)	Residential	Citrus Nursery	Ornamental Nursery	Retail Stores	Survey Traps	Samples	Results
Northern	793	816	4	1	163	178	175	Negative
Central	62,730	393	36	22	0	268	151	Negative
Southern	13,208	1,509	9	91	0	23	1,207	Negative
Total	**76,731**	**2,718**	**49**	**114**	**163**	**469**	**1,533**	**Negative**

Karnal Bunt

Karnal bunt is a fungal disease of wheat, durum wheat, rye and triticale. The causal agent of Karnal bunt is *Tilletia indica*. This pathogen infects wheat seed at the time of flowering. CDFA plant pathologists in conjunction with the USDA and the affected counties performed the survey in eastern Riverside County and in a small portion of Imperial County. Statewide, 23 counties participated in a voluntary survey for Karnal bunt. During the 2009 wheat harvest, a total of 56 samples were collected from 24 counties. All fields were negative for Karnal bunt.

Potato Cyst Nematode (PCN) Survey

Due to the detection of PCN in Idaho in 2006, the USDA requires a national survey of all certified seed potato fields. The objective of the nematode survey is to obtain current information on the occurrence and distribution of the PCN. These nematodes are parasites of over 90 species of solanaceous plants, such as potato, tomato and eggplant. Additionally, approximately 10 percent of the potato production fields were sampled.

There were 3,702 soil samples submitted to the CDFA Plant Pest Diagnostic Center for identification (Table 7). All samples were negative for PCN; however, the C-rated cabbage cyst nematode, *Heterodera cruiferae*, was detected from a field in Santa Barbara.

Table 7. Potato Cyst Nematode Survey Data

County	Number of Soil/ Samples Processed		Total
	Seed Potato	Production Potato	
Kern	417	2,340	2,757
Marin	0	2	2
Modoc	0	366	366
San Benito	0	11	11
San Joaquin	251	0	251
San Luis Obispo	80	0	80
Santa Barbara	152	0	152
Siskiyou	0	40	40
Sonoma	0	23	23
Yolo	0	20	20
Total	**900**	**2,802**	**3,702**

EMERGENCY PROJECTS

OTHER SURVEYS

Statewide Postentry Quarantine Program

The Postentry Quarantine Program is a cooperative federal-state undertaking. By agreement, state plant pathologists and entomologists with specialized training perform field inspections of postentry quarantine material (e.g., plant stock, plant cuttings, bulbs). The purpose of the program is to conduct a survey of the growing site to determine whether to approve the site for placement of plant materials and to inspect postentered plant material during the growing period for pests. In 2009, PD/EP staff inspected 128 shipments of various plants in 23 counties.

EMERGENCY PROJECTS

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

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

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

Eradication Programs

Oriental Fruit Fly Complex

The oriental fruit fly complex comprises 68 species with varying distributions in Asia, Australia and the Pacific Islands. This complex is recognized as one of the most damaging fruit fly pests in the world due to its very wide host range, high reproductive potential, high mobility and adaptability to climate. This complex attacks over 230 different kinds of fruit. Two species have become established in Hawaii (*Bactrocera dorsalis*) and northeastern South America (*Bactrocera carambolae*), greatly increasing the risk of introduction into California.

There were two eradication programs that were initiated in 2009 and six programs that began in 2008 and were completed in 2009 for the oriental fruit fly complex of flies (Table 8). One quarantine area was established in La Verne (Los Angeles County). The primary treatment method for this group of flies is male attractant technique, which consists of applying a minimum of 600 methyl eugenol (lure) mixed with insecticide bait stations per square mile every two weeks for two generations of the fly. Eradication has been declared for six of the eight infested areas. The other two eradication projects are still in progress.

Table 8. Oriental Fruit Fly Complex Eradication Projects

County	City	Number Trapped	Treatment Area (square miles)	Eradication Status
Los Angeles	La Verne	6	14	In progress
	San Marino[1]	2	13	Eradicated
	Lakewood[1]	18	22.5	Eradicated
Sacramento	Elk Grove	3	7.3	In progress
San Bernardino	Loma Linda[1]	2	9	Eradicated
	Ontario[1]	4	18.5	Eradicated
San Diego	Carlsbad[1]	2	8.2	Eradicated
Santa Clara	Santa Clara/San Jose[1]	4	10.6	Eradicated
	Total:	41	103.1	

Guava Fruit Fly

The guava fruit fly is an exotic insect which is widely distributed in Southern Asia occurring from Pakistan eastward through India to Thailand. In India, this fly is a serious pest of a variety of tree fruits. Important California crops which would be infested include stone and pome fruits, especially peaches and various types of citrus. Damage occurs when the female lays eggs in the fruit. These eggs hatch into larvae, or maggots, which tunnel through the flesh of the fruit, making it unfit for consumption. The first Western hemisphere infestation of this pest was detected in Garden Grove, Orange County, in 1986 and was successfully eradicated. Since that time, several infestations have been delimited and successfully eradicated.

Multiple guava fruit flies were detected in the Santa Ana/Garden Grove area of Orange County and in Calabasas in Los Angeles County that resulted in eradication projects. PD/EP pest response team members applied bait stations in these areas for two life cycles (Table 9).

EMERGENCY PROJECTS

Table 9. Guava Fruit Fly Eradication Projects

County	City	Number Trapped	Treatment Area (square miles)	Eradication Status
Los Angeles	Calabasas	2	16.5	In progress
Orange	Garden Grove/Santa Ana	7	13.5	In progress
	Santa Ana[1]	2	12	Eradicated
	Total:	11	42	

[1]Program began in 2008 and continued in 2009.

White Striped Fruit Fly

Whited Striped Fruit Fly

The white striped fruit fly (WSFF) is an exotic insect which is native to tropical southeast Asia, occurring from southern Thailand into Malaysia and Indonesia, and on the Andaman and Nicobar Islands, Christmas Island, and probably Irian Jaya. It is known to attack the fruit of a number of trees, most significantly guava and mango. In July, WSFF was detected in the city of La Verne. This was the first Western Hemisphere infestation of this pest.

The primary treatment method for the WSFF is the male attractant treatment. This involved the placement of bait stations containing a mixture of cuelure and naled housed within special insect traps. There were 1,000 traps per square mile placed in 15 square miles. The male WSFF is attracted to the bait station and is eradicated before they can mate with the female WSFF. This disrupts the breeding cycle and the population is eliminated. Additionally, foliar bait ground treatments that consisted of an organic formulation of spinosad was applied to all host plants 200-meters around each detection site. Larval survey occurred up to 200-meters around any property where WSFFs were trapped to determine if other life stages were present. No immature WSFFs were detected. This infestation was eradicated.

Mediterranean Fruit Fly Larvae

Mediterranean Fruit Fly

The Mediterranean fruit fly (MDFF) is native to Africa, and has spread to southern Europe, Australia, Hawaii, and Central and South America. The MDFF is arguably the world's most threatening pest affecting the food supply. The MDFF attacks more than 260 different types of fruit, vegetables and nuts. When host fruit is continuously available and weather conditions are favorable for many months, successive generations of the MDFF will be large and continuous. In California, it is likely that the MDFF will establish a permanent presence in the State if it is not eradicated. The damage occurs when the female MDFF lays eggs in the fruit. The larvae that hatch from the eggs tunnel their way through the fruit, decay organisms enter, leaving the fruit a rotten mass and unfit for human consumption.

California is at risk of becoming permanently infested by the MDFF due to the State's proximity and ties to MDFF-infested regions of the world and our status as the world's leader in agricultural production. Because the MDFF is not known to be established in California, it does not have any natural enemies to keep its population in check.

In 2009, one MDFF infestation was detected in Los Angeles County and five infestations were detected in San Diego County. The MDFF infestation in El Cajon (San Diego County) that started in 2008 was declared eradicated in 2009 (Table 10). Eradication activities included spinosad applications in a 200-meter radius around each MDFF detection site for one life cycle, sterile MDFF release, larval survey and fruit removal. Fruit infested with MDFF larvae was removed from 100-meters around each larval detection site.

Table 10. Mediterranean Fruit Fly Eradication Projects

County	City	Number Trapped	SIT Area (square miles)	Properties Under Ground Treatment	Fruit Removed (pounds)
Los Angeles	Santa Monica	3	9	126	5,607
San Diego	Escondido	7	44	788	4,080
	Fallbrook	4	9.35	206	51,422
	Imperial Beach	1	13	139	0
	Mira Mesa	6	102	335	1,795
	Spring Valley	2	25.2	147	0
	El Cajon	21	51	659	2,973
	Total:	44	253.55	2,400	65,877

Mexican Fruit Fly

The Mexican fruit fly (MXFF) is an exotic insect native to central Mexico. The conversion of large areas of native vegetation to agriculture and the subsequent artificial movement of host fruit within Mexico have resulted in a significant range expansion of the MXFF during the past century. In Mexico, the MXFF attacks over 40 different types of tropical and cultivated fruits, favoring citrus and mango. Important California crops which would be damaged by the introduction of this pest include peach, pear, grapefruit and orange.

In December 2008, four MXFFs were detected in the city of Azusa in Los Angeles County (Table 11), initiating an eradication project. Foliar ground treatment with spinosad was applied for 200 meters around each detection site. Fruit was cut in a 200-meter radius around each detection

EMERGENCY PROJECTS

site for the presence of larvae. Fruit was also removed from all host trees in a 100-meter radius around a detection site where an adult mated female was detected. Sterile MXFFs were released over 12.3 square miles at the rate of 750,000 MXFFs per square mile per week. This infestation was eradicated.

An infestation in Azusa, Los Angeles County, was declared eradicated in July. This concluded this program that began in December 2008. There were no MXFF eradication projects in 2009.

Ground Treatment with an Organic Pesticide

Table 11. Mexican Fruit Fly Eradication Projects

County	City	Number of MXFFs Detected	SIT Area (square miles)	Properties Under Treatment	Fruit Removed (pounds)
Los Angeles	Azusa[1]	4	12.3	391	6,321
	Total:	**4[1]**	**12.3**	**391**	**6,321**

[1]Project began in 2008 and completed in 2009.

Gypsy Moth

The gypsy moth (GM) is an exotic pest not known to occur in California. The gypsy moth is a voracious pest of trees. The goal of the GM program is to identify likely pathways for entry of this exotic pest and maintain an early detection program. An introduction into California would pose a major threat to the forest habitats as well as urban landscaping.

In 2007, four gypsy moths were trapped at a single property in Ojai, Ventura County. In 2008, seven additional adult gypsy moths were detected at four sites. Two egg masses were discovered during a survey that occurred in fall 2008. These finds triggered an eradication program in March 2009. Prior to the start of the treatment program, CDFA proactively initiated an outreach campaign, partnering with the Ventura County Agricultural Commissioner's Office, the Office of Environmental Health Hazard Assessment, U.S. Forest Service, the USDA, California Department of Pesticide Regulation and other local agencies. Despite these efforts, the program was not without opposition from a small group of residents. Through extended outreach and legal actions, all of the properties were treated according to established protocol.

Three biweekly treatments were applied to the foliage of all trees and shrubs in a 400-meter radius around adult gypsy moth and egg mass find sites using *Bacillus thuringiensis var. kurstaki* (Btk) (Figure 10). The first treatment began in March 2009 with treatment completed by late-April. A total of 584 properties received treatments. Post-treatment delimitation trapping yielded no GM in 2009. Trapping will continue through the 2010 trapping season to ensure eradication is achieved.

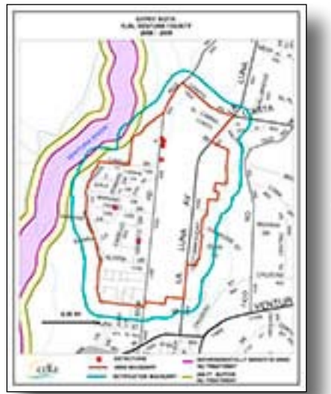


Figure 10. 2009 Asian Gypsy Moth Treatment Area – Ventura County

MULTI-YEAR ERADICATION PROJECTS

Asian Citrus Psyllid

The Asian citrus psyllid (ACP) is an exotic pest that is originally from Asia. It has been introduced into Central and South America, the Caribbean and Mexico. In the United States, ACP has been found in Alabama, Florida, Georgia, Hawaii, Louisiana, Mississippi, South Carolina, Texas and California. The ACP feeds on members of the Rutaceae, primarily on *Citrus* spp. and *Murraya* sp., but is also known to attack several other genera. The most serious damage caused by ACP is due to its ability to effectively vector the phloem-inhabiting bacterium *Candidatus liberibacter* spp. that causes Huanglongbing (HLB). HLB is considered one of the most devastating diseases of citrus in the world. Symptoms of HLB include yellow shoots with mottling and chlorosis of the leaves, misshapen fruit, fruit that does not fully color, and fruit that has a very bitter taste making it unusable for human consumption. The psyllids cause injury to their host plants via the withdrawal of large amounts of sap as they feed and via the production of large amounts of honeydew that coats the leaves of the tree, encourages the growth of sooty mold and blocks sunlight from reaching the leaves. This pest presents a major threat to citrus grown within the State. California is the top citrus producing state in the U.S., with total production valued at over $1.8 billion.

MULTI-YEAR ERADICATION PROJECTS

Since the detection of ACP in San Diego and Imperial counties in 2008, ACP was detected in Orange and Los Angeles counties. In August 2009, a small infestation of ACP was confirmed in Santa Ana (Orange County) and a large infestation was detected in Los Angeles County. These detections resulted in delimitation trapping and treatment 400-meters around the detection sites (Figure 11, Figure 12 and Figure 13). Additionally, treatment and trapping activities continue in San Diego and Imperial counties (Table 12). All host plants are treated with imidachloprid and cyfluthrin.

Table 12. Asian Citrus Psyllid Program Data

County	Number of Detection Sites	Number of Properties Treated
San Diego	134	1,189
Imperial	256	3,351
Los Angeles	680	9,072
Orange	7	534
Total:	**1,077**	**14,146**

Two major components of the treatment program are public outreach and environmental monitoring. Public meetings are held within the treatment areas to inform residents of CDFA activities and answer any questions.

Environmental monitoring ensures the protection of human health and the environment. Sampling media include air, leaf, soil, tank and water.

HLB surveys occur in all of the areas where ACP has been detected. To date, HLB has not been detected in California.

Yellow panel traps were also placed in citrus trees at exotic fruit fly trap sites throughout southern California to determine if ACP is present in these counties (Table 13).

Yellow Panel Trap Placed in a Citrus Tree

Table 13. Asian Citrus Psyllid Detection

County	Number of Traps	Number of HLB Samples	HLB Results
San Diego	5,834	224	Negative
Imperial	3,688	156	Negative
Los Angeles	12,209	478	Negative
Orange	2,721	12	Negative
Riverside	4,319	See citrus commodities survey	
San Bernardino	590	See citrus commodities survey	
Santa Barbara	350	See citrus commodities survey	
Ventura	1,653	See citrus commodities survey	
Total:	**31,364**	**870**	**Negative**

Other ACP Activity

On July 13, a Pest Exclusion canine team working at an air cargo facility, detected one adult ACP and several nymphs on curry leaves that was packed in personal luggage. The dead nymphs tested positive for HLB. Similarly, on August 26, 2009, a canine team in Sacramento intercepted a package at an air cargo facility that contained ACP on plant material. In both instances, delimiting traps were placed around the air cargo facilities and at the destination addresses. No additional ACP was detected.

Red Imported Fire Ant

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

Survey Activities

Northern California

A majority of the RIFA infestations can be traced back to out-of-state beehives that are brought into California with hitchhiking RIFA on the pallets the hives are placed on, and within the hives

MULTI-YEAR ERADICATION PROJECTS

themselves. These bee colonies are brought into the State to pollinate the almond blossoms. Therefore, the survey targets almond orchards, specifically the areas where the beehives have been placed within the orchard. Spam® bait are placed systematically throughout the orchard and inspected for RIFA.

General Survey

Approximately 27,000 acres of almonds were surveyed in Kern County and found to be free from RIFA. Nearly 65 percent of all of the almond acreage in the San Joaquin Valley has been surveyed for RIFA (Table 14).

Table 14. Almond Orchard Survey[1] – General Survey

County	Acres Surveyed		Samples Collected		Positive Sites		Cumulative Percent Almonds Surveyed
	Previous	2009	Previous	2009	Previous	2009	
Fresno[2]	114,578	0	28,744	0	10	0	88
Kern	83,333	27,256	15,242	1,580	5	0	82
Kings	8,127	0	1,581	0	0	0	100
Madera	75,820	0	20,258	0	7	0	91
Merced	41,018	0	11,351	0	14	1[3]	43
San Joaquin	3,000	0	1,121	0	1	0	7
Stanislaus	50,836	0	14,091	0	7	0	55
Tulare	1,303	0	1,112	0	0	0	7
Total:	378,015	27256	93,500	1,580	44	1	65

[1] Total almond acreage is 558,328

[2] 41,932 acres in Fresno County were resurveyed. The percent completed does not include the resurveyed acreage.

[3] Detected as a result of a delimitation survey.

Delimitation Survey

Delimitation surveys occurred around the Turlock, Ballico and the newly discovered Cressey infestations. Approximately 6,747 acres were delimited. Because the delimitation survey was not completed in 2009, these are the only areas where untreated RIFA infestations may exist. The delimitation survey will resume in 2010. All other known infested areas in the San Joaquin Valley have either been eradicated or treatment is nearly completed and RIFA may no longer exist.

Treatment Activities

Treatment activities continued in the San Joaquin Valley. All properties were treated with abamectin, pyriproxyfen or methoprene. The total RIFA-infested acreage increased by 2,827 acres as a result of new properties found to be infested in Ballico and Cressey. The total acreage that is being treated in the San Joaquin Valley increased by 304 acres.

The total acreage considered eradicated or that is in the post-treatment monitoring stage increased to 15,676 acres. Seventy-two percent of the acreage that was infested is no longer under a treatment program.

Post-Treatment Survey

Post-treatment survey was conducted primarily in Fresno and Madera counties. A limited amount of post-treatment survey was conducted in Chowchilla. A total of 3,866 acres were surveyed. Five surviving RIFA detections on 335 acres were discovered and treated. Seven properties totaling 712 acres were removed from treatment and will be included in the post-treatment surveys.

Southern California – Orange, Riverside, San Bernardino and Los Angeles Counties

Quarantine Activities

The RIFA quarantine remained unchanged in 2008 from its inception in 1999. Three counties are regulated in the 865.5 square mile quarantine zone: all of Orange (790 square miles), parts of Riverside (67 square miles) and parts of Los Angeles (8.5 square miles). The quarantine is designed to contain the spread of RIFA by requiring inspection and treatment of articles (nursery stock, soil, landscaping and beehives) through which the ant can be spread.

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

Regulatory Activities

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

Program staff issued 154 new compliance agreements, bringing total establishments monitored to 6,166.

PEST PREVENTION PROGRAMS

ESTABLISHED PEST PREVENTION PROGRAMS

Hawaii Fruit Fly Rearing Facility

The Hawaii Fruit Fly Rearing Facility (HFFRF) is the main supplier of sterile Mediterranean fruit fly (MDFF) pupae for CDFA's Preventive Release Program (PRP). The HFFRF is located on the island of Oahu, approximately 30 miles from Honolulu International Airport. Due to the HFFRF's close proximity to the airport, pupae are immediately transported there and placed on a flight to Los Angeles. This minimizes the amount of time the MDFF pupae are in hypoxia and therefore provides for a very high quality sterile MDFF. Overall, the facility produced sterile male MDFFs with 86 percent of the pupae emerging as adults and 81 percent were able to fly following emergence from the pupal case. The facility operates daily (7 days a week, 365 days a year) to meet the demands of the PRP. In 2009, the facility shipped over 160 million pupae per week.

Quality Control Tests

Mediterranean Fruit Fly Preventative Release Program

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

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

David R. Rumsey Emergence and Release Facility

Each week, 310 million sterile Mediterranean fruit fly pupae are delivered to the David R. Rumsey Emergence and Release Facility located on the Joint Forces Training Base (JFTB) in Los Alamitos. The sterilized pupae are shipped via air freight daily, throughout the year, from production facilities operated by CDFA in Hawaii and the USDA in Guatemala. Four days after the sterile MDFFs are received as pupae, they are released as adult flies from fixed wing aircraft over the Los Angeles Basin.

The standard rate of release is 62,500 sterile male flies per square mile per week, with a higher rate of 125,000 sterile male MDFFs being released in a historically high-risk area encompassing 250 square miles in central Los Angeles. A typical week features 56 missions flown over 15,000 linear miles to release 200 million sterile MDFFs.

To date, the PRP has been highly successful, resulting in a 97 percent reduction in the number of MDFF infestations in the Los Angeles Basin since the beginning of the preventive releases. After completing 13 years of the program, a total of 166 billion sterile MDFFs have been released during 31,925 flight missions traveling over 8,004,000 linear miles.

Current Sterile Insect Technique Programs

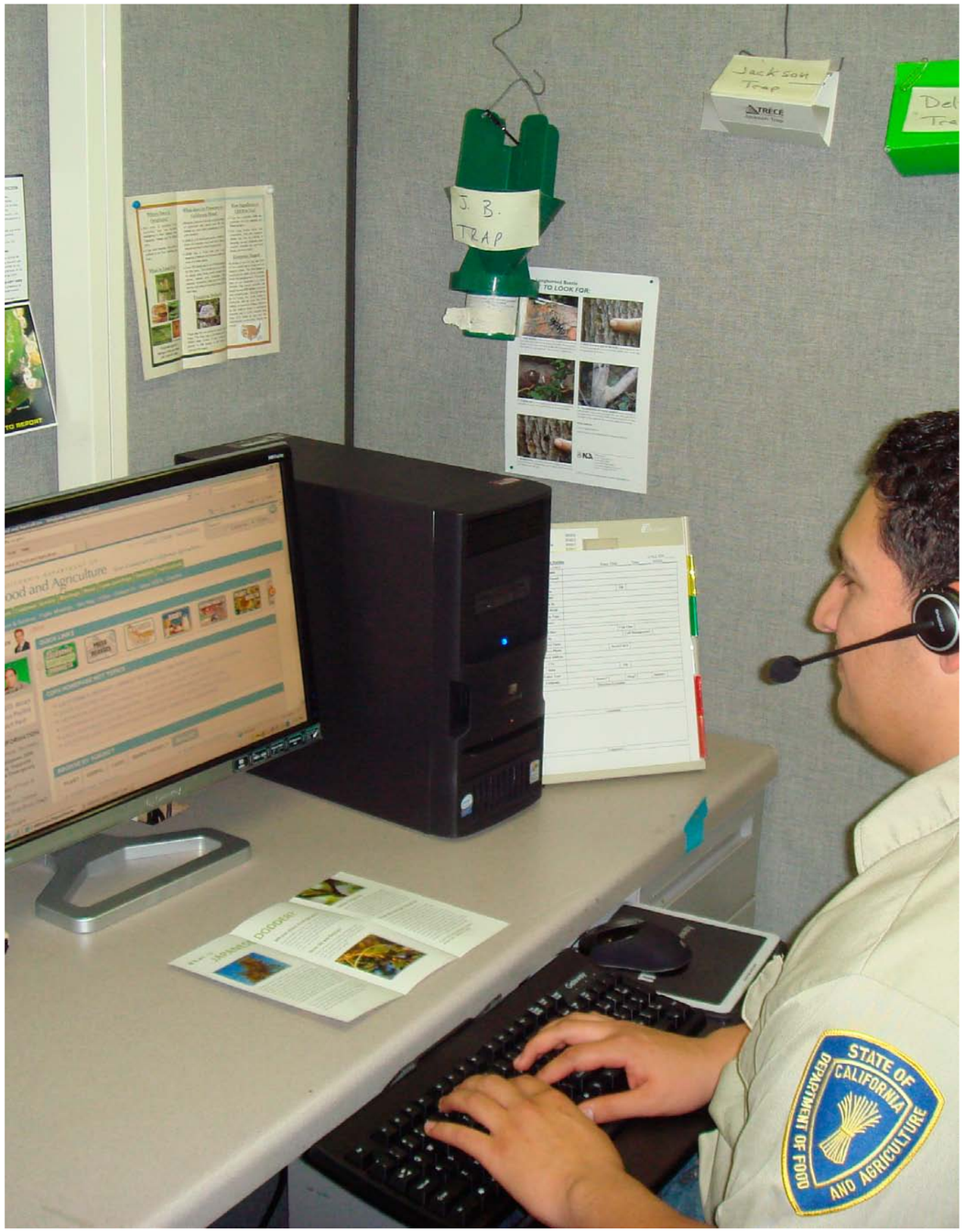
All MDFF and MXFF Sterile Insect Technique (SIT) eradication programs in California are based out of the Los Alamitos facility. In addition to regular releases over the Los Angeles Basin, in 2009 the PRP made eradicative releases of sterile MDFFs over communities in San Diego and Los Angeles counties. Additionally, sterile MXFFs were released over Azusa to eradicate an infestation (Table 15).

Table 15. Additional SIT Flights Due to Eradication Projects

County	Location	Type of Fly	Linear Miles	Flights per Week
San Diego	El Cajon	MDFF	9,256	2
	Escondido	MDFF	2,841	2
	Fallbrook	MDFF	579	2
	Spring Valley	MDFF	2,349	
	Mira Mesa	MDFF	8,248	4
	Imperial Beach	MDFF	466	2
Los Angeles	Santa Monica	MDFF	756	2
	Azusa	MXFF	2,544	5
		Total:	27,039	19

CDFA Exotic Pest Call Management System

The Exotic Pest Call Management System (CMS) is a toll-free telephone number, accessible statewide, providing information regarding current programs to the public with maximum efficiency. A menu driven format is available to any caller who wants to obtain information regarding CDFA activities. If the caller wants to talk to an attendant, this can be done as well. This information is recorded by an operator and entered into an Internet database. In 2009, the CMS received 3,975 calls from the public (Table 16).

Table 16. Calls to the Exotic Pest Call Management System

Pest	Calls Received
African Honey Bee	18
Asian Citrus Psyllid	2,172
Asian Gypsy Moth	15
Asian Longhorned Beetle	9
Avian Health Program	5
Diaprepes Root Weevil	157
False Codling Moth	2
Gladiolus Rust	10
Glassy Winged Sharpshooter	1
Guava Fruit Fly	70
Gypsy Moth	227
Huanglongbing	34
Japanese Beetle	31
Japanese Dodder	51
Light Brown Apple Moth	202
Mediterranean Fruit Fly	284
Mexican Fruit Fly	27
Oriental Fruit Fly	28
Other (Non-related)	128
Other (Related)	113
Red Imported Fire Ant	270
West Nile Virus	1
White Striped Fruit Fly	120
Total	**3,975**