

# Pierce's Disease Control Program 2007 Annual Report to the Legislature



CALIFORNIA DEPARTMENT OF  
FOOD & AGRICULTURE

# **Pierce's Disease Control Program**

## **California Department of Food and Agriculture**

### **Annual Report to the Legislature**

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A.G. Kawamura, *Secretary*

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## Statement of the Secretary

In 2007, the new pest on the block is the Light Brown Apple Moth (LBAM). Over the past few years, we've seen a steady march of new, invasive species ranging from an aggressive weed called Japanese dodder to an aquatic pest called Quagga mussel, to insects like the Asian longhorned beetle and the Diaprepes root weevil. Each pest brings with it a unique set of challenges for California, as did the glassy-winged sharpshooter when it arrived.

Each time a new pest arrives, this agency and our colleagues at the local and federal levels construct a program to eradicate or suppress the infestations if good science facilitates its feasibility. As we proceed through the necessary steps to combat these new pests, we often look to the established Pierce's Disease Control Program as a model of what works. From the advisory groups and researchers who keep us focused on the task at-hand, to the trappers and surveyors who accurately track the sharpshooter, to the industry and inspectors who keep nursery shipments free from this pest, every participant in this program serves a vital purpose and all of us together have moved consistently closer to a permanent solution to the problem of Pierce's disease.

As California's agriculture secretary, I commend our growers as well as the many staff, advisory panel members, researchers and other stakeholders who have helped make this program a success. This report summarizes and takes stock of these efforts. I look forward to continuing our work toward finding an innovative solution to Pierce's disease and the glassy-winged sharpshooter.

A.G. Kawamura, Secretary  
California Department of Food and Agriculture

## Executive Summary

During 2007 the Pierce's Disease Control Program (PDCP) continued to fulfill its mission of minimizing the statewide impact of Pierce's disease in California. The strategy of preventing the glassy-winged sharpshooter from spreading to new areas of the state once again proved feasible and effective at protecting susceptible, high-value crops and other valuable plant resources from the serious damage caused by the Pierce's disease bacterium. The PDCP proved successful in 2007 by utilizing the strength of its many components that include research, scientific advisory panels, biocontrol, outreach and education, multi-agency cooperation, and industry support.

During this year, researchers continued to generate vital information increasing our understanding of this complex disease and its transmission by the glassy-winged sharpshooter (GWSS). Researchers assembled once again in San Diego for the annual Pierce's Disease Research Symposium to share ideas and the progress of over 80 ongoing research projects. To accelerate these scientific findings, a Research Scientific Advisory Panel was appointed by the Secretary to evaluate recent research and identify those areas offering the most potential in the future.

Work continued toward implementing an approved treatment for nursery stock destined to GWSS uninfested areas. An ad hoc committee was created, including representatives from federal, state and county agencies and nursery industry members, to formulate standards for an approved treatment. The standards put forth from this committee were then reviewed by the Secretary's PD/GWSS Science Advisory Panel. Further steps for an approved treatment for nursery stock are pending in the near future.

Urban GWSS eradication methods in northern California counties continue to improve. The effectiveness is evidenced by the low numbers of GWSS trapped in Santa Clara County's infested areas and especially with the eradication of the GWSS infestation in Vacaville, Solano County in October 2007.

Biocontrol methods continued to be investigated, improved and refined. In 2007, biocontrol agents were released in over 13 sites throughout California. Areawide management programs continued to control GWSS in vast agricultural production areas.

The Pierce's Disease Control Program is moving out of its infancy and has become the role model for other CDFA emergency programs. Let there be no mistake that Pierce's disease is still a threat and is very lethal to grapevines. While regulatory, detection, control and eradication strategies are in place, until research finds a cure, the Pierce's Disease Control Program will continue to protect the most premium winegrapes in California, the nation and arguably the world.

# Background

## The Threat

Pierce's disease has been present in California for more than 100 years. The disease has caused sizable losses in California viticulture in the past, but the damage occurred primarily in traditional "hotspot" areas. Until recently, it was not severe enough to completely prevent grape production in areas where the pathogen was present. This situation changed dramatically with the arrival of the glassy-winged sharpshooter. Viticulture in traditionally safe growing regions is now at risk from the disease. Considering only grapes, the disease now threatens a crop production value of \$3.71 billion and associated economic activity in excess of \$51 billion. Other crop and ornamental plant resources such as almonds (\$2.52 billion) and susceptible species of citrus (\$1.22 billion), stone fruits (\$1.13 billion), and shade trees are also at risk, either from the Pierce's disease strain of the bacterium or from related strains found elsewhere in California, the United States and the world. To counter this threat, the Pierce's Disease Control Program was established within the California Department of Food and Agriculture to minimize the statewide impact of Pierce's disease and the glassy-winged sharpshooter.

## Pierce's Disease



A vine showing symptoms of Pierce's disease

Pierce's disease in grapevines was first noted in California near Anaheim around 1884. The disease is caused by a strain of the bacterium *Xylella fastidiosa*. It kills grapevines by clogging their water-conducting vessels (xylem). Several strains of this bacterium exist, attacking and causing damage to different host plants including grapes, citrus, stone fruits, almonds, oleander, and certain shade trees such as oaks, elms, maples, and sycamores. Since its discovery, Pierce's disease has been found in 28 California counties. The University of California reported that the disease destroyed over 1,000 acres of grapevines in northern California between 1994 and 2000<sup>1</sup>, causing \$30 million in damages. There is currently no known cure for Pierce's disease.

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<sup>1</sup> Report of the Pierce's Disease Research and Emergency Response Task Force. April 2000.

## The Glassy-winged Sharpshooter

The glassy-winged sharpshooter was first reported in California in 1994 but probably arrived in the state in the late 1980s. It is native to the southeastern United States and northeastern Mexico. It feeds on the xylem fluid of a large number of plants. This sharpshooter builds to large populations on a diverse array of host plants and is an aggressive flyer, traveling greater distances than native sharpshooters.

California's first indication of the severe threat posed by this new disease and vector combination occurred in Temecula, Riverside County in August of 1999, when over 300 acres of grapevines infested with the glassy-winged sharpshooter were destroyed by Pierce's disease.

Scientists believe that the glassy-winged sharpshooter has the potential to increase both the incidence and severity of Pierce's disease in California. As observed in the Temecula infestation, the sharpshooter:

- Builds to high populations that substantially increase the number of insects vectoring the destructive *Xylella fastidiosa* bacteria to crops;
- Travels longer distances in a shorter time than other sharpshooters;
- Makes use of more breeding habitats and plant hosts than native vectors; and
- Transmits the bacteria from vine to vine, resulting in an exponential increase in disease incidence in vineyards.

The combination of Pierce's disease and the glassy-winged sharpshooter constitutes an unprecedented threat to California's multi-billion dollar grape and wine industry, as well as to almonds, oleander, and other crop and ornamental plants.



Lifestages of the glassy-winged sharpshooter: egg mass, nymph, adult

# Program Description

The Pierce's Disease Control Program (PDCP) works to minimize the statewide impact of Pierce's disease and the glassy-winged sharpshooter. The strategy is to slow or stop the spread of the glassy-winged sharpshooter while short- and long-term solutions to Pierce's disease are developed. This strategy relies upon the following five elements:

## 1. Contain the Spread

Prevent the spread of the glassy-winged sharpshooter to new areas of the state by regulating shipments of host plants and other host material.

## 2. Statewide Survey and Detection

Find and monitor glassy-winged sharpshooter infestations and populations through trapping and visual survey.

## 3. Rapid Response

Respond quickly to detections of glassy-winged sharpshooter in new areas by intensively surveying the area and applying treatments if necessary.

## 4. Outreach

Raise awareness about Pierce's disease and its vectors while responding to the concerns of growers and the general public.

## 5. Research

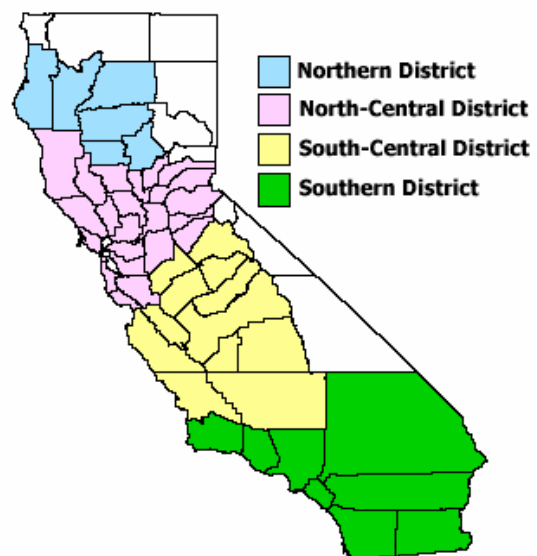
Develop solutions to Pierce's disease and its vectors.

## Organization

The PDCP is a partnership that includes the California Department of Food and Agriculture, the county agricultural commissioners, the United States Department of Agriculture, the University of California and the California State Universities, other state and local agencies, industry, and agricultural organizations throughout the state.

A statewide coordinator directs the program in accordance with the policies and priorities established by the Secretary of CDFA. Program staff are located throughout the state and are responsible for coordinating and implementing various elements of the program, as well as communicating with program stakeholders. This includes working closely with the county agricultural commissioners to ensure that program activities are conducted in

**Pierce's Disease Control Program Districts**



accordance with all statutory and regulatory requirements. Scientists at CDFA's Plant Pest Diagnostics Center provide pest identification services. Natural enemies of GWSS are produced in CDFA laboratory facilities in Riverside and Arvin. Researchers throughout the state and elsewhere are under contract with CDFA, USDA and other funding organizations. Local task forces help develop action plans, mobilize local resources, and share information with stakeholders and affected parties.

## County Workplans

The agricultural commissioner of each county is responsible for conducting local PDCP activities. These activities are guided by annual workplans developed by the county agricultural commissioners (in consultation with CDFA) and submitted to CDFA for approval. As stated in legislation (California Food and Agricultural Code Section 6046), county workplans must include the following elements:

1. Outreach presentations and training in local communities that respond to local concerns;
2. Ongoing training of employees in the biology, survey, and treatment of Pierce's disease and its vectors;
3. Identification of a local coordinator;
4. Proposed response to the discovery of the disease and its vectors (including delimitation and treatment); and
5. A system to track and report new infestations.

Program activities are conducted year-round. County agricultural commissioners submit activity reports electronically to CDFA each month. Audits are conducted on one or more counties each year to verify accuracy and appropriateness of charges and expenditures.

## Advisory Groups

Several groups advise the PDCP. These include the following:

### Pierce's Disease and Glassy-winged Sharpshooter Board

The PD/GWSS Board is composed of representatives from the winegrape industry. It provides recommendations to the Secretary on the use of funds collected under the PD/GWSS winegrape assessment, a statewide value-based assessment which has raised approximately \$28.4 million over the last six years. The Board is advised by subcommittees established to focus on specific areas and issues.

### Pierce's Disease Advisory Task Force

The Pierce's Disease Advisory Task Force is composed of county agricultural commissioners, scientists, agricultural representatives, and other experts. The Task Force meets regularly to review program progress and develop recommendations for the Secretary. Similar to the PD/GWSS Board, the Task Force is advised by subcommittees established to focus on specific areas and issues.

### **Pierce's Disease/Glassy-winged Sharpshooter Science Advisory Panel**

The PD/GWSS Science Advisory Panel is composed of university scientists who are experts on Pierce's disease and its vectors. The Panel provides input and expertise on scientific issues associated with the program.

### **Pierce's Disease Research Scientific Advisory Panel**

The Pierce's Disease Research Scientific Advisory Panel is composed of university scientists with expertise in research areas directly applicable to Pierce's disease and its vectors. It provides input and expertise on the PD/GWSS research effort.

### **Pierce's Disease Research Symposium Planning Group**

The Pierce's Disease Research Symposium Planning Group is composed of representatives from the University of California, USDA, and industry. This group assists the PDCP with the planning of the annual research symposium by providing input on the symposium's format, content, and schedule.

### **California Agricultural Commissioners and Sealers Association/ Glassy-winged Sharpshooter Advisory Group**

The California Agricultural Commissioners and Sealers Association (CACASA)/ Glassy-winged Sharpshooter Advisory Group is composed of agricultural commissioner representatives from each of the five CACASA area groups in the state. This group meets regularly to discuss issues of statewide and regional concern and to promote statewide program consistency, uniformity and good communication among state and county cooperators.

# Contain the Spread

The Contain the Spread element of the program is designed to prevent the spread of the glassy-winged sharpshooter to uninfested areas on articles and commodities shipped from infested areas. Emergency regulations governing the movement of nursery stock and bulk grapes were first adopted in July 2000. Regulations on bulk citrus were added later, following finds of live sharpshooters in citrus shipments. Permanent program regulations were adopted in July 2003.

## Nursery

Nursery stock is a high-risk commodity for spreading the glassy-winged sharpshooter. California has approximately 11,500 licensed nurseries, 72% of which are located in sharpshooter-infested counties. Many of these nurseries ship to the uninfested areas of the state. Activities to mitigate the risk of moving GWSS on nursery stock include:

1. Inspection of nursery stock in infested areas prior to shipping to non-infested areas;
2. Treatment of nursery stock when necessary;
3. Certification of shipments; and
4. Inspection of nursery stock at receiving nurseries prior to sale.

## Inspection Results

In 2007, there were 60,600 shipments of nursery stock from infested areas to uninfested areas. Viable life stages of GWSS were discovered on only 46 of these shipments. Compared to 2001, the total number of shipments has increased by 5% while the total number of loads with viable life stages has decreased by 70%.

Over 90% of all rejections between 2001 and 2007 have been for egg masses. The table on the right reflects the results of the ongoing nursery inspection and shipment certification program.

YEAR	NUMBER OF SHIPMENTS	GWSS FOUND	% FREE OF GWSS
2001	57,600	149	99.74%
2002	65,800	77	99.88%
2003	65,000	40	99.94%
2004	76,700	64	99.92%
2005	72,600	84	99.88%
2006	69,000	47	99.93%
2007	73,100	46	99.94%

Regulated nursery shipment results

## Enforcement Actions

Enforcement actions are taken against shipments and nurseries that are in violation of the regulations. Actions can be taken at origin or destination.

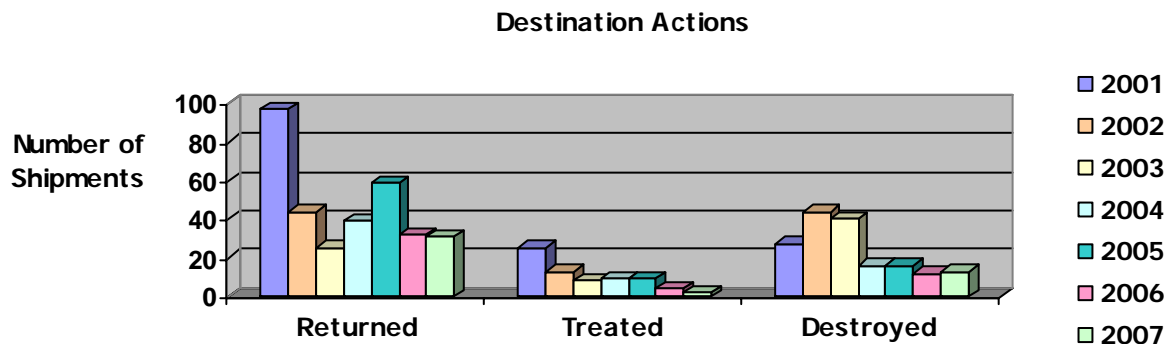
Actions that can be taken at origin consist of the following:

- **Restriction:** The nursery is restricted from shipping certain species of host material out of the infested area for a period of time.
- **Suspension:** The nursery is suspended from shipping all host material out of the infested area until the pest risk is mitigated.
- **Revocation:** The nursery's compliance agreement is revoked and it cannot ship any host material out of the infested area for an established period of time.

Actions that can be taken at the final destination of nursery shipments include the following:

- **Treatment:** The nursery shipment must be treated with an effective material.
- **Return:** The shipment must be returned to origin.
- **Destruction:** The shipment must be destroyed.

Shippers and receivers who violate nursery stock regulations are subject to fines. In 2007, administrative penalties were levied against seven companies, totaling \$10,450.



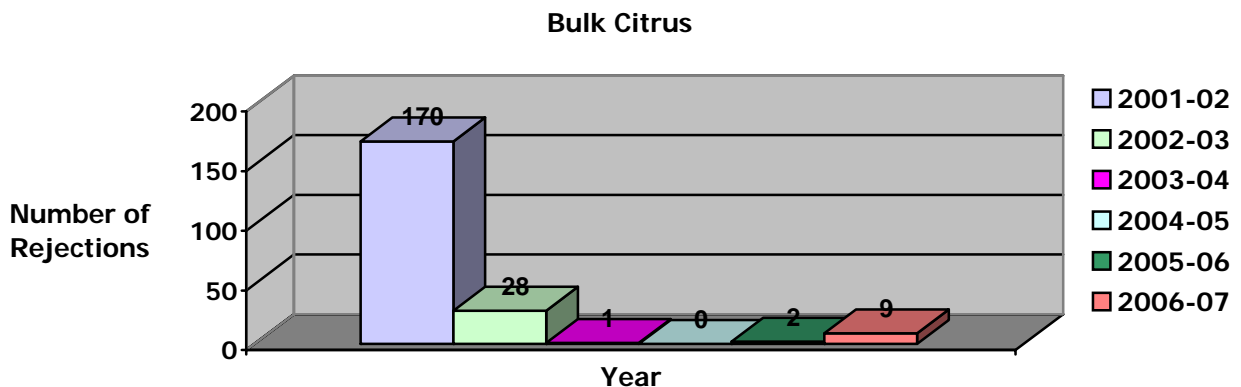
## Bulk Citrus

Citrus trees are primary hosts for the glassy-winged sharpshooter throughout the year. When the weather is warm, the insects are active and will flee the disturbances associated with harvest. However, once the weather turns cold, the sharpshooters are relatively inactive, and can end up in picking bags with harvested fruit, ultimately turning up at processing facilities in other parts of the state.



Citrus harvest and inspections

During the most recent citrus-shipping season (October 2006 through September 2007), live glassy-winged sharpshooters were found in only nine out of approximately 33,009 certified shipments of bulk citrus. This shipping season achieved a success rate of 99.98%. This success is attributed to the cooperative efforts of bulk citrus program participants.



Bulk citrus rejections have been reduced drastically over the past six years

## Statewide Survey and Detection

The Statewide Survey and Detection element of the program is designed to locate new glassy-winged sharpshooter infestations quickly, and verify that uninfested areas remain free of infestation.

The activities of this element focus on systematically surveying and trapping commercial and residential areas and nurseries to determine if GWSS is present. The program maintains an internet map server to quickly map and display discoveries of GWSS.

To survey for GWSS, yellow panel traps are deployed in 43 counties that are not infested or are partially infested with GWSS. Statewide, no new infestations of GWSS were found in 2007 and 35 counties were verified as being free of infestation (see figure next page). The GWSS are attracted to the trap's bright yellow color and will stick to the adhesive surface. County and state personnel service traps on a regular basis during the trapping season (March through October).

Each trap is checked bi-weekly and moved to a new location every six weeks. New traps are used as needed.

In 2007, program biologists provided detection training to 302 county and state personnel. Biologists assisted county personnel with field surveys and also conducted quality assurance examinations of state and county GWSS detection programs. Statewide, no new infestations of GWSS were found in 2007 and 35 counties were verified as being free of infestation.



A yellow panel trap in crape myrtle

## Glassy-winged Sharpshooter and Pierce's Disease Distribution



**January 30, 2008**

## Rapid Response

The Rapid Response element of the program involves responding quickly to potential new glassy-winged sharpshooter infestations. When one or more GWSS lifestages are found in a new area, a delimitation survey is initiated by the county agricultural commissioner's office to determine if an infestation exists and, if so, to identify its boundaries. In urban and residential areas, the program provides the funding for treatments, which are applied by or under the supervision of the county agricultural commissioner. In agricultural settings, treatments are the responsibility of the grower, and must be conducted in a manner approved and supervised by the commissioner.

In 2007, the GWSS infestation in Vacaville, Solano County, was declared eradicated. This followed upon no insects being found since May 2005. Statewide, rapid response intensive trapping detected GWSS at approximately 1,482 residential properties in the partially-infested counties of Fresno, Sacramento, Santa Clara and Tulare. Approximately 4,721 properties (infested plus adjacent properties) were treated during rapid response activities.



Visual survey after GWSS detection

### Pre-Treatment Communication with Stakeholders

In 2007, one public meeting was organized in Sacramento County with community members before the treatment of the GWSS infested area of the Foothill Farms neighborhood. This meeting provided residents the opportunity to learn and discuss the treatment process with environmental health and program specialists. Door-to-door contacts, direct mail, and/or local media sources were used to inform residents of the public meeting. Occupants of all properties scheduled for treatment were provided individual, advanced notification of the treatment date and time, the label of the pesticide to be used, and a phone number to call for more information. A database of threatened and endangered species was consulted to determine if any listed species were present in the treatment area. The United States Fish and Wildlife Service, the California Department of Fish and Game, the California Department of Pesticide Regulation, the California Department of Health Services, and other agencies were notified prior to treatment.

## Treatment

Public safety is the Department's number one concern whenever pesticide treatments are applied. Program staff and cooperators ensure that only registered materials are applied, in strict compliance with label and other restrictions.

Imidacloprid has proven very effective against the glassy-winged sharpshooter. It is used in treatment programs in urban and residential settings. Cyfluthrin is another material that has been used. The insecticide carbaryl has been used in residential settings and recent data shows that it is very effective against adult and emerging nymphs of GWSS on a broad variety of ornamental plants and fruit trees.

The Environmental Hazards Assessment Program of the California Department of Pesticide Regulation has monitored pesticide treatments to determine resulting target and non-target residue levels. This information is used by the PDCP to assess proper application rate and coverage. Sampling results and related monitoring reports are available on the Department of Pesticide Regulation's website:

[www.cdpr.ca.gov/docs/emon/epests/gwss](http://www.cdpr.ca.gov/docs/emon/epests/gwss).



# Outreach

The goal of the Outreach effort is to raise awareness about Pierce's disease, the glassy-winged sharpshooter and the threat they pose to agriculture and the environment of California. Public awareness leads to public involvement, which in turn leads to earlier detection of infestations and reduced damage from this serious pest and disease complex. The PD/GWSS Board initiated a public awareness campaign in 2004 and continues to raise winegrape grower awareness about ongoing program efforts that are funded by the winegrape grower assessment.

## PD/GWSS Board Outreach

In 2007, the outreach and education campaign continued with its efforts to communicate to the growers the progress being made in finding ways to control and manage PD/GWSS by highlighting the research funded by the winegrape grower assessment. Additionally, the PD/GWSS Board continued to provide background and supporting material to other audiences (advisors, media, and farm, regional and wine associations).

In July of 2007, the program initiated a monthly e-newsletter with current information about what was taking place around the state related to PD/GWSS. Soon after the first electronic mailing, the information also began appearing, usually verbatim, in most of the wine industry trade publications. The e-newsletter has quickly become a reliable method for getting program information out in a timely manner to all interested stakeholders.

The following materials were prepared or updated:

- Newsletters
- Website message board
- A tabletop display/exhibit
- Brochures
- Speaking points
- E-newsletter
- Presentation kit containing fact sheets, frequently asked questions, background information and list of resources

A quarterly newsletter continues to be mailed directly to California's more than 7,000 winegrape growers. The program continues to maintain a presence at key industry events with a tabletop display, accompanied by a brochure featuring research and control program progress around the state. This year, the PD/GWSS Board sponsored a research forum during the wine industry's largest trade show, the Unified Wine & Grape Symposium, as well as at the American Society of Enology and Viticulture's annual meeting in Reno. The forum allowed growers the opportunity to meet directly with researchers to learn about and discuss their research projects related to Pierce's disease and GWSS.

The PD/GWSS Internet Forum website message board, [www.pdgwss.net](http://www.pdgwss.net), created in the fall of 2006 continues to open lines of communication between stakeholders on the issues of Pierce's disease and GWSS. This website is intended to enhance communications between winegrape growers, researchers and others who share the common interest of eliminating the Pierce's disease and GWSS threat.

## Local County Outreach

Local county agricultural staff and industry members played key roles in maintaining program visibility and stakeholder awareness. County public outreach and education efforts included the distribution of Pierce's disease and GWSS informational material to local retail, production and shipping nurseries, landscape companies and to the members of the community. Industry trade publications, cooperative extension newsletters and media interviews also proved to be successful methods of outreach. Many counties participated in continuing education seminars and conducted training for landscapers, pest control operators, nursery employees and nursery association members.

## Research Symposium

The annual Pierce's Disease Research Symposium provides a venue for researchers and growers to interact and share information.



Researchers and other attendees viewing scientific posters at the Pierce's Disease Research Symposium

## Media Coverage

In 2007, articles and reports about Pierce's disease and GWSS continued to appear in national and international publications, on television and radio shows, and on internet websites. On balance, the coverage has been fair and factual and has included many statements and information generated by the Outreach Program.

## Informational Materials

Over the years, the Outreach Subcommittee of the PD/GWSS Board compiled a list of outreach materials produced by the PDCP, county officials, the University of California, and industry groups. These materials can be quickly adapted to match local needs, and help deliver a more consistent and cohesive message.

## Website

The CDFA has a highly successful website dedicated to Pierce's disease and GWSS. The website, which was activated in March 2000, offers frequent updates on program activities, survey guidelines, regulatory guidelines, upcoming meetings and events, the GWSS host list, and other information. In addition, the website provides an interactive interface that allows direct activity reporting by local entities. The PDCP website was recently reorganized as part of the State's new website design and is now located on the internet at: [www.cdfa.ca.gov/phpps/pdcp](http://www.cdfa.ca.gov/phpps/pdcp).



A graphic from the PDCP website

# Research

Research continues to be an integral part of the Pierce's Disease Control Program. In 2007, the flurry of research activity that began at the start of the program continued with approximately 80 projects being worked on by some of the nation's top plant health researchers. Projects ranged from lab-based investigations at the molecular and genomic levels to areawide projects in major agricultural areas. The information generated provided valuable insight into the biology, ecology, and behavior of Pierce's disease and its vectors, moving us closer to an eventual solution.

In 2007, the PDCP continued to contract with a consultant to serve as PD/GWSS research director. Also in 2007, a Research Scientific Advisory Panel (RSAP) was appointed by the Secretary to provide input and expertise on the PD/GWSS research effort. Following a similar review by the National Academy of Science, the RSAP reviewed all PD/GWSS research conducted since 2004. In August 2007, the RSAP issued its report, providing an overview of research progress and giving recommendations on where to invest future research resources. The report is available online at

[www.cdafa.ca.gov/pdcp/Documents/RSAP\\_Final\\_Report\\_08302007.pdf](http://www.cdafa.ca.gov/pdcp/Documents/RSAP_Final_Report_08302007.pdf).



## Research Symposium

Every year, the PDCP organizes a research symposium focused on Pierce's disease and its vectors. Approximately 200 persons attend these meetings to share information and learn more about the progress being made against Pierce's disease. The 2007 symposium was held in mid-December in San Diego.

A compendium of research progress reports is prepared each year and distributed at the symposium. This document, known as the Proceedings, can also be accessed electronically on the program's website ([www.cdafa.ca.gov/pdcp/Research.html](http://www.cdafa.ca.gov/pdcp/Research.html)).

## Research Proposal Solicitation and Review

In 2007, the PDCP consolidated its research proposal solicitation and review process with the University of California's Pierce's Disease Research Grants Program. A total of 49 proposals were reviewed, with CDFA managing ad hoc reviews and the University of California managing panel reviews. Based on the feedback received during this extensive vetting process, 14 research projects, totaling \$2.06 million, were selected for funding by CDFA using winegrape assessment funds. Despite reduced funding availability, the University of California was still able to fund four projects, totaling \$540,000.

## Pilot Projects

### Nursery Treatment Pilot Program

The Nursery Treatment Pilot Program began in June 2005. This program was implemented in an effort to reduce the costly inspection program that currently exists, and to further test the efficacy of laboratory-proven pesticides in real delivery situations. In this program, sleeved egg masses on plant material are treated with selected chemicals and are allowed to enter designated non-infested nurseries under a special compliance agreement. Since the inception of the program, no viable life stages have been found in any of the test shipments.

## Areawide Treatment Programs

The areawide program coordinates insecticidal treatments in commercial citrus blocks and urban areas along with the release of biological control agents.

### Kern County

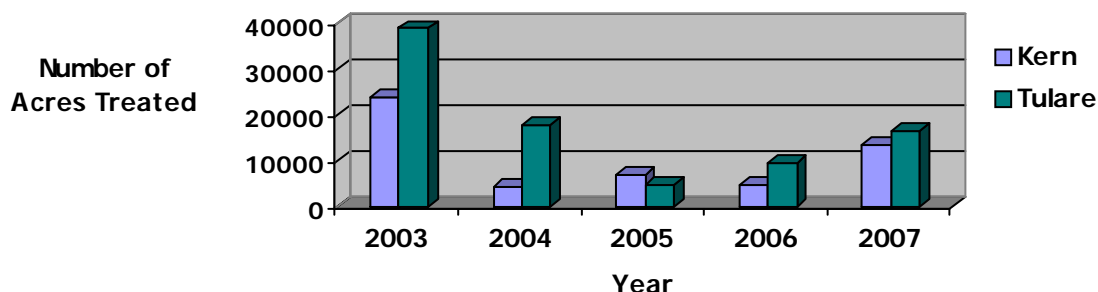
The Kern County Pest Management Pilot Project has proven to be successful at dramatically reducing GWSS populations and was therefore utilized as the model for areawide programs in Fresno, Kern, Riverside, Tulare and Ventura counties. Monitoring for GWSS and Pierce's disease is occurring throughout most of these project areas.

In 2007, the boundaries of the Kern County infested area remained the same as in 2006. The infested area includes agricultural lands as well as Bakersfield and several smaller Kern County communities. There were 13,601 acres of citrus and several stands of windbreaks treated with a variety of insecticides in 2007. This is higher than the 4,788 acres of citrus treated in 2006. The increase is partially due to coordinated foliar applications in the fall because of increased GWSS detections this year. The last time GWSS populations required a coordinated treatment effort was 2004.

### Tulare County

The infested area in Tulare County has not expanded since 2004 when the last coordinated treatments were applied. There were 16,609 acres of citrus treated in 2007, with 15,501 acres treated with Assail and 1,108 acres treated with Pyrethrins. The 2007 acreage compares to 9,614 acres treated in 2006. The Tulare acreage authorized to treat is higher this year because of the coordinated fall foliar treatments required due to rebounding GWSS populations.

**Areawide Citrus Acreage Treated in Kern and Tulare Counties**



## Fresno County

In the summer of 2003, Fresno County implemented areawide trapping for GWSS in citrus groves. Through 2007, no GWSS have been detected within the areawide program, and no treatments were needed.

## Riverside County - Coachella Valley

In 2007, the GWSS management boundaries remained the same as in 2006. Treatments for GWSS were initiated when at least two GWSS adults were found in the same trap location for two consecutive weeks. All citrus within a one mile radius from the trap find was treated. A total of 885 acres of citrus were treated with Imidacloprid.

## Riverside County - Temecula Valley

In 2007, the GWSS management boundaries remained the same as in 2006. Treatments were dependent on GWSS finds. There were 40 acres of conventional citrus treated with Lorsban followed by an application of Imidacloprid and 30 acres of organic citrus that were treated with Pyrethrins.

## Ventura County

The GWSS management program in Ventura County continued in 2007 as an areawide trapping program, monitoring GWSS populations in citrus groves throughout the county. Nurseries within the Ventura areawide program were given the option of applying and being reimbursed for treatments that coincided with surrounding citrus treatments. In 2007, three nurseries treated four different locations totaling 380 acres.

## Epidemiology Projects

In 2007, a new management protocol to prevent the vine-to-vine spread of Pierce's disease by the glassy-winged sharpshooter was developed for southern California grape production areas such as Temecula. A cooperative USDA-UC-CDFA-industry team combined the results of the last six years of epidemiological research and worked together this year to define and test the new management practice. The new practice is simple and cost effective. It will enable growers in southern California to operate without the significant losses from Pierce's disease that have impacted the industry since GWSS became established.

When the team surveyed the Temecula area, they found that the vineyards that have been treated for the last three to six years were effectively disease-free, even in the presence of low to moderate levels of GWSS. The neighboring untreated vineyards sustained losses of as many as 20-80+% of the vines over the same period.

In southern California there is a window of vulnerability for vine-to-vine transmission of *Xylella fastidiosa* that we have now learned begins in late May or early June. If vineyards can be chemically protected during this vulnerable period, losses from Pierce's disease can be prevented. Research has shown that a systemic neonicotinoid insecticide, such as Imidacloprid, can protect vineyards from vine-to-vine transmission. It has also been learned that one application of Imidacloprid applied through the drip irrigation system in mid-May will persist at effective levels through the rest of the growing season, protecting the vineyard from Pierce's disease.

The team is recommending the following three actions: (1) apply a systemic insecticide, such as Imidacloprid, at the recommended concentration in mid-May; (2) monitor the vineyard for diseased vines at the end of the growing season (when symptoms are readily observable) and remove them; (3) maintain an areawide GWSS management program to prevent the level of population outbreaks that occurred during the Temecula epidemic. This management tool works when GWSS populations are kept at low to moderate levels. It is unknown however, what might happen if the GWSS population exploded to the very high levels seen in the late 1990s.

This management tool should be effective in Santa Barbara, Ventura, Los Angeles, Riverside, Orange, San Diego and possibly Imperial counties. In these areas vine-to-vine transmission poses the greatest risk for Pierce's disease losses. In the north, vector insects transmit *Xylella* infections that are acquired from sources outside the vineyard, from other plants that harbor the bacterium. In north coastal areas, like Napa Valley for example, the vulnerable time in the season is during the first four to eight weeks after bud-break. Because the northern winter climate is more severe and inhospitable to *Xylella*, vines that acquire their infection after this vulnerable time period, lose their infection during the dormant season and are free of disease the following year. Because vine-to-vine transmission cannot begin until well after eight weeks into the season, such infections do not survive the winter. Vine-to-vine transmission of *Xylella* occurs in the north, but the infections do not survive to cause disease or economic loss.

Because this new management tool is based on the use of insecticides, it is possible that GWSS may eventually develop resistance to the effects of the chemicals used. Therefore, this management practice does not replace the promising new lines of research leading to more robust and final solutions to the management and prevention of Pierce's disease. California's agricultural losses from Pierce's disease are economically significant and a comprehensive cure independent of insecticide usage would benefit growers in all regions of the state.



**Treated:** This healthy three-year-old vineyard has been treated using the new management protocol. The fallow land behind the vineyard is where vineyards were lost to Pierce's disease and removed during the epidemic of 1996-2000.



**Untreated:** The many blue stakes in this four-year-old untreated vineyard are where vines have been lost to Pierce's disease and are being replanted.

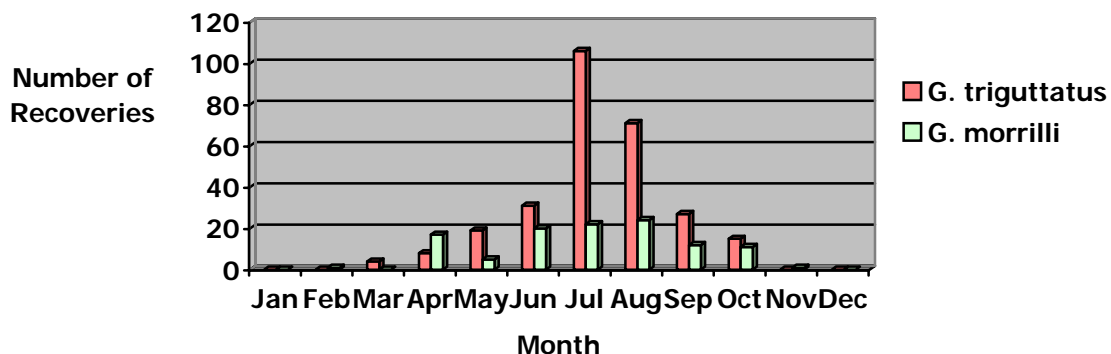
# Biological Control

The GWSS biological control group has been producing, releasing, and evaluating agents for the control of GWSS since 2000. Since the inception of the program, over 1.5 million parasitoids have been released to control GWSS. A total of seven species of parasitoids have been produced by the CDFA production facilities in Kern and Riverside counties. These species have been released in 13 counties over the past seven years. It is only after this length of time that the success of the parasitoids can be properly evaluated and steps taken to improve the biological control aspect of this program. As a part of the evaluation process of introduced agents, native and introduced natural enemies have also been evaluated for their importance in controlling GWSS. This information is invaluable in assessing the importance of natural enemies in suppressing GWSS populations and the potential of new agents.

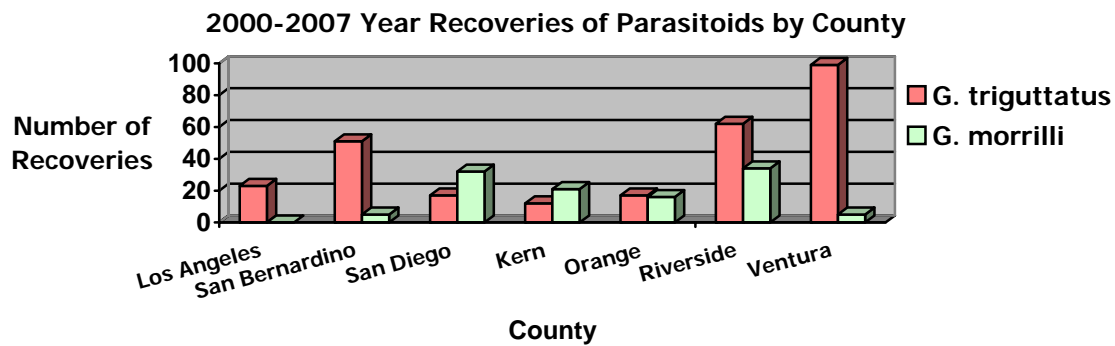
A structured monitoring protocol has been in place at all release sites since 2002. The density of egg masses in the field are evaluated by counting the number of egg masses present on 30 leaves for 10 trees at each site. The population of the two primary parasitoids being released in the field build-up in the summer with a gradual decline towards winter following the decline of GWSS oviposition rates.

The number of recoveries is correlated with the time of year, the location in which they are released and the numbers released at each site. In 2007, *Gonatocerus triguttatus* was most frequently recovered from Ventura County where the majority of releases occurred. Recoveries of *Gonatocerus morrilli* were low in Ventura County since releases only began in 2007.

**2000-2007 Year Recoveries of Introduced Parasitoids in California**



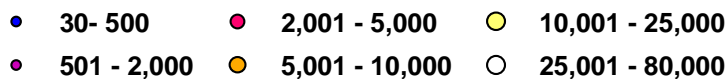
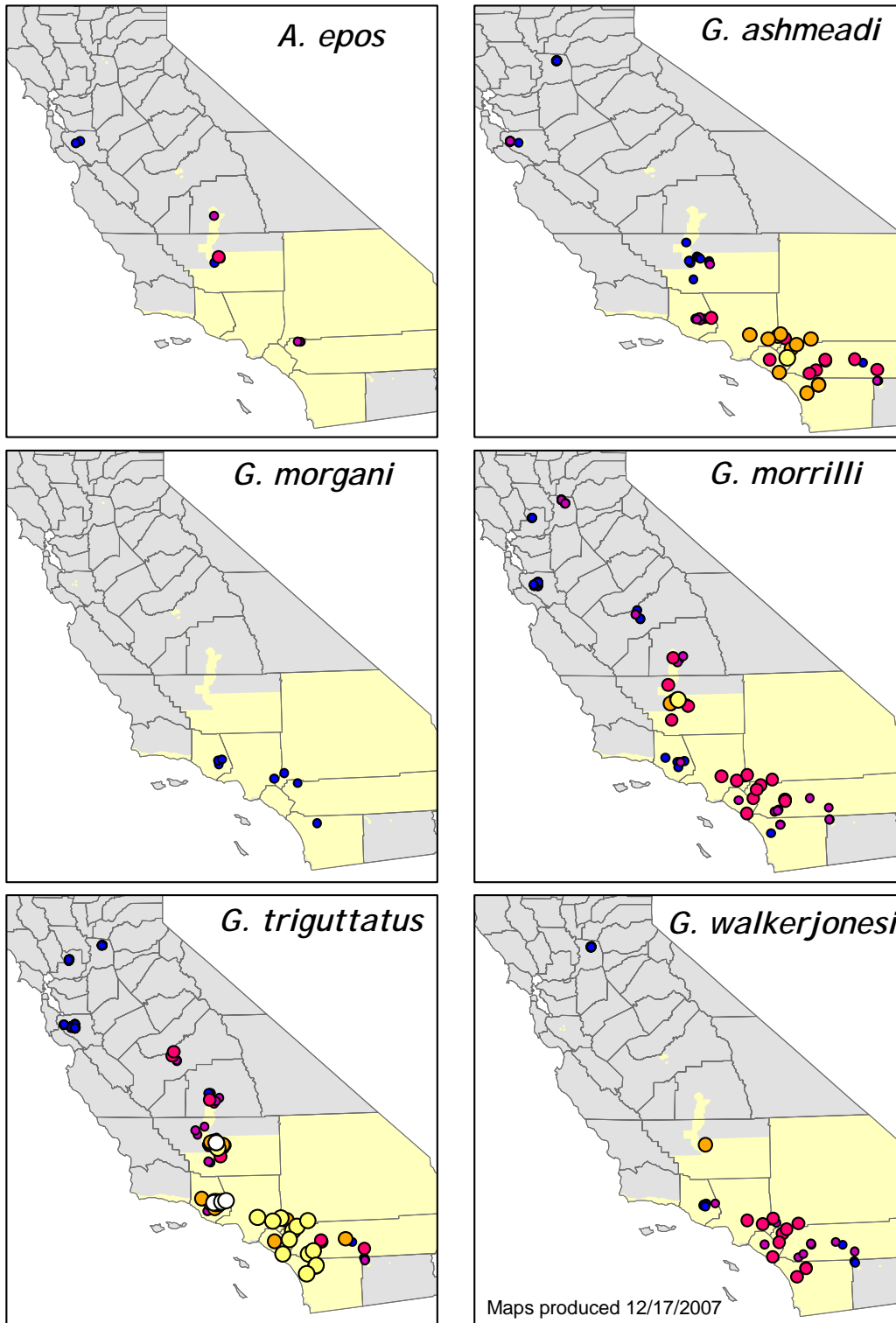
This data does not include the numbers of natural enemies already present in California. Many species of parasitoid that attack GWSS are considered native to California and play an important role in suppressing GWSS populations. Native parasitoids include *Gonatocerus ashmeadi*, *Gonatocerus walkerjonesi*, and *Gonatocerus incomptus*, and are responsible for at least 50% of all egg mortality in the field.



Information gained through monitoring allows us to develop management decisions regarding the value of specific biological control agents in suppressing GWSS in California. For example, *Gonatocerus morgani* has successfully spread from its first identified location in Orange County southward to San Diego County. Following this observation, a colony has been established and releases are currently being made at locations geographically isolated from the original site. This practice has two benefits: first, there is strong evidence of the efficacy of this parasitoid in California, and second, no time-consuming pre-release trials are necessary because the parasitoid was first identified in California.

Accomplishments for 2007 include the establishment of *Gonatocerus morgani* colonies for release throughout southern California and a doubling of the number of egg masses parasitized by *Gonatocerus triguttatus* and *Gonatocerus morrilli*, indicating effective establishment in California. At one site, *Gonatocerus morrilli* became the predominant natural enemy for a month prior to the build-up of the native natural enemy *Gonatocerus ashmeadi*. This is of particular note as *Gonatocerus morrilli* was only recently introduced into the state.

# Biological Control Release Sites



Total # of agents released for biological control of GWSS in California 2001-2007

## Environmental Compliance

In 2007, the California Department of Food and Agriculture continued with its commitment to ensuring that the Pierce's Disease Control Program is conducted in an environmentally responsible manner. These efforts include adhering to a special notification and consultation process with federal and state environmental stewardship agencies prior to treatment, ensuring that pesticide applications are performed by licensed pest control professionals in strict accordance with pesticide laws and regulations, and conducting environmental monitoring during some pesticide treatments.

A statewide programmatic environmental impact report (EIR) was released for the PDCP in mid-2003. A legal challenge was filed against the EIR shortly thereafter. Although a trial court found the EIR to be adequate, the State Appeals Court later reversed the trial court's judgment. In 2007, the CDFA began the process of complying with the Court's ruling by securing the services of an environmental consulting firm to prepare the environmental analyses, documents, and risk assessments called for by the Appeals Court. This work will continue in 2008.

# Financial Statement

<b>FISCAL YEAR</b>	<b>2006/07</b>	<b>2007/08</b>
<b>REVENUE</b>		
State (Budget Act)	\$ 4,500,225	\$ 4,549,000
Federal (USDA)	\$ 14,832,260	\$ 15,300,000
<b>Total Revenue</b>	\$ 19,332,485	\$ 19,849,000
<b>EXPENDITURES</b>		
Personal Services	\$ 3,850,721	\$ 3,844,335
Operating Expenses	\$ 3,629,245	\$ 1,904,665
County Payments	\$ 11,852,519	\$ 14,100,000
<b>Total Expenditures</b>	\$ 19,332,485	\$ 19,849,000

## Abbreviations/Acronyms

CACASA	California Agricultural Commissioners and Sealers Association
CCC	California Conservation Corps
Caltrans	California Department of Transportation
CDFA	California Department of Food & Agriculture
EIR	Environmental Impact Report
GWSS	Glassy-winged sharpshooter
LBAM	Light Brown Apple Moth
PD/GWSS Board	Pierce's Disease & Glassy-winged Sharpshooter Board
PDCP	Pierce's Disease Control Program
RSAP	Research Scientific Advisory Panel
USDA	United States Department of Agriculture
USDA-ARS	United States Department of Agriculture-Agricultural Research Service