PIERCE'S DISEASE CONTROL PROGRAM

REPORT TO THE LEGISLATURE

California Department of
Food and Agriculture

FEBRUARY 2004

Pierce's Disease Control Program
California Department of Food and Agriculture

Report to the Legislature

Arnold Schwarzenegger, *Governor*
A.G. Kawamura, *Secretary*

Published by the California Department of Food and Agriculture
2014 Capitol Avenue, Room 109, Sacramento, CA 95814

Cover design by Paul Gordon, Peggy Blincoe & Roger Spencer, CDFA
Photo courtesy of Jeff Erwin, Napa County Agricultural Commissioner's Office

Table of Contents

Statement of the Secretary

In August 1999, grape growers in California's Temecula Valley saw their crops wither and die from the effects of Pierce's disease. California's grape, citrus and nursery industries acted quickly to form a coalition with agricultural agencies to address the threat being posed by the glassy-winged sharpshooter, a pest that spreads this disease.

The California Department of Food and Agriculture (CDFA) plays a key role in nurturing and protecting California's crops, and also the environment, jobs and many other elements of our society that are linked to agriculture. For the past four years, the Pierce's Disease Control Program has devoted considerable resources and expertise to protect the state from the glassy-winged sharpshooter and the disease-causing bacteria it spreads. We have been successful in controlling the spread of the pest and continue to work with the top-research scientists and advisors to explore long-term solutions. The prestigious National Academy of Sciences has joined this think-tank of experts to provide guidance and leadership by exploring a variety of scientific areas. Field personnel and county agricultural staff diligently maintain surveillance and eradication efforts to protect not just grapes but also almonds, alfalfa, peaches, plums and other crops vulnerable to this disease. The nursery and citrus industries are also key participants in the program, not because they are targeted by the disease, but because their crops are key hosts of this pest and their cooperation allows us to effectively limit the spread of the glassy-winged sharpshooter.

California's grape crop has an estimated economic impact of $50 billion. Almonds also are a top-ten crop, and California's leading agricultural export. Add the economic weight of the additional crops protected by this program, and its importance is readily apparent. California's wine industry, which has the most at stake in this fight, has worked hard to develop the consumer's trust and confidence in their product. However, the competition from growing wine markets in Chile, Australia, Mexico, Oregon and Washington is fierce. These emerging markets understand the value and economic impact the wine industry has on California and hope to capture part of that market. If California is to retain this vital industry, it is critical that the state provide an environment in which our producers and farmers can grow a safe, reliable product. The threat of Pierce's disease adds one more challenge to this vital industry. California must continue its work to limit the spread of the glassy-winged sharpshooter and maintain an aggressive research regimen to develop a long-term solution to Pierce's disease.

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

Executive Summary

The year 2003 was a year of accomplishments for the Pierces' Disease Control Program (PDCP). Our mission to control the spread of the vector, the glassy-winged sharpshooter (GWSS), until a cure for Pierce's disease can be found was achieved through strong regulatory programs, research, and diligence of collaborating agencies and industry.

Glassy-winged sharpshooter infestations were contained and were eradicated in one urban community. The statewide trapping program for the glassy-winged sharpshooter revealed that this pest did not invade additional California counties in 2003 and it was declared eradicated from Butte County.

Research holds the answers for long and short-term solutions. The PDCP organized a research symposium in early December bringing together scientists from many universities and agencies who are investigating over 103 different scientific projects.

The PDCP's biological control activities increased significantly in 2003. The number of biological control agents released and recovered increased by over 65 percent compared to last year. In 2003, there were over 500 separate releases of beneficial organisms covering 46 locations in ten counties.

Two important documents were completed this year. In May 2003, an environmental impact report (EIR) for the PDCP was released and certified. In July, the PDCP's emergency regulations were established as permanent program regulations.

Regulatory programs to prevent the movement of GWSS in nursery stock, bulk citrus, and bulk grapes were very successful in 2003. The nursery industry shipped plants for a record number of months without hitchhiking glassy-winged sharpshooters. Bulk citrus loads with live glassy-winged sharpshooter showed a marked improvement, dropping from 170 infested shipments in 2002 to only 28 in 2003. As in past years, no glassy-winged sharpshooters were found in bulk grape shipping containers.

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 and until recently was usually not severe enough to completely prevent grape production in affected areas. This situation changed dramatically with the arrival of the glassy-winged sharpshooter. Viticulture in traditionally safe-growing regions are now at risk from the disease. Counting only grapes, the disease now threatens a crop production value of $3.2 billion and associated economic activity in excess of $33 billion. Other crop and ornamental plant resources such as almonds ($897 million) and susceptible species of citrus ($1.07 billion), stone fruits ($905 million), and shade trees are also at risk, either from the Pierce's disease strain of the bacterium or from related strains found elsewhere in the world. To counter this threat, the Pierce's Disease Control Program was established within the Department of Food and Agriculture minimizing the statewide impact of Pierce's disease and the glassy-winged sharpshooter.

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 spread to other areas of the state and is currently known to exist in 25 counties. The University of California reported that the disease destroyed over 1,000 acres of grapevines in northern California between 1994 and 2000[1], causing $30 million in damages. There is currently no known cure for the disease.

Grapevine showing symptoms of Pierce's disease.

The Glassy-winged Sharpshooter

The glassy-winged sharpshooter was first reported in California in 1994 but probably arrived and established itself 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. The sharpshooter builds up large populations on a diverse array of host plants and is an aggressive flyer, traveling greater distances than native sharpshooters.

[1] Report of the Pierce's Disease Research and Emergency Response Task Force - April 2000.

California's first indication of the severe risk 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.

Adult glassy-winged sharpshooter.

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 *X. fastidiosa* bacteria to crops;
- Covers 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.

Program Description

The Pierce's Disease Control Program 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 plant materials.

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 the 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.

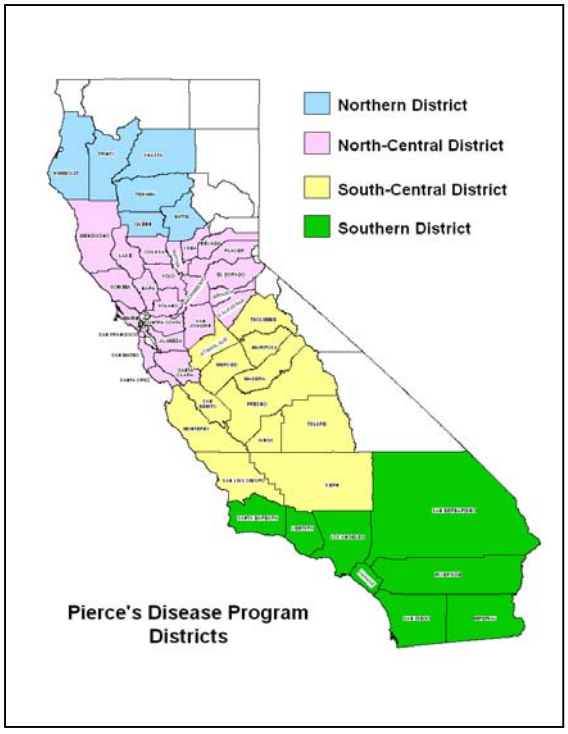
5. Research

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 (USDA), the University of California, other state and local agencies, industry, and agricultural organizations throughout the state.

A statewide coordinator directs the program in accordance with the policies approved by the secretary of Food and Agriculture. 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 accordance with all statutory and regulatory requirements. Scientists at CDFA's



Map showing the Program districts.

Plant Pest Diagnostics Center provide pest identification services. Natural enemies of the glassy-winged sharpshooter are produced in CDFA and USDA laboratory facilities in Riverside and Bakersfield. Research is performed by researchers throughout the state and elsewhere under contract with CDFA, the USDA, industry, 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 that are developed by the agricultural commissioners and submitted to CDFA for approval. As stated in legislation (Senate Bill 671), 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 reports electronically to CDFA each month to report activities and support invoices. 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 Pierce's Disease and Glassy-winged Sharpshooter (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 winegrape assessment, which over two years has raised approximately $10 million. Similar to the advisory task force, 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. Subcommittees that focus and provide input on specific areas of the program advise the task force.

Pierce’s Disease/Glassy-winged Sharpshooter Science Advisory Panel

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

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 and good communication among state and county cooperators.

Pierce's Disease Research Symposium Planning Group

The Pierce's Disease Research Symposium Planning Group is composed of representatives from the University of California, United States Department of Agriculture, 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.

Program Goals for 2004

- Implement an approved treatment process for nursery stock shipments;
- Expand rearing capacity and releases of biological control agents;
- Identify additional parasitoids to augment the existing biocontrol efforts;
- Review the National Academy of Sciences research recommendations and develop an implementation plan for suggested improvements; and
- Develop a process to effectively communicate research findings and results to stakeholders.

Summary of Accomplishments in 2003

The following summarizes the major accomplishments of the Pierce's Disease Control Program in 2003.

Contain the Spread

- Approximately 65,000 shipments of regulated plant material were made in 2003, with only 39 problem shipments. This represents a decrease of 66 percent in shipments containing the glassy-winged sharpshooter when compared to the previous two years.
- Program staff conducted 14 training sessions to prepare county staff for the busy spring nursery stock shipping season.
- The success of the bulk grape shipping inspection and certification program continued in 2003 with no glassy-winged sharpshooters detected in shipments.
- Revised and expanded regulations for bulk citrus shipments were implemented statewide in 2003, resulting in an 83.5 percent reduction in shipments containing the glassy-winged sharpshooter.

Statewide Survey and Detection

- Results from statewide survey efforts confirmed that 36 California counties remain completely free of the glassy-winged sharpshooter.
- Survey efforts found new infestations in Imperial County and expansion of infested areas in Fresno, Kern, and Tulare counties.
- Quality control checks concentrated on county and state trapping programs to ensure effectiveness and statewide consistency.
- During 2003, the PDCP provided onsite detection training to county personnel in 21 counties.

Rapid Response & Control Activities

- In November 2003, the glassy-winged sharpshooter infestation in Butte County was declared eradicated. This marks the second time an incipient, isolated infestation of GWSS has been eradicated.
- Delimitation and treatment activities continued against isolated infestations of GWSS in Fresno, Imperial, Sacramento, Santa Clara, and Tulare counties.

Public Outreach

- County agricultural staff and industry members continued to play key roles in maintaining and increasing public awareness about Pierce's disease and GWSS. A variety of new programs were implemented at the local level in 2003.
- CDFA made additional informational materials and a training video were made available in English and Spanish on a statewide basis.

Research

- The nation's top plant health and pest researchers were engaged in 103 research projects to aid in the fight against Pierce's disease and the glassy-winged sharpshooter.
- The third annual PD Research Symposium was held in December 2003, bringing together scientists currently engaged in Pierce's disease research projects. The Symposium Proceedings were published and distributed to those attending the event and can be downloaded from the Pierce's Disease Control Program's website: http://www.cdfa.ca.gov/phpps/pdcp/docs/2003Proceedings3version.zip
- The National Academy of Sciences continued its review of past, current, and potential research activities to develop a long-term research strategy to combat Pierce's disease and its vectors. The report is expected in mid-2004.
- Pest management pilot projects were continued in Riverside, Kern, Ventura, and Tulare counties. These projects are partnerships between CDFA, USDA, county agricultural commissioners, the University of California, and the agricultural industry. The PDCP participates by conducting trapping and providing other support.
- Scientists from the CDFA and the University of California developed an effective low-cost method for growers to identify and remove diseased vines from their vineyards. This will greatly reduce vine-to-vine spread of the disease and the risk of losses from Pierce's disease in areas where glassy-winged sharpshooter is present.

Biological Control

- The CDFA has released 909,000 parasitic wasps for the control of the glassy-winged sharpshooter in California, over half of which were released in the past year. Over 480,000 parasitic wasps were released in 2003.
- The CDFA biological control production facilities house the largest and one of the few laboratory colonies of glassy-winged sharpshooter. These insects are guaranteed to be free of *Xylella fastidiosa* and are extremely invaluable for transmission studies.
- Four species of minute parasitic wasps, each less than 1/16" long, have been permitted for release. All species attack the eggs of the glassy-winged sharpshooter. Two species are exotic to California.
- The CDFA and USDA / Agricultural Research Services (ARS) are evaluating several species of sharpshooter parasitoids from South America in quarantine conditions. These wasps are in their 27th generation of reproduction and are feeding on egg masses of the glassy-winged sharpshooter. Currently, no California native sharpshooter species have been affected by these wasps.
- Ongoing monitoring by the CDFA at release sites have recorded over 90 separate recoveries of introduced parasitoids from field-collected eggs of the glassy-winged sharpshooter. Additional recoveries have been recorded by independent sources. The significance of recoveries show that these newly introduced parasitic wasps are surviving and thriving in California further reducing glassy-winged sharpshooters.

- Exploration for potential biological control agents continues in North and South America. The Biological Control Group has provided plants, sharpshooters, parasitic wasps, training, and expert advice to over 15 research projects involved in the search for control strategies for *X. fastidiosa* and its vector, the glassy-winged sharpshooter.

Environmental Compliance

- The final environmental impact report for the PDCP was completed, certified, and released in May 2003. This extensive environmental review, conducted with full opportunity for public input, determined that program activities did not present a risk of causing significant environmental impacts. Following certification of the report, the department formally approved the Pierce's Disease Control Program.

Contain the Spread

The Contain the Spread element of the program is designed to prevent the spread of the glassy-winged sharpshooter 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 shipments 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 glassy-winged sharpshooter. California has almost 9,000 licensed nurseries, 60 percent 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 the glassy-winged sharpshooter 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

There were approximately 63,000 shipments of nursery stock from infested areas to uninfested areas in 2003. Viable life stages of glassy-winged sharpshooter were discovered on only 39 of these shipments in 2003 compared to 77 shipments in 2002 and 151 shipments in 2001. This represents a 74 percent reduction of infested shipments in a two-year period due to the diligence of the program. Egg masses are the most frequently discovered life stage of the glassy-winged sharpshooter in nursery stock. The table above reflects the results of the ongoing nursery inspection and shipment certification program.

YEAR	NUMBER OF SHIPMENTS	GWSS FOUND	% FREE OF GWSS
2001	57,600	151	99.74%
2002	65,800	77	99.88%
2003	65,000	39	99.94%

Regulated Nursery Shipment Results.

Enforcement Actions

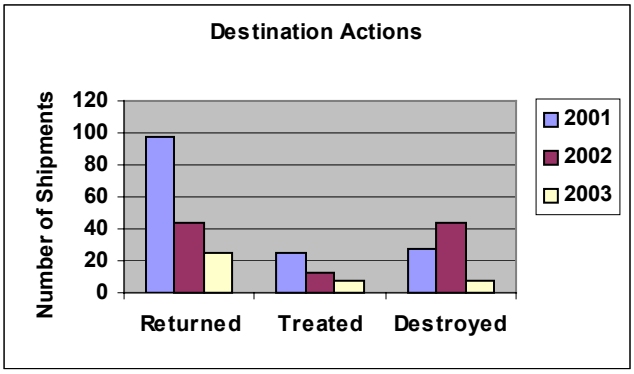
Enforcement actions are taken against nurseries and shipments that are in violation of the regulations. Actions can be taken at origin or destination. Actions that can be taken at origin consist of the following:

- ***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.



Number of actions taken at destination.

Shippers and receivers who violate nursery stock regulations are subject to fines. In 2003, administrative penalties were levied against three companies, totaling $4,500.

Bulk Grapes

Many of the state's grape growers sell their harvest to grape processors (i.e., wineries and juice manufacturers) located far from the production vineyard. A program is in place to prevent GWSS from being moved in bulk grape shipments. The program includes inspection and monitoring of origin vineyards and bulk grape shipments from counties with infested areas, along with a color coded certificate tag system for shipments from counties with infested areas. During 2003, approximately 115,000 shipments of bulk grapes were monitored. Nearly 20,000 of those shipments originated from infested counties and traveled to their destination with the required certification tags. As in prior years, no glassy-winged sharpshooters were found on bulk grape shipments in 2003.

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.

During the most recent citrus shipping season (October 2002 through September 2003), live glassy-winged sharpshooters were found in only 28 out of approximately 140,000 certified shipments of bulk citrus. This represents an 83 percent reduction in infested shipments compared to the prior shipping season.

SHIPPING SEASON	SHIPMENTS	REJECTIONS
2001/02	150,000	170
2002/03	140,000	28

Regulated Citrus Shipment Results.

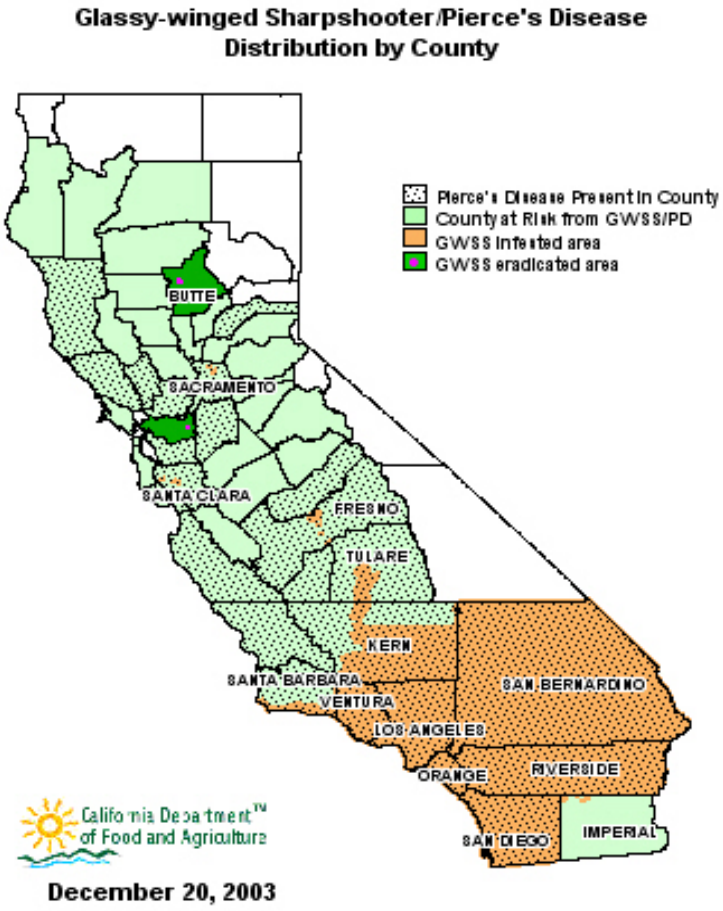
Statewide Survey and Detection

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

The activities of this element focus on systematically surveying and trapping commercial, residential, nursery, and cropland areas to determine if the glassy-winged sharpshooter is present.

Revised survey protocols were distributed to all California counties in the spring of 2003. The revisions reflected decreased emphasis on visual survey and more reliance on trapping to achieve initial detections of new infestations.

During 2003, onsite detection training was provided to county personnel in 21 counties. CDFA biologists assisted county personnel with field surveys and also conducted quality control inspections of county and state detection trapping programs. The program maintains an internet map server to quickly map and display discoveries of Pierce's disease and the glassy-winged sharpshooter.



Map showing the at-risk area and the distributions of Pierce's disease and the glassy-winged sharpshooter.

Rapid Response

The Rapid Response element of the program involves responding quickly to potential new infestations. When evidence of a potential new infestation is discovered, a delimitation survey is initiated by the county agricultural department to determine if an infestation is present and, if so, the boundaries of the infested area. In urban and residential areas, treatment costs are covered by the program and applied under 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.

A CCC member surveys a newly discovered glassy-winged sharpshooter infestation

During 2003, glassy-winged sharpshooters were detected on approximately 900 residential properties in six partially infested counties (Fresno, Kern, Imperial, Sacramento, Santa Clara, and Tulare). Approximately 5,200 properties (positive and adjacent) were treated during rapid response activities.

Pre-Treatment Communication with Stakeholders

Specific steps are taken to ensure residents are properly advised and environmental concerns addressed before infested areas are treated. A public meeting with community members precedes treatment in urban or residential areas. This provides 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 are used to inform residents of public meetings. Occupants of all properties scheduled for treatment are 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 is consulted to determine if any listed species are present in the treatment area. The U.S. 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 are 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 on ornamental plantings. The insecticide carbaryl was used against new infestations detected in the first year of the program in residential settings 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: http://www.cdpr.ca.gov/docs/gwss.

The program has enlisted the assistance of the California Conservation Corps (CCC) and the California Department of Transportation (Caltrans) in the fight against Pierce's disease and the glassy-winged sharpshooter. The CCC has helped the program to quickly delimit new infestations and prepare for treatment activities. Caltrans employees have been trained to identify the sharpshooter and have assisted with treatment activities along California's highways.

Outreach

The goal of the outreach effort is to raise awareness about Pierce's disease and the glassy-winged sharpshooter and the threat these pose to agriculture and the environment of California. We believe that 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.

During 2003, the program built upon the significant progress made in earlier years by continuing to maintain program visibility and stakeholder awareness. Local county agricultural staff and industry members played key roles in achieving this. Examples of these efforts include:

- Napa County's public outreach and educational programs that incorporate their http://www.bugspot.org/ website, toll free phone number for information and reporting, wallet cards, magnets, posters and brochures;
- Napa and Solano Counties combined their resources and secured the services of the King-Esparza Communications firm to assist with the development of informational materials in English and Spanish;
- Santa Clara County provides nursery employee training, articles in Farm Bureau and Master Gardeners newsletters, booths at local cultural events and media interviews;
- Sutter County provides handouts to local retail nurseries;
- Butte County has displays at public events;
- Los Angeles County provides informational materials to shipping nurseries and holds talks for landscapers, pest control operators (PCO) and California Association of Nurseries and Garden Centers members (CANGC);
- San Francisco County works closely with the local media to ensure factual information in press stories and utilizes the internet for outreach efforts;
- Mariposa County distributes pamphlets at nurseries, all trapping locations and continuing education seminars;
- Orange County provides outreach to production nurseries within infested areas;
- Alameda County distributes posters and brochures to nurseries, landscape companies, growers and homeowners as well as participating in the Pesticide Applicator's Professional Association (PAPA) training seminars; and
- CDFA staff provided training and information at PAPA, California Association of Pest Control Advisors (CAPCA), and CANGC seminars throughout the state.

Media Coverage

Articles and reports about Pierce's disease and the glassy-winged sharpshooter continue 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 much information generated by the outreach program.

Media Guide

A media guide produced by the California Farm Bureau Federation, in coordination with the program, identifies scientific experts and industry spokespeople throughout the state who are available as contacts for reporters. These individuals have received extensive information on the program from the CDFA and have volunteered to help disseminate accurate, timely information through the media and other outlets. This guide is available in print and online at http://www.cfbf.com/issues/gwss/dir_gov.htm.

Informational Materials

Program staff, working with the Outreach Subcommittee of the Pierce's Disease Advisory Task Force, has compiled a list of outreach materials produced by the program, county officials, the University of California, and industry groups. In 2003, these materials were also made available in Spanish. A video was produced in English and Spanish demonstrating effective monitoring and identification of live glassy-winged sharpshooter in field or croplands. As needs arise in different counties and communities, these materials will enable authorities to share these resources, quickly adapt them to match local needs, and deliver a more cohesive statewide message.

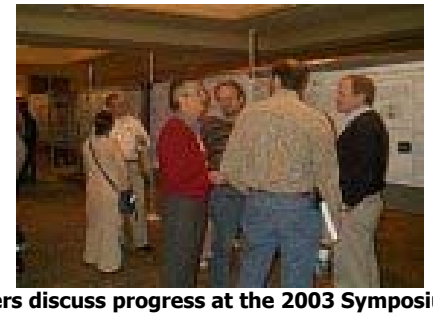
Website

Graphic from the home page of the Program's website.

The CDFA has a highly successful website dedicated to Pierce's disease and the glassy-winged sharpshooter. The website, which was activated in March 2000, offers frequent updates on program activities, survey and regulation guidelines, treatment information, upcoming meetings and events, the host list, and other information. In addition, the website provides an interactive interface that allows direct activity reporting by local entities. This website is located on the Internet at: http://www.cdfa.ca.gov/phpps/pdcp/.

Research Symposium

The annual Pierce's Disease Research Symposium provides a venue for researchers, growers and scientists to interact and share information. The 2003 symposium included a 3-hour poster session to facilitate communication between all parties.



Researchers discuss progress at the 2003 Symposium

Research

Research continues to be an integral part of the Pierce's Disease Control Program, and holds the key to developing a long-term solution to the problem. The flurry of research activity that began at the start of the program continues, with approximately 103 projects in progress in 2003 by some of the nation's top plant health researchers. Projects ranged from lab-based investigations at the molecular and genomic levels to vast areawide projects in major agricultural areas. In total, more than $18 million has been committed to research since this serious problem was first discovered. The information generated provides valuable insight into the biology, ecology, and behavior of Pierce's disease and its vectors, moving us closer to an eventual cure.

Scientific Communication

The third annual Pierce's Disease Research Symposium was held in mid-December 2003 in San Diego. This event is regarded as one of the most useful ways to learn the latest about research being conducted on Pierce's disease and its vectors.

As in prior years, a compendium of research progress reports was prepared beforehand by the PDCP and provided at the symposium. These proceedings help to communicate the latest research findings, are available in print, from the PDCP, or electronically at http://www.cdfa.ca.gov/phpps/pdcp/ResearchSymposium/gwSympIndex.htm.

Research Strategy

Using funds collected from the winegrape industry under Assembly Bill 1394 (Wiggins), the National Academy of Sciences (NAS) was engaged in late 2002 to develop a research strategy for solving the Pierce's disease problem. During 2003, a committee established by the NAS met four times and reviewed extensive amounts of information on Pierce's disease and GWSS. They also consulted extensively with researchers, growers, and other involved parties. This project should be completed in mid-2004.

Pilot Projects

Pest management pilot projects initiated in 2001 continued in Kern County and Temecula. These projects are a partnership between CDFA, USDA, the University of California, and the agricultural industry. A key component of these projects is a computerized data collection management system that utilizes barcodes and scanners to improve tracking of each insect trap in the project. The data collected is used for coordinating treatments and developing maps to analyze the glassy-winged sharpshooter's distribution and movement. The technology and methodologies gleaned from these valuable pilot projects have been transferred to the areawide projects.

Areawide Projects

Following the early success of the Kern County Pilot Project, a similar project for the entire production area of Kern County was implemented. This includes agricultural lands as well as the city of Bakersfield and several smaller communities. Projects have also

been implemented in Riverside and Tulare counties. Monitoring for the glassy-winged sharpshooter and Pierce's disease is occurring throughout these project areas. Traps provide information on sharpshooter population numbers and serve as indicators of developing "hot spots" where treatments may be needed.

An areawide management project was initiated in Ventura County in 2003 to test the effectiveness of sharpshooter control in citrus at protecting shipping nurseries from infestation. This project involves treating citrus groves in close proximity to nurseries.

An areawide trapping project was begun in Fresno in the summer of 2003, to determine if glassy-winged sharpshooters is present in the citrus acreage in Fresno County. Trapping results indicate there are no glassy-winged sharpshooter populations established in the Fresno County citrus belt.

These areawide projects are financed with federal funds and coordinated by the local county agricultural commissioners.

Epidemiology Projects

Over the last two years, scientists from the CDFA and University of California Cooperative Extension have conducted two collaborative research projects on the incidence and dynamics of Pierce's disease in Kern and Tulare counties. This research indicates that the glassy-winged sharpshooter can spread the Pierce's disease bacterium from one vine to another and that disease resistance varies by variety.

This work has led to the development of cost-effective, practical methods to survey vineyards, identify infected vines, and remove them so that vine-to-vine spread is greatly reduced.

An important component of these projects is the creation of a central data center to integrate and compile the disease survey information with the insect control information in a large geographic information system database that is available to collaborating researchers from various disciplines.

Vine-to-vine spread of Pierce's disease in Red Globe variety wine grapes

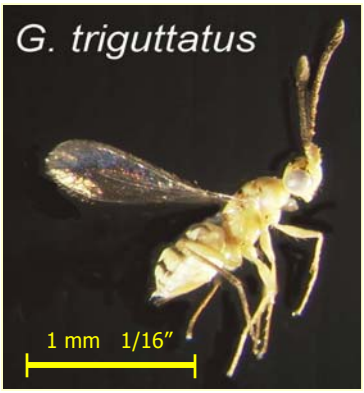
Analysis of temporal and spatial Pierce's disease patterns, and comparisons among vineyards over time should lead to better models of disease epidemiology, better control and management practices, and much better risk assessment. This will enable both industry and government to make better predictions and assist in the management of local, areawide, regional, and statewide control programs.

Biological Control

Biological control involves using natural enemies of a pest to reduce the pest's population size and consequent damage. When successful, this method mitigates the need for pesticide-based solutions for pest control. It is one of the most promising long-term solutions for combating the glassy-winged sharpshooter.

The Pierce's Disease Control Program's Biological Control Unit has three major components:

1) Biological control agent selection;
2) Biological control agent production; and
3) Release and evaluation of biological control agents.



***G. triguttatus,* a natural enemy of GWSS.**

Biological Control Agent Selection

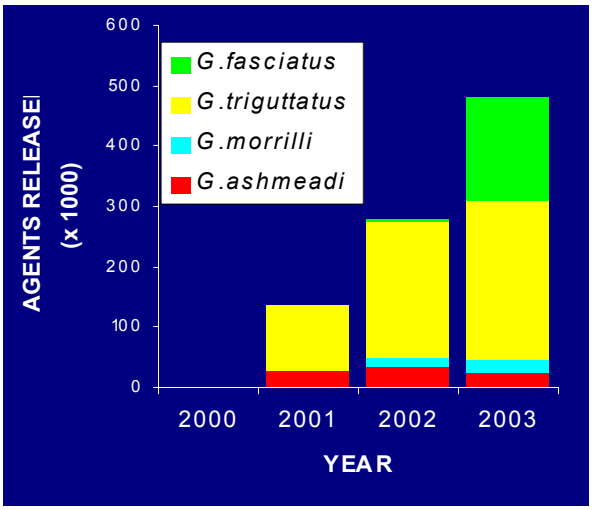
Selecting the right organisms to use as natural enemies is critical to the success of biological control efforts. The most successful agents will persist in the new target environment and reduce pest numbers to nondamaging levels without impacting nontarget organisms. Early studies on the glassy-winged sharpshooter revealed that the insect's most important natural enemies were tiny wasps that oviposited (laid eggs) in the eggs of the sharpshooters thereby killing them.

Exploration for biological control agents has covered six southeastern U.S. states and four northeastern Mexican states. Twelve species of wasps have been identified with potential as control agents. Currently, four species of natural enemies of the glassy-winged sharpshooter are produced and released by the CDFA. All species produced are tiny wasps, about the size of a grain of rice (approx. 1/16"). In addition, two potential control agents from South America are under evaluation in quarantine facilities.

Future exploration will focus efforts in the northeastern US to search for cold-hardy biological control agents that are likely to have better over-wintering capabilities compared to their southern counterparts. These control agents will be better adapted for survival in the more temperate climates of central and northern California.

Biological Control Agent Production

Two program facilities were established in 2001 for producing biological control agents of the glassy-winged sharpshooter. The Mount Rubidoux Field Station is located in Riverside and wholly operated by CDFA, while the Oswell Street Biological Control Facility, located in Bakersfield, is jointly run by CDFA and the USDA's Animal and Plant Health Inspection Service. Together, these facilities produced over 480,000 parasitic wasps for release in 2003 and tested different approaches for increasing parasite production. The program will significantly expand its



GWSS Biological control agents released in California.

production capabilities in 2004 with the relocation of the Oswell Street Biological Control Facility to a much larger facility in Kern County, and completion of renovations at the Mount Rubidoux facility.

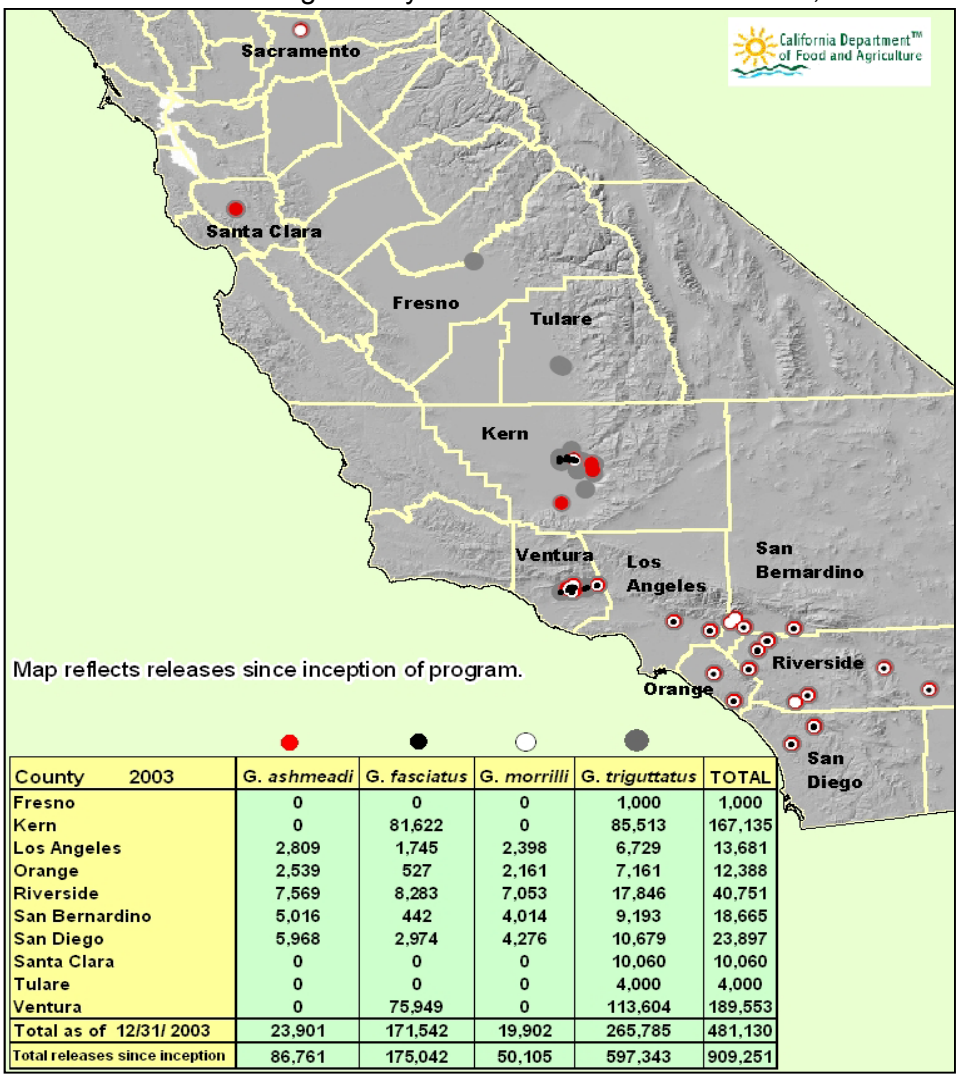
Producing parasites of GWSS at rearing facilities is challenging because it requires culturing both the glassy-winged sharpshooter and its host plants. Field-collected and laboratory-reared sharpshooters are used to obtain eggs for producing the egg parasites. The program is constantly evaluating each step to look for ways to optimize overall production.

These facilities are extremely valuable to researchers as they maintain continuous populations of non-contaminated glassy-winged sharpshooters that are essential for many research projects. Researchers from laboratories throughout the world visit these facilities to learn the techniques involved in the production and maintenance of sharpshooter colonies.

Release and Evaluation of Biological Control Agents

Biological control releases started in 2000. Since then, the number of agents released each year has increased. Releases exceeded 480,000 in 2003, approximately 200,000 more than the prior year. Releases continue to be made in all generally infested counties of California, and in selected locations where GWSS outbreaks have occurred. As the range of GWSS changes, so does the distribution of releases. Releases are made in citrus and in urban areas close to threatened resources (grapes and nurseries) and in situations where other control strategies may be difficult to apply.

Release sites of biological control agents are surveyed twice a month and GWSS eggs are collected from the field to monitor and evaluate the program's release strategies. Over 95 parasitized egg masses have been recovered in the field. This is significant as it proves that parasitoids reared in the laboratory can survive and reproduce in the field.



County 2003	G. *ashmeadi*	G. *fasciatus*	G. *morrilli*	G. *triguttatus*	TOTAL
Fresno	0	0	0	1,000	1,000
Kern	0	81,622	0	85,513	167,135
Los Angeles	2,809	1,745	2,398	6,729	13,681
Orange	2,539	527	2,161	7,161	12,388
Riverside	7,569	8,283	7,053	17,846	40,751
San Bernardino	5,016	442	4,014	9,193	18,665
San Diego	5,968	2,974	4,276	10,679	23,897
Santa Clara	0	0	0	10,060	10,060
Tulare	0	0	0	4,000	4,000
Ventura	0	75,949	0	113,604	189,553
Total as of 12/31/ 2003	23,901	171,542	19,902	265,785	481,130
Total releases since inception	86,761	175,042	50,105	597,343	909,251

Distribution of Biocontrol agents released in 2003

Environmental Compliance

The CDFA continues with its commitment to ensuring that the Pierce's Disease Control Program is conducted in an environmentally responsible manner. These efforts include preparation of a statewide programmatic environmental impact report, adhering to a special notification and consultation process with federal and state environmental stewardship agencies when treatments are planned in nonagricultural areas, conducting environmental monitoring during treatments, and ensuring that pesticide applications are performed by licensed pest control professionals in strict accordance with pesticide laws and regulations.

In May 2003, the final environmental impact report for the Pierce's Disease Control Program was released and certified. This extensive, in-depth environmental review, conducted with full opportunity for public and stakeholder input, determined that program activities did not present a risk of causing significant environmental impacts. In June 2003, a lawsuit was filed against the environmental impact report by three environmental groups. The case is currently being adjudicated and should be decided in early 2004.

Conclusion

This has been an important year in the fight against Pierce's disease and the glassy-winged sharpshooter. The statewide Pierce's Disease Control Program continued to effectively address this serious pest problem through its comprehensive approach of preventing the spread of the glassy-winged sharpshooter to new areas, finding and responding to new infestations, maintaining effective outreach, and coordinating innovative research. The program's successes in 2003 include:

- Expansion of the GWSS biological control program.
- Implementation of successful areawide sharpshooter suppression projects in Kern, Riverside, Tulare, and Ventura counties.
- Progress in the research for screening approved nursery stock treatments.
- Establishment of an areawide program in citrus croplands in Fresno County.
- Completion and certification of the program's Environmental Impact Report.

These accomplishments reflect the hard work of program staff and the contributions of industry stakeholders and federal, local, and University cooperators.

Looking ahead to 2004, specific goals have been established for the program. These include furthering the expansion of the biological control program by increasing the rearing capacity and release of biological control agents, continuing the areawide sharpshooter suppression projects, acting upon the results of the National Academy of Sciences report (scheduled for completion mid-year), and implementation of an approved treatment process for nursery stock shipments.

The availability of resources continues to be a key challenge to the program. State funding is critical to the program's success. The federal government has recognized the importance of finding a solution by committing significant funding and has indicated it will provide future support. Industry's willingness to participate in funding has been demonstrated and is vital to the success of the program. With the ongoing cooperation and assistance of our federal and county counterparts, and University and industry partners, we will continue moving closer to finding a long-term solution to this serious agricultural threat.

Financial Statement

REVENUE AND EXPENDITURE REPORT

FISCAL YEAR	2001/02	2002/03	2003/04
BEGINNING BALANCE	$2,596,313	$13,693	$26,970
REVENUE			
State (Budget Act)	$8,287,500	$6,087,600	$6,220,075
Federal (USDA)	$6,321,159	$10,995,000	$10,995,000
Board Assessment		$152,000	$318,000
Research (AB 1232)	$750,000	$0	$0
Total Resources	$17,954,972	$17,248,293	$17,533,075
EXPENDITURES			
Personal Services	$2,501,528	$2,695,490	$3,001,038
Operating Expenses	$3,354,871	$2,608,409	$2,473,744
County Payment	$12,084,880	$11,917,424	$12,006,120
Total	$17,941,279	$17,221,323	$17,480,902
Fund Balance	$13,693	$26,970	$52,173

Appendix A

Abbreviations/Acronyms Used in this Document

ARS	Agricultural Research Service
CAC	County Agricultural Commissioner
CACASA	California Agricultural Commissioner and Sealers Association's
CAN	California Association of Nurserymen
CAPCA	California Association of Pest Control Advisors
CCC	California Conservation Corps
CDFA	California Department of Food & Agriculture
CSU	California State University
EIR	Environmental Impact Report
GWSS	Glassy-winged sharpshooter
NAS	National Academy of Sciences
PAPA	Pesticide Applicator Professional Association
PCO	Pest Control Operators
PD	Pierce's Disease
PD/GWSS Board	Pierce's Disease & Glassy-winged Sharpshooter Board
PDCP	Pierce's Disease Control Program
UC	University of California
USDA	United States Department of Agriculture
Xf	*Xylella fastidiosa*