Pierce's Disease Control Program

Report to the Legislature
February 2002

California Department of Food and Agriculture

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Statement of the Secretary

In August 1999, when grape growers and agricultural officials in Temecula saw their vines falling victim to Pierce's disease, the urgency of the situation was clear. The glassy-winged sharpshooter, an invasive species new to California, had infested the area and had begun spreading the disease at an unprecedented rate. Growers, elected officials, regulators and the agricultural community in general banded together to combat this serious threat to their livelihood, their farms and their state. With the aid of Governor Gray Davis, the California Legislature and the state's Congressional delegation, both state and federal funding came rapidly to the aid of these growers. The result of this cooperative effort is the Pierce's Disease Control Program, administered by the California Department of Food and Agriculture. This program has brought considerable resources and expertise to bear against the glassy-winged sharpshooter and the disease-causing bacteria it spreads—and we've achieved marked progress.

As the following pages illustrate, the Pierce's Disease Control Program has assembled a team of experienced scientists, advisors, field personnel and administrators to tackle the most significant threat to California agriculture in 20 years. A coalition of affected industries and members of the community have come together in the spirit of cooperation, and their collective contribution to the cause has helped the program accelerate its efforts.

The program's goals are to seek a treatment or cure for Pierce's disease in the long-term, and to control the spread of the bacteria and combat the insect in the short-term. With over 60 research projects funded and underway, we have made important inroads that will eventually help us solve the puzzle of Pierce's disease. The regulatory framework now in force statewide, encompassing inspections and safeguarding treatments, has proven successful at preventing the spread of the glassy-winged sharpshooter to the uninfested areas of California. A pilot project in Kern County has taught us that, with a disciplined approach and strong cooperation from growers, we can reduce heavy populations of this insect over a large and agriculturally diverse area; these lessons will soon be applied by more farmers on many more acres, expanding the success of the program.

The program encompasses much more work than I can cover in these few lines, so I encourage you to review the more detailed information on the following pages. I look forward to continuing the successful partnership that we have begun.

Secretary William (Bill) J. Lyons, Jr.

California Department of Food and Agriculture

Executive Summary

The Pierce's Disease Control Program saw a year of progress on many fronts. Detection survey results eased fears by showing that the glassy-winged sharpshooter, the primary vector of Pierce's disease, is not widespread throughout northern California but is found in a few isolated areas. All infestations in northern California have been contained and existing populations have decreased in size.

The lessons learned from the Kern County Pilot Project have provided immediate benefits to local area agriculture and future glassy-winged sharpshooter (GWSS) suppression strategies.

The vast majority (99.7%) of shipments from regulated southern California nurseries were free of the glassy-winged sharpshooter. Bulk grape shipments proved not to be a serious pathway of spreading glassy-winged sharpshooters, while bulk citrus protocols were strengthened.

Over 60 research projects are now funded and underway. Meanwhile, the biological control program's production of glassy-winged sharpshooter parasites has greatly increased.

New legislation in 2001 created an assessment on crushed grapes and a new board, the Pierce's Disease / Glassy-winged Sharpshooter Board, which will develop recommendations on the uses of collected funds.

Survey and detection protocols were overhauled early in 2001 improving the statewide annual search for GWSS. Areas with the greatest susceptibility as an introductory site for GWSS are focused upon for survey and trapping. A preferred host list was developed for trapping purposes and traps are relocated to more desirable host plants as seasons change.

The California Agricultural Commissioners responded rapidly with treatments in northern California counties to combat satellite GWSS infestations in Butte, Contra Costa, Fresno, Sacramento, Santa Clara and Tulare counties.

Small infestations required spot treatments in Chico, Rancho Cordova, and San Jose while Commissioners in Fresno and Tulare counties dealt with suppressing larger infestations.

Surveys during the fall of 2001 found no evidence of GWSS in previously infested areas of Brentwood (Contra Costa County), Kingsburg (Fresno County), and Magnolia (Tulare County).

Overview

Background

In the summer of 1999, winegrape growers in Riverside County experienced a sudden and alarming increase in the death of grapevines in a number of area vineyards. In August of 1999, after experiencing the rapid destruction of over 300 acres of vineyards in the Temecula Valley, the Riverside County Board of Supervisors declared a local emergency. The culprit of the destruction was Pierce's disease, spread by a new carrier, the glassy-winged sharpshooter.

Pierce's disease symptoms on grape leaf

Riverside County and the City of Temecula each contributed $125,000 for research to combat Pierce's disease. Within days, Secretary William (Bill) J. Lyons, Jr. of the California Department of Food and Agriculture (CDFA) adopted an action plan and appointed a task force to develop long-term strategies and resources to combat the emerging threat. CDFA resources were redirected to coordinate activities, meet with stakeholders, and develop plans for action. Governor Gray Davis signed legislation allocating $2.25 million over three years for Pierce's disease research and creation of the Pierce's Disease Advisory Task Force. Meanwhile, Secretary Lyons successfully sought federal assistance to reduce sharpshooter populations in Temecula.

January 2000 marked the first meeting of the Pierce's Disease Advisory Task Force. Subcommittees were established to review research proposals and develop management plans. A preliminary survey indicated that glassy-winged sharpshooter was present in eight southern California counties.

By February 2000, the CDFA had already expended thousands of hours of staff time to meet with stakeholders, coordinate activities, and develop protocols for regulatory action and treatment. Concerned about the spread of the glassy-winged sharpshooter through nursery stock, the nursery industry adopted a voluntary inspection and treatment program while Secretary Lyons met with federal government officials to seek their assistance.

In the spring of 2000, a number of significant developments affected the fight against Pierce's disease and the glassy-winged sharpshooter. The CDFA developed and released statewide survey protocols and guidelines for counties to use to find infestations of glassy-winged sharpshooter. Concerned that nursery inspections at origin still left destination counties somewhat vulnerable, several non-infested counties began to inspect nursery stock shipments from

infested areas upon arrival. Mandatory inspections were implemented statewide after the CDFA upgraded the pest rating of the glassy-winged sharpshooter.

Meanwhile, scientists from the CDFA and the University of California traveled to Mexico capturing natural enemies of the glassy-winged sharpshooter.

Responding to the need to keep stakeholders informed, the CDFA developed and activated a website in March 2000 dedicated to Pierce's disease and the glassy-winged sharpshooter.

In May 2000, a glassy-winged sharpshooter was trapped in a San Joaquin County nursery distant from the infested areas. The subsequent large-scale survey effort helped establish the protocol for responding to new sharpshooter discoveries. Later in the month, an infestation of the sharpshooter was discovered in a residential area of Tulare County. Multiple state and local agencies were mobilized for rapid response.

The Pierce's Disease Control Program (PDCP) was formally established through legislation signed by the Governor in May 2000. SB 671 by Senator Wes Chesbro outlined specific requirements for county agencies and authorized the Secretary of CDFA to adopt program regulations. The legislation allocated $6.9 million to the program from the State's 1999/00 budget and supported an additional $6.9 million in the 2000/01 Budget Act.

While treatment activities began in Tulare County, help from alert residents led to the discovery of two new infestations in Fresno County.

Surveys reveal decreased GWSS populations

On June 23, 2000, the federal government responded to Governor Davis' request for a federal emergency declaration. Federal assistance of $22 million was committed to counter the spread of the glassy-winged sharpshooter and support research to find a solution to Pierce's disease.

During the summer of 2000, survey and detection efforts uncovered new infestations in the counties of Fresno and Sacramento. Meanwhile, concerns about the movement of nursery stock and bulk grapes intensified. On July 25, 2000, the CDFA adopted emergency regulations for nursery stock and bulk grapes and coordinated statewide systems for compliance.

In August 2000, scientists from the CDFA and the University of California initiated a pilot project by releasing limited numbers of a natural enemy of the glassy-winged sharpshooter. Small numbers of a tiny, stingerless wasp from Mexico were released in test locations in

Kern, Riverside, and Ventura Counties. The wasp parasitizes the sharpshooter by laying its eggs inside those of the sharpshooter.

In the final quarter of the year 2000, new glassy-winged sharpshooter infestations were discovered in Butte, Contra Costa, Fresno, and Tulare Counties. State and local agencies worked together to treat over 250 residential properties. In accordance with supplemental budget language, an Environmental Protection Task Force was formed by the CDFA and began a series of meetings to review the potential environmental impacts associated with program treatments.

In October 2000, significant numbers of the glassy-winged sharpshooter were discovered in bulk citrus shipments moving from Kern County to packing facilities in Tulare County. This led to a temporary suspension of citrus-shipping activities. Following an assessment of citrus-processing activities, the CDFA adopted emergency regulations requiring citrus to be free of the sharpshooters prior to shipping.

The CDFA conducted regional stakeholder meetings in Napa, Orange, Sacramento, San Diego San Luis Obispo, Stanislaus, and Tulare Counties to gather input regarding program activities. Hundreds of grape growers, vintners, nursery operators, environmental organization representatives, and general public members attended and expressed their opinions about the program to combat the Pierce's disease and the glassy-winged sharpshooter.

In December 2000, an international symposium focused on research related to Pierce's disease was held at the University of California in Davis. More than 60 scientists from around the world participated. The symposium provided the first opportunity for researchers to collectively share progress and critical information and identify gaps in current research efforts.

Throughout the year 2000, the program was encouraged by significant progress on a number of research projects. The DNA of the bacterial strain that causes citrus-variegated chlorosis (closely related to Pierce's disease) was completely identified, enhancing our ability to determine how the Pierce's disease strain works and where it might be susceptible to attack. Several DNA-based identification kits are in the final stages of testing. They will greatly enhance the ability to determine if a plant or the sharpshooter has the Pierce's disease strain of the bacteria.

During the fall of 2000 and subsequent winter months, the Kern County Pilot Project in began studying the movement of the sharpshooter and how the pest transmits the disease. Throughout 2001, this project developed and documented effective pest management strategies in a large, agriculturally diverse environment. A number of insecticides were tested and appear to be effective against the sharpshooter. The Kern County Pilot Project demonstrated that insect populations can be significantly reduced without requiring the extensive use of pesticides. This success prompted a proposed Kern County areawide management program that would transfer the lessons learned in the Kern County Pilot Project for use on a much larger scale.

Infestations of glassy-winged sharpshooter were found in two new counties (Santa Clara and Imperial) in 2001. Eradication efforts were implemented in San Jose, Santa Clara County. The new infestations in Imperial County are near the border with Riverside County, which is generally infested. These infestations in Imperial County are not near agricultural areas and therefore are not being suppressed but are under close observation.

Trapping and visual surveys in 2001 revealed no glassy-winged sharpshooters in the Contra Costa County community of Brentwood. This indicates that the infestation found in this area in October 2000 has in all probability been eradicated.

In 2001, Butte and Sacramento Counties reacted with treatments to spot infestations with apparently effective results. The year 2001 also showed considerable decreases in the number of properties infested with glassy-winged sharpshooter in both Fresno and Tulare Counties.

The nursery industry stepped forward again in 2001 bearing a good deal of costs to comply with nursery stock shipping regulations. Approximately 57,000 shipments of nursery stock arrived in the non-infested portions of northern California from the infested area. Of these, 99.7% were free of glassy-winged sharpshooter.

During 2001, the search for approved treatments for nursery stock continued. Pesticide trials were conducted yielding valuable information. Also, a contract was established with the University of California to screen alternative, reduced risk pesticides that might prove effective against the glassy-winged sharpshooter.

The biocontrol unit imported and released in California three new types of stingerless wasps (parasitoids) that are known to attack and kill the glassy-winged sharpshooter. During the 2001 season, more than 125,000 parasitoids were released at multiple locations in eight California counties.

On May 31, 2001, a research symposium was held in Riverside for CDFA-funded researchers to present progress reports on their projects. A research symposium was held December 5-7, 2001, in San Diego where all researchers presented progress reports. Currently, there are approximately $12 million funding 65 research projects.

The process of preparing an Environmental Impact Report (EIR) for the Pierce's Disease Control Program began in 2001. The draft EIR will be released in early 2002 for public review.

During the 2001 grape crush, of the approximate 102,000 shipments of bulk grapes, over 20,000 of these shipments traveled to destination processors with program certification tags. No glassy-winged sharpshooters were found in any of the shipments.

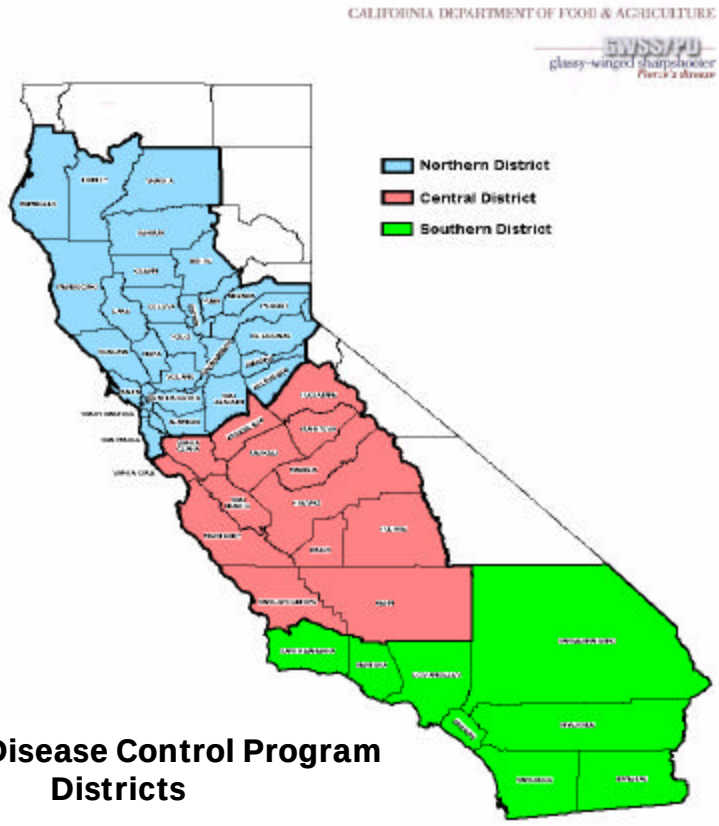
AB 1394 became law in July 2001. This legislation created the Pierce's Disease and Glassy-winged Sharpshooter Board, and an assessment on grapes delivered to crushing facilities. The Board will provide recommendations to the Secretary on how the collected funds should be used.

Program

The Pierce's Disease Control Program accomplishes many of its objectives through contracts with the County Agricultural Commissioners. Industry, the USDA, and other state agencies also play critical roles in supporting the program and providing feedback to maintain program effectiveness.

The program has five central 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**
   Provide guidelines and oversight to local authorities for developing and implementing action plans to respond to new infestations.
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.



Pierce's Disease Control Program Districts

Major Accomplishments

Year 2000

- A task force with broad representation from industry, research communities, and local government was appointed to advise the Secretary of Food and Agriculture on each phase of the program.
- A task force was established by the CDFA to identify environmental concerns associated with the treatment element of the program. This task force made recommendations to the Secretary in a formal report.
- The CDFA adopted emergency nursery, bulk grape and citrus regulations to prevent the artificial spread of the glassy-winged sharpshooter.
- County staff inspected over 52,000 nursery shipments, finding less than one-half of 1% of the shipments carried life stages of the sharpshooter.
- State, local, and university cooperators have worked in partnership to distribute over 100,000 brochures (in English and in Spanish) to increase public awareness of the pest and its potential impact.
- County staff, with the help of the public, detected new glassy-winged sharpshooter infestations in five counties.
- Treatment activities were conducted in five counties (Butte, Contra Costa, Fresno, Sacramento, and Tulare).
- The CDFA developed protocols for a statewide detection program to provide guidance to county inspectors.
- Seventeen local Pierce's disease/glassy-winged sharpshooter task forces were formed to facilitate local planning and communication regarding Pierce's disease and glassy-winged sharpshooter.
- The CDFA established a website providing information on the program, Pierce's disease, and glassy-winged sharpshooter. Activated in March 2000, the site was visited over 500,000 times during its first year of operation.
- CDFA staff participated in over 200 outreach meetings for growers and the general public to provide status reports and opportunities to contribute feedback to the program.
- The USDA committed $22.3 million towards the fight against Pierce's disease and its vectors.
- Following a review of the risks posed by glassy-winged sharpshooter and its distribution in the state, CDFA changed the

designation of the pest to one of limited distribution and major economic importance.

Year 2001

- Statewide survey activities determined that 34 at-risk counties were still free of glassy-winged sharpshooter.
- Treatment activities were conducted in six counties (Butte, Contra Costa, Fresno, Sacramento, Santa Clara, and Tulare).
- Over 2,000 properties in five counties were treated for glassy-winged sharpshooter in calendar year 2001. Glassy-winged sharpshooter populations were reduced on properties treated last year. For instance, Fresno County detected 918 infested properties in 2000. After treating these properties, inspectors found only 385 properties infested in 2001. Similarly, Tulare County found and treated 1,027 infested properties last year and only 918 properties remained infested after last year's treatments.
- The program contracted with an experienced public outreach firm to help develop and deliver outreach materials for use by local cooperators. Surveys were done to gauge the level of public awareness about Pierce's disease and GWSS. These provided baseline information on awareness and will help guide the development of appropriate outreach messages.
- Outreach efforts and program activities have led to approximately 800 articles and press releases in national and international publications.
- CDFA, working closely with industry and the University of California, has coordinated the investment of approximately $12 million in research to seek short- and long-term solutions to Pierce's disease and the glassy-winged sharpshooter.
- Department staff and an outside consultant are preparing an Environmental Impact Report (EIR) covering the statewide program and the activities of county cooperators. Public scoping meetings were held in April 2001 throughout the state to maximize the opportunity for public input into the process. The draft EIR will be released in early 2002 for public review.
- Biological control agents, tiny parasitic wasps, were released in eight counties to combat GWSS. Rearing operations for these wasps were established in Bakersfield and Riverside.
- CDFA and USDA staff have secured a former alfalfa research station in Kern County. It has been renovated and is now producing glassy-winged sharpshooter parasitoids. Over 84,000 parasitoids

were produced from this facility and released in the San Joaquin Valley this year.

- County staff, with the help of the public, detected new glassy-winged sharpshooter infestations in two additional counties (Santa Clara and Imperial).
- County staff inspected over 57,000 nursery shipments, finding less than 1% of the shipments carried life stages of the sharpshooter.
- The signing of AB 1394 in July 2001, will bolster research and other program activities by providing approximately $5 million per year for five years from an assessment on winegrapes This urgency bill also established the Pierce's Disease/Glassy-winged Sharpshooter Board to develop recommendations on the use of collected monies.

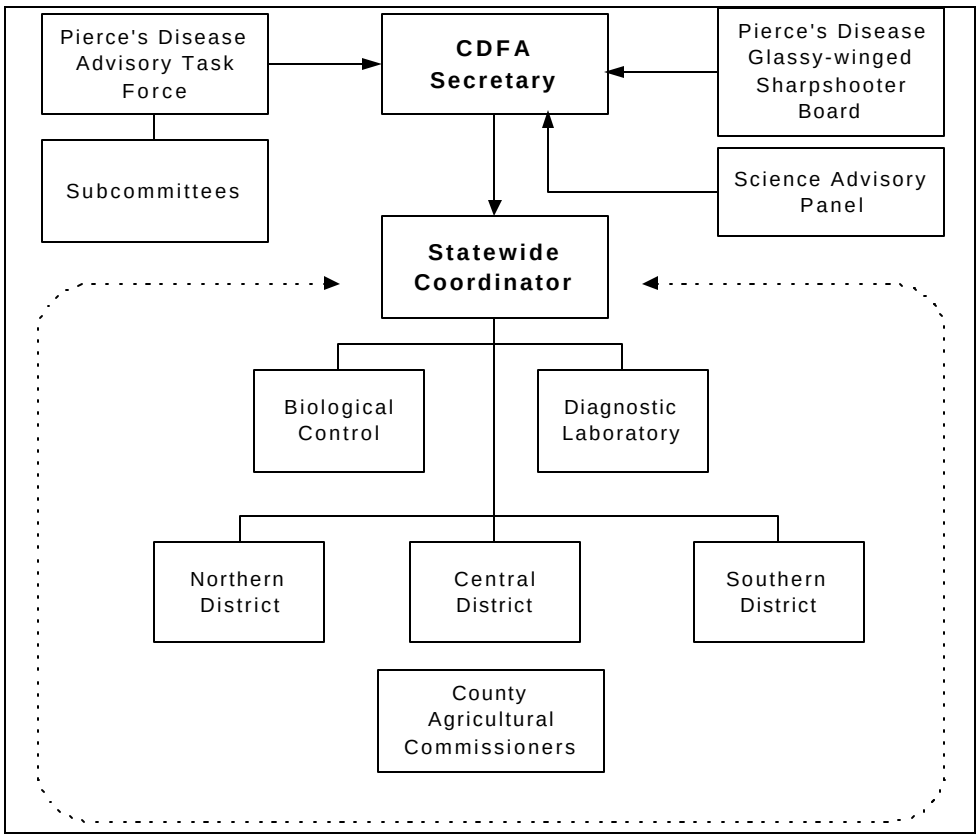
Organization

The Pierce's Disease Control Program is a partnership that includes the California Department of Food and Agriculture, the County Agricultural Commissioners, the University of California, the USDA, other state and local agencies, and agricultural organizations throughout the state.

The Pierce's Disease Control Program is advised by the Pierce's Disease Advisory Task Force and its subcommittees. A Statewide Coordinator directs the program in accordance with the policies approved by the Secretary.

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. The program works in partnership with the offices of County Agricultural Commissioners to ensure that activities are being conducted in accordance with all statutory and regulatory requirements.

Identification of the disease and the sharpshooter is performed by the systematists at the CDFA's Plant Pest Diagnostics Center. Natural enemies of the sharpshooter are reared in CDFA and USDA lab facilities. Research is being performed statewide by researchers under contract with CDFA, the USDA, industry, and other funding organizations.

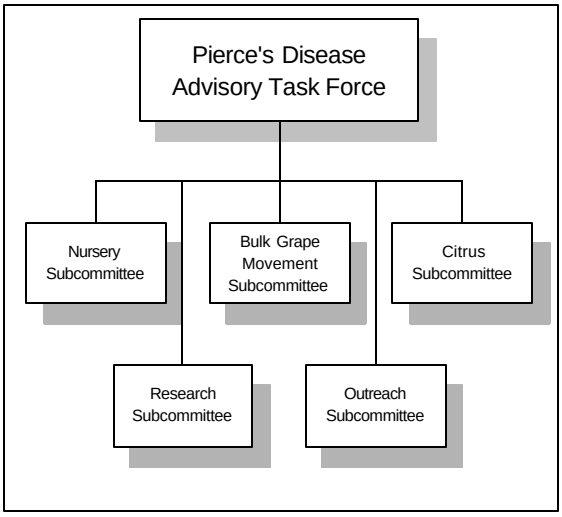


Planning

The Pierce's Disease Advisory Task Force, the Science Advisory Panel, the new Pierce's Disease/Glassy-winged Sharpshooter Board, and internal experts provide recommendations to the Secretary.

Pierce's Disease Advisory Task Force

The Pierce's Disease Advisory Task Force and its subcommittees serve as the key management advisory group. Composed of County Agricultural Commissioners, scientists, agricultural representatives and other experts, the Task Force meets regularly to review program progress and developments.



Science Advisory Panel

Members of the Science Advisory Panel (SAP) are experts in glassy-winged sharpshooter. The panel reviews the progress and activities of the program for scientific solutions and technical feasibility.

Pierce's Disease/Glassy-winged Sharpshooter Board

This newly formed board will advise the Secretary on the use of monies collected from the wine grape assessment (AB 1394, Patricia Wiggins).

Local Management

The County Agricultural Commissioner of each county has lead responsibility for conducting local Pierce's Disease Control Program activities. Agricultural Commissioners are responsible for developing and seeking CDFA approval for program work plans addressing the disease and its vectors. As stated in legislation (SB 671), county work plans must include the following elements:

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

Seventeen local management areas and task forces have been

formed throughout the state and are instrumental in mobilizing local resources to combat Pierce's disease and the glassy-winged sharpshooter.

Strategic Planning

The Pierce's Disease Control Program is conducting strategic planning efforts to identify, establish, and review its long-term goals and ensure that its strategies, activities, and performance measures are consistent with attainment of those goals. PDCP strategic planning efforts have included internal self assessments and evaluations as well as participation in larger, more formal and directed efforts being conducted in partnership with other members of CDFA's Division of Plant Health and Pest Prevention Services. These efforts have reinforced the overall long-term goal of the Pierce's Disease Control Program to minimize the statewide impact of Pierce's disease and the glassy-winged sharpshooter. The strategy developed to achieve this overall goal is to slow or stop the spread of glassy-winged sharpshooter in order to provide sufficient time to develop short-term and long-term solutions to Pierce's disease. The strategy relies upon the five major elements of the PDCP: Contain the Spread, Statewide Survey, Rapid Response, Outreach, and Research.

Clear goals and measurable outcome criteria have been developed for the overall program as well as for each element of the program. These will be revisited and evaluated throughout the ongoing process of strategic planning.

The Disease & The Insect

Pierce's Disease

Pierce's disease of grapevines was first noted in California near Anaheim around 1884. The disease is caused by a strain of the bacterium, *Xylella fastidiosa,* and kills grapevines by clogging up 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 (including oaks, elms, maples and sycamore). Since its discovery, Pierce's disease has spread to other areas of the state and is currently known to exist in 24 counties. The University of California reported that the disease destroyed over 1,000 acres of grapevines in northern California between 1994 and 2000[1] resulting in damages of $30 million. There is no known cure for the disease.

The Sharpshooter

The glassy-winged sharpshooter (GWSS), first noted in California in 1994, is native to the southeastern U.S. and northeastern Mexico. It feeds on the xylem fluid of a large number of crop and ornamental plants. The GWSS builds up 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 risk posed by this new disease and vector combination occurred in Riverside County in August of 1999, when over 300 acres of grapevines infested with GWSS were destroyed by Pierce's disease.

Adult glassy-winged sharpshooter; a vector of Pierce's Disease

Scientists believe that the GWSS 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 Pierce's disease vectors; and
- Transmits the disease from vine-to-vine, resulting in an exponential, rather than linear, 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 almonds, oleander, and other crop and ornamental plants.

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

Contain the Spread

The “contain the spread” element of the program is designed to prevent the artificial spread of the glassy-winged sharpshooter on those commodities that present a risk of carrying the insect. The activities of this element focus on commodities moving from infested areas to non-infested areas within California as well as on commodities entering from other states.

Regulations and standards were adopted on July 25, 2000, to regulate the movement of nursery stock and bulk grapes. On November 8, 2000, subsequent regulations for the movement of citrus were added. The regulations are intended to prevent the artificial spread of the glassy-winged sharpshooter and to enable certification that shipments of plant material are pest-free.

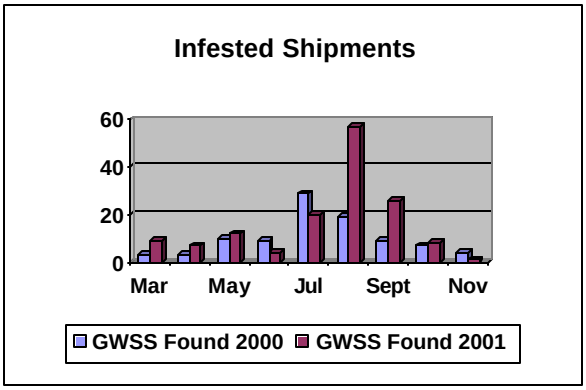
Nursery Stock Inspections

The nursery industry stepped forward again in 2001 bearing a good deal of costs to comply with nursery stock shipping regulations. Nursery stock is a high risk commodity for transporting the sharpshooter. California has almost 9,000 licensed nurseries. Approximately 60% of the state’s nurseries are located in counties that have infestations and many ship to uninfested areas. Activities to mitigate the risk of moving glassy-winged sharpshooters 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) notification of nurseries receiving nursery stock to hold the commodities for inspection prior to sale.

Inspection Results

There were approximately 57,000 shipments of nursery stock from the infested area to the uninfested area in 2001. Viable life stages of glassy-winged sharpshooter were discovered on only 151 of these shipments. This is a success rate of 99.7%.

Egg masses are the most frequently discovered life form of the sharpshooter in nursery stock and efforts are underway to develop a chemical treatment (ovicide) that will kill egg masses. An effective ovicide could significantly reduce the activity level of the current inspection program.

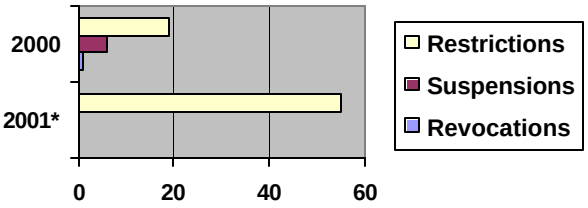


Compliance Actions

A number of regulatory actions have been taken to ensure nursery compliance with the shipping protocols at both origin and destination. Actions that may be invoked at the origin of nursery shipments include the following:

- ***Suspension***. The nursery is suspended from shipping out of the infested area until the risk is mitigated.
- ***Restriction.*** The nursery is restricted from shipping certain host material species out of the infested area for a period of time.
- ***Revocation***. The nursery's compliance agreement is revoked for an established period of time because of repeated violations.

Origin Actions



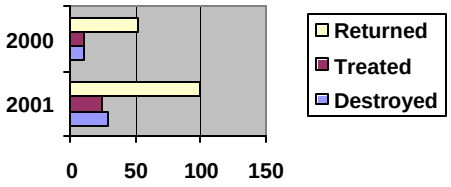
*no suspensions/revocations

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

- ***Treatment.*** The county may require the nursery shipment be treated with an effective material.
- ***Returned*.** The county may require the shipment be returned.
- ***Destroyed***. The county may require the shipment be destroyed.

Administrative penalties were levied on four nurseries in 2001 for seven counts in violation of the nursery shipping regulations. These fines totaled $11,000.

Destination Actions



Bulk Grapes

Many of the state's grape growers sell their harvest to grape processors (i.e., wineries, juice manufacturers) located considerable distances from the production vineyard.

Bulk shipments of grapes to crushing facilities have been closely monitored for the past two years. During this year's grape harvest, shipping, and crushing season, no glassy-winged sharpshooters were observed in over 110,000 shipments of bulk grapes. Nearly 20,000 of those shipments originated from counties with infested areas and traveled to their destination with the required certification tags.

No GWSS found in bulk grape shipments

Similar to last season, no glassy-winged sharpshooters were found in any shipments of bulk grapes this year, indicating that movement of bulk grapes may not present a significant risk of spreading glassy-winged sharpshooter.

Citrus

On October 28, 2000, significant numbers of sharpshooters were found in orange shipments arriving at packing facilities in Tulare County. This discovery led to the immediate examination of the harvesting and processing practices associated with citrus.

GWSS can hitchhike on citrus shipments

Citrus plants have been identified as a primary feeding plant for the glassy-winged sharpshooter. Although citrus is harvested throughout the year, the insects are active when the weather is warm and generally avoid the disturbance created by harvest crews. However, once the weather turns cold, the glassy-winged sharpshooter is relatively inactive. It is believed that during this time the insects are pulled into picking bags when the fruit is harvested and ultimately end up at processing facilities in other parts of the state.

In response to the discovery of this new pathway, the CDFA adopted emergency regulations governing the movement of citrus fruit from infested areas to noninfested areas. These regulations required that citrus shipments be free of glassy-winged sharpshooters prior to leaving infested areas.

Citrus is a preferred host of GWSS

Statewide Survey and Detection

The statewide survey and detection element of the program is designed to rapidly locate new infestations, determine infestation status of areas, and monitor glassy-winged sharpshooter infestations and populations.

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

In the spring of 2001, the CDFA distributed revised survey and delimitation protocols to all California counties. Detection methods for trapping and visual surveys were more specifically defined and the preferred host list for trapping was narrowed to nine types of plants. An onsite detection-training program was provided to county personnel in the 43 glassy-winged sharpshooter free and partially infested counties. Program biologists continued to assist county personnel with field surveys and conducted quality control inspections of glassy-winged sharpshooter detection trapping programs.

There are a total of 49 counties participating in the Pierce's Disease Control Program. At the beginning of this year's survey and detection season, there were six counties considered "generally infested," nine counties "partially infested" and 34 counties determined "free" of glassy-winged sharpshooter. Santa Clara and Imperial Counties were added to the "partially infested" list this year. Meanwhile, the infestation in Contra Costa County was found to be, in all probability, eradicated. Research and field experience during the first two seasons have provided better information about the biology of glassy-winged sharpshooter, allowing for further refinement of detection techniques. At this date, it appears that satellite infestations in nurseries and new landscaping can be eradicated if detected early. Each season of detection work contributes to our knowledge of the pest's distribution and to the determination of our ability to detect and stop its spread.

Rapid Response

The rapid response element involves responding quickly to potential new infestations. When a new glassy-winged sharpshooter infestation is discovered, the County Agricultural Commissioner proceeds according to established protocols. The County Agricultural Commissioner first initiates a delimitation survey to determine the extent of the infestation. Once the extent of the infestation is determined, the county will take action on the basis of its approved work plan. If the sharpshooter is discovered in an agricultural setting, the pest may be treated at the cost of the grower in a manner approved and supervised by the Agricultural Commissioner. If the infestation is detected in an urban or residential area, it may be eradicated where feasible. If eradication is not feasible, the infestation will be contained within the smallest possible area, as determined by the Commissioner.

Treatment Preparation

Before treatments begin, the County Agricultural Commissioner consults a California database of endangered and threatened species maintained by the Department of Pesticide Regulation. If a species was identified in the treatment area, the Commissioner would contact the U.S. Fish and Wildlife Services or the California Department of Fish and Game (CDFG) to identify appropriate mitigation for threatened or endangered species and environmentally sensitive areas within proposed treatment areas. In addition, notification is provided to the California Department of Pesticide Regulation, which monitors treatment activities, and the California Department of Health Services, which responds to illness reports.

A public meeting to provide community members the opportunity to learn about the treatment process and discuss it with environmental health and program specialists precedes any treatment. Door-to-door contacts, direct mail and local media sources are used to inform residents of public meetings. Occupants of all properties as well as adjacent properties scheduled for treatment are provided individual advanced notification, including the label of the pesticide to be used and a phone number to call for more information.

Pesticide Use & Monitoring

The California Department of Pesticide Regulation (DPR) is the lead agency for regulating the use of pesticides in California. The main consideration for selection of a pesticide to use against the glassy-winged sharpshooter is whether the product is effective against the pest and whether it is labeled for use on the host plants found in the infested area. The potential for impacts on public health and the environment are considered when any product is registered in the state, but making

sure the potential for impacts is kept to a minimum is of paramount importance in a treatment program.

The insecticide carbaryl was used against new infestations detected in the first year of the program. This material is labeled for use in residential settings on a broad variety of ornamental plants and fruit trees. The CDFA also had previous experience with the material and had done a full environmental review of similar uses. *(*see *Final Environmental Impact Report: Gypsy Moth, CDFA. 1992)*.

Imidacloprid has proven very effective against the sharpshooter. It has had some use in treatment programs on ornamental plantings in commercial areas. Imidacloprid was the main product used in Fresno and Butte County in 2001.

The Environmental Hazards Assessment Program of the Department of Pesticide Regulation monitors treatments to determine chemical concentrations in the air, surface water, leaves, and representative backyard fruits and vegetables. This information is used by the CDFA to assess proper application rate and coverage.

Over 2,000 infested or adjacent properties in five counties were treated in calendar year 2001. Glassy-winged sharpshooter populations were reduced on properties treated last year. For instance, Fresno County detected 918 infested properties in 2000. After treating these properties, inspectors found only 385 properties infested in 2001. Similarly, Tulare County found and treated 1,027 infested properties last year and only 918 properties remained infested after last year's treatments. Tulare County's infested properties dropped 10% in 2001. Further evaluation will continue in the spring of 2002. Maps of treatment areas are contained in the appendix.

Sampling results and related glassy-winged sharpshooter monitoring reports are available at DPR's website (www.cdpr.ca.gov/docs/gwss).

Strategic Alliances

The CDFA has enlisted the cooperation of the California Conservation Corps (CCC) and the California Department of Transportation (Caltrans) to assist in the fight against Pierce's disease and the glassy-winged sharpshooter.

The CCC has been very helpful rushing into action in several communities where new infestations have been found. This enables local officials and the CDFA coordinators to quickly assess the extent of sharpshooter infestations. The CCC has also assisted in preparation for treatment activities.

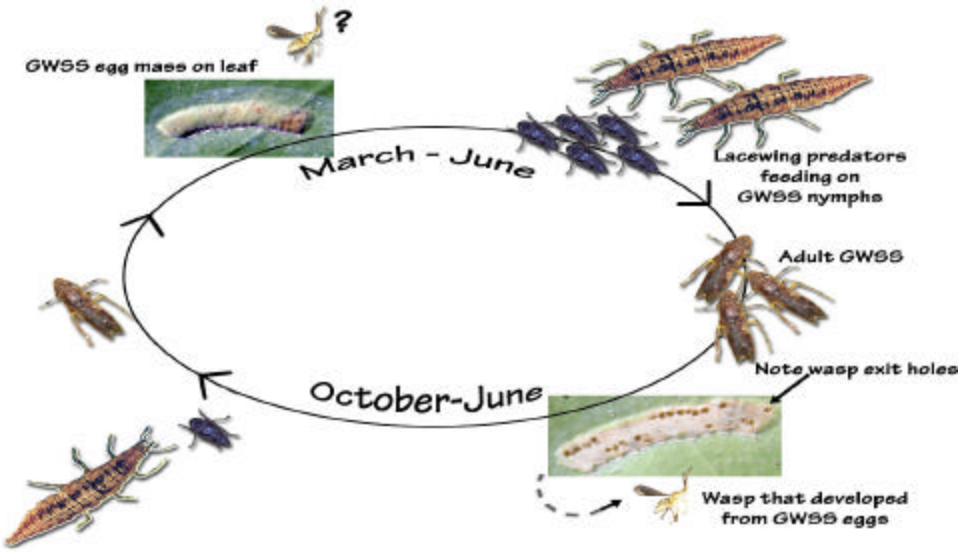
The miles of oleander and other plants lining the medians and shoulders of California's highways are ready hosts to the sharpshooter. Caltrans employees have been trained to identify the sharpshooter and can quickly respond to new infestations when discovered.

Biological Control

One of the most promising long-term solutions for combating the glassy-winged sharpshooter is biological control. Biological control involves finding and releasing natural enemies to reduce populations of the glassy-winged sharpshooter.

The California Department of Food and Agriculture has had a strong commitment to biological control in pest prevention programs since 1977. Classical biological control involves collecting natural enemies that can be found in a pest's native range, rearing large numbers of these natural enemies, and then releasing them so they can begin to exert control over the unwanted pest populations. Before the natural enemies are released, they are rigorously evaluated to make sure that there will be no unwanted impacts on non-target plants or animals.

A key objective of the program's biological control component is to locate a full complement of parasites and predators that can attack multiple life stages of the sharpshooter. These natural enemies must also have the ability to survive the extremes of California's environment, including dry summers and winter freezes. Releasing large numbers of parasites or predators at the right time in the season will reduce the need for insecticides. Ten scientists from the CDFA, the University of California and the USDA are currently engaged in foreign exploration, establishing rearing facilities, and evaluating natural enemies for pilot field releases prior to broad-scale releases of suitable natural enemies.



A complement of natural enemies will help to control the various stages of the glassy-winged sharpshooter throughout the season.

Sharpshooter in California

The glassy-winged sharpshooter is native to the southeastern United States and northeastern Mexico. The presence of natural enemies

Classical Biological Control: Importation of parasites from the native home of the pest, in this case the glassy-winged sharpshooter.

is one of the more important factors that make this pest difficult to find in its native home. In California, up to 85% of glassy-winged sharpshooter egg masses were attacked by a native parasitoid in late summer. The goal of this project is to import additional species of parasitoids that can increase egg mortality to 90% or more during the entire year, thereby reducing regional populations of glassy-winged sharpshooter and Pierce's disease.

Accomplishments

The Biological Control Program has in the last 12 months initiated a multi-agency effort to provide biological alternatives for the control of the glassy-winged sharpshooter. The Department has taken a lead in importing new biocontrol agents, with the USDA contributing funding and personnel, and the University of California providing research and expertise in support of these efforts.

Over the last eight months, three new stingerless wasps (parasitoids) known to attack and kill the glassy-winged sharpshooter in its native home have been collected, imported, and released into California.

Assessed Environmental Impacts

An important phase in assessing the suitability of a new parasite is determining whether it will attack non-pest organisms, such as valuable native insects. Parasitic wasps imported from Mexico receive rigorous screening at a quarantine facility at the University of California at Riverside.

Established Rearing Protocols

In order to increase the chances that a new natural enemy will become established and have an impact on the pest organism, large numbers of the new natural enemy must be reared and released. The process for rearing the sharpshooter's natural enemies is complex. Host plants must be raised to serve as food for a colony of sharpshooters. The eggs produced by these lab-reared sharpshooters are then used to rear the wasp parasitoids. Over the last year, staff members from UC Riverside and the CDFA have been developing a rearing protocol for the sharpshooter and associated parasitoids.

Coordinated Multi-agency Effort

Classical biological control has several steps. The roles for each of the cooperating agencies in this project are based on their expertise and resources.

Importing Natural Enemies to Control Exotic Pests

The University of California has a rich history of importing natural enemies to control exotic pests. CDFA Staff is working with colleagues at UC Riverside in the collection of new parasitoids. The

Roles of Cooperating Agencies

Activity	Agencies
Collect new parasitoids in U.S. & Mexico	UC Riverside & CDFA
Collect new parasitoids in South America	USDA-ARS
Screening & host testing	UC Riverside, CDFA
Rearing & field testing	CDFA, USDA-APHIS, UC Riverside
Mass rearing & regional releases	CDFA & USDA-APHIS
Evaluation	CDFA & USDA-APHIS

University has a quarantine facility for screening new insects and highly specialized systematists capable of identifying the new wasps. The USDA-ARS located in Weslaco, Texas has made arrangements with staff at their international field station in Argentina. Trained personnel have collected 10 parasitoids in Argentina that can attack the egg stage of the glassy-winged sharpshooter. Candidates for field release will be shipped to UC Riverside for screening. Only insects known to attack the glassy-winged sharpshooter will be released into California.

Help from Private Industry

Over the last year, UC Riverside, CDFA, and USDA staff have been developing rearing methods for glassy-winged sharpshooter and associated parasitoids. Much more work needs to be done to increase the efficiency of this system. CDFA and USDA staff have secured a former alfalfa research station in Kern County. It has been renovated and is now producing glassy-winged sharpshooter parasitoids. Approximately 89,500 parasitoids were produced from this facility and released in the San Joaquin Valley this year (see map, on page 24). An additional 49,600 were produced in Riverside. Additional greenhouses will help produce plants and insects under controlled environmental conditions. We have plans to renovate a former USDA-ARS field station in Riverside and retrofit it for rearing insects. Hot summers and cold winters are harmful to plants and insects. The facility has several greenhouses that can be screened for insect control to prevent cross contamination, i.e. wasps getting into the glassy-winged sharpshooter rearing rooms. CDFA is also leasing land from a commercial insectary in Riverside County. With funding from the USDA, small greenhouses were constructed and are being used to rear raise parasites. CDFA has also contracted with another private insectary to produce glassy-winged sharpshooter eggs. This production has been used to help increase parasitoid production.

Map of Release Sites for Parasitoids of Glassy-winged Sharpshooter

	Insectary Locations			
Species	UCR	Riverside	Oswell	Total
G. morrilli ○	0	755	0	755
G. ashmeadi ●	0	24550	2250	26800
G. triguttatus ●	1440	22865	87260	111565

The Future

Additional Foreign Exploration
Foreign exploration for new natural enemies associated with glassy-winged sharpshooter in its native home will continue next spring. UC Riverside and CDFA staff are testing new rearing techniques for glassy-winged sharpshooter. Studies include mixes of plants, artificial diets, and ways to "trick" insects into laying eggs during the winter, which they don't normally do. Staff are also searching for a strain of glassy-winged sharpshooter that lays eggs all year.

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This tiny parasitic wasp feeds on the eggs of GWSS. These non-stinging wasps are smaller than a grain of rice.

Environmental Review

As reported in last year's Report to the Legislature, budget language incorporated in the 2000/01 Budget Act required that the Department consult with a task force to receive input concerning the potential adverse effects on public health and the environment of pesticide applications conducted as part of the Pierce's Disease Control Program. The task force was also charged with suggesting measures that would reduce possible harm to public health and the environment while effectively and expeditiously managing the pest threat presented by Pierce's disease and the glassy-winged sharpshooter.

The Environmental Protection Task Force met in October and November of 2000 and reviewed several aspects of the statewide program. Their discussions culminated in the development of one finding, three consensus recommendations, and two minority recommendations. One of their recommendations was that the Department prepare an Environmental Impact Report for the Pierce's Disease Control Program.

The Department began the process of preparing a programmatic Environmental Impact Report for the statewide Pierce's Disease Control Program in January 2001. The Report is intended to cover implementation of the proposed program by state and local jurisdictions. A Notice of Preparation for the report was distributed in March 2001 and again in May 2001. In April 2001, community scoping sessions were held in Napa, San Luis Obispo, Riverside, and Visalia. The focus of the Environmental Impact Report was then established with consideration of the input received.

The Draft Environmental Impact Report (DEIR) is expected to be released in early 2002. Release of the document begins a 45-day period during which the public and agencies have the opportunity to review and submit comments on the document and the program. Extensive outreach is planned to ensure that interested parties are aware of the DEIR's release and have opportunity to comment. The Department will then consider and respond to the comments received and decide if additional environmental review is needed or if it should go forward with the program.

In addition to these efforts, the Department continues with its commitment and efforts to ensure the program is conducted in an environmentally-responsible manner while continuing to be efficacious. These efforts include following a special 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.

Research

Research is an integral part of the Pierce's Disease Control Program. Research on the disease and its vectors has short-, medium-, and long-term objectives. From the short-term perspective, tools are needed to reduce the natural and artificial spread of the glassy-winged sharpshooter. This includes understanding the biology of the insect in California, finding new natural enemies of the pest, and determining which insecticides are most effective.

Medium-term objectives blend research on the sharpshooter with an effort to determine how to manage Pierce's disease. Areas of concern include:
(1) discovering how the sharpshooter selects a host plant;
(2) analyzing the epidemiology of the disease;
(3) searching for disease pathogens that will attack the sharpshooter; and
(4) determining if cultural practices can reduce the disease's infection in grapevines.

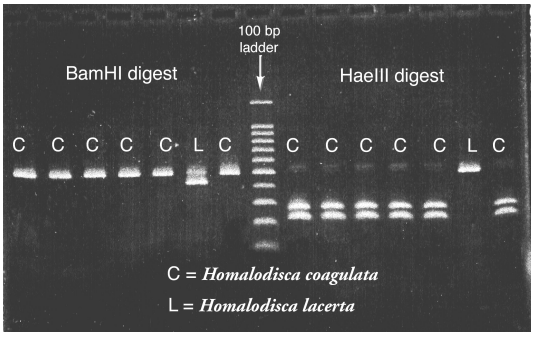
Long-term research focuses almost exclusively on the disease – breeding grapevines resistant to Pierce's disease, finding a non-pathogenic strain of the disease to use as a biological control agent, and determining whether the sharpshooter could be modified so that it cannot spread the disease.

The search for an approved pesticide treatment for nursery stock continued in 2001. Two pesticide trials were conducted yielding valuable information. In addition, a contract was established with the University of California to screen alternative, reduced risk pesticides that might prove effective against the glassy-winged sharpshooter.

Throughout 2001, the Kern County Pilot Project developed and documented effective pest management strategies in a large, agriculturally diverse environment. A number of pesticides were tested and demonstrated effective control of the glassy-winged sharpshooter. These trials achieved significantly lower insect populations without the extensive use of pesticides. This has prompted a proposed Kern County areawide management program that would transfer the lessons learned in the pilot project for use on a much larger scale.

Research Task Forces and Funding

In August 1999, CDFA Secretary Lyons appointed an ad hoc task force to develop research priorities and identify sources for funding Pierce's disease research. Governor Gray Davis signed AB 1232 (Cardoza) in October 1999, allocating $750,000 in state funds, with a requirement for matching industry funding of $250,000 a year, for three years for competitive research grants. These funds were disbursed to researchers using the priorities established by the ad hoc Glassy-winged Sharpshooter/Pierce's Disease Task Force.



DNA analysis has enabled scientists to differentiate GWSS eggs from other sharpshooter species

In addition to research funding, AB 1232 created the Pierce's Disease Advisory Task Force. Recognizing the enormity of the challenge and the limited resources available for research, the Task Force formed a Research Subcommittee comprised of representatives from affected commodities, including viticulture, the almond and citrus industries, and the USDA. Coordinating the efforts of these groups has helped to eliminate redundant research, increased available research funds, and fostered collaborative efforts among researchers. The Pierce's Disease/Glassy-winged Sharpshooter (PD/GWSS) combined research funding effort is supporting approximately 65 projects in Fiscal Years 2000/01 and 2001/02, using combined research funds of approximately $12.1 million from the USDA, the State of California, and various industry groups. A list of projects is provided in the appendices.

Scientific Communication

Sharing the results of ongoing projects and any new research projects is vital to ensuring rapid progress. To that end, a research symposium was held in Riverside in late May 2001 for researchers to report progress made on research projects funded by CDFA. A larger, more comprehensive symposium was held December 5-7, 2001 in San Diego. The symposium featured progress reports on all projects receiving funding from the PD/GWSS research funding partnership, which includes the USDA, the state of California, and industry. Additionally, the University of California held its annual Glassy-winged Sharpshooter Working Group meeting in Bakersfield in late October 2001, providing another venue for the communication of scientific information and progress.

"Raisining" of grape bunches due to Pierce's disease

Outreach

The outreach effort serves to raise awareness of Pierce's disease and the glassy-winged sharpshooter. Many citizens informed through outreach activities have already contributed to the program's efforts by notifying local authorities of pest sightings. Public awareness leads to public involvement, which leads in turn to earlier detection of sharpshooter infestations, less damage to agriculture and natural resources, and lower costs for efforts to combat the infestations.

Over the past 12 months, CDFA employed a public relations contractor to assist program staff in identifying and training pest and plant experts, growers and industry representatives throughout the state to serve as a voluntary outreach corps. Significant progress was made in this area over the past year. Dozens of carefully selected individuals have received updates, talking points, presentation materials and other tools to enable them to disseminate basic information to local audiences as the need arises. These local volunteers also serve as resources for local media, enabling the program to illustrate the importance of local involvement in this statewide program.

Outreach also helps community members understand the significance of the Pierce's disease threat and the measures that can be taken to combat it. Upon the discovery of a new infestation, outreach staff assist local authorities with the planning and presentation of public meetings; inform the media; provide information and instructive materials for local organizations; and work with local agricultural officials to respond to each community's unique social, environmental, and public health needs and concerns.

Accomplishments

Media Coverage

Over 800 articles about Pierce's disease and the sharpshooter have appeared in national and international publications. Radio and television reports center on new infestations, such as the Santa Clara County infestation discovered in the summer of 2001. On balance, the coverage has been fair and factual and has included statements and information generated by the statewide program.

Media Guide

A printed and online media guide, produced by the California Farm Bureau Federation in coordination with the program, identifies scientific experts and industry spokespeople throughout California. These individuals have received extensive information on the program from CDFA and have volunteered to serve as contacts for reporters to help disseminate accurate, timely reports through the media.

Speaker Training

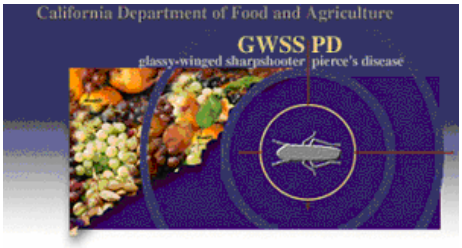
Working with the public relations contractor, program staff conducted several training sessions around the state during autumn 2001. Agricultural commissioners and their staffs, farm advisors, educators, industry representatives and growers were among the many attendees at these sessions. Training included extensive informational presentations about the statewide program, a primer on preparing for a media interview, and the development of messages relevant to the local community's specific questions, needs and concerns about pests, plant diseases and related issues.

Informational Materials

Adding to the materials produced in 1999 by CDFA and the University of California, the program has added a series of publications and materials specifically written and designed to help residents look for, report and respond to infestations of the glassy-winged sharpshooter. These publications include a brochure and a pocket-sized card to help identify the pest and Pierce's disease symptoms, a series of "Frequently Asked Questions," talking points for local officials who present information to the public, and a computerized presentation for more formal public events.

Website

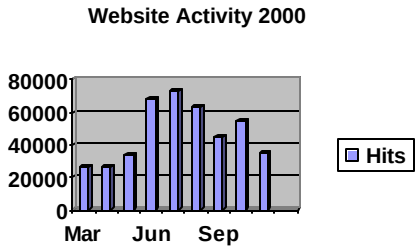
The CDFA developed and activated a website dedicated to Pierce's disease and the glassy-winged sharpshooter. The website was activated in March 2000 and received over 500,000 hits during its first year. The site offers frequent updates on program activities, survey and regulation guidelines, treatment information, upcoming meetings and events, a host list, and other information.



This website has received over 500,000 hits since March 2000.

http://www.cdfa.ca.gov/phpps/pdcp/

In addition, the website provides an interactive interface that allows direct activity reporting by local entities.



Over 500,000 hits on webpage since its creation in March 2000

Conclusion

This has been a significant year in the fight against Pierce's disease and the glassy-winged sharpshooter, one in which statewide agricultural organizations and other stakeholders united for a common purpose. Several strains of the bacteria that cause Pierce's disease exist and can attack and cause damage to a number of different plants. Consequently, a number of agricultural organizations have a vested interest in the program's success. As the Pierce's Disease Control Program originated and the fight itself continued to gain momentum, stakeholders asked for more input on policy and decision-making activities. The CDFA listened and used the feedback in its leadership of key initiatives. In the coming year, the CDFA hopes to build on the spirit of cooperation and interaction to bring the State of California closer to an integrated solution for Pierce's disease and its vectors.

The program has faced many challenges. The first challenge was to determine the extent of the glassy-winged sharpshooter's presence in California. An initial statewide survey was conducted in early 2000. Comprehensive surveys were completed this year. Urban area infestations are very much a threat and comprehensive statewide surveys were necessary to accurately assess the sharpshooter population and risk.

Emerging changes in the discovery of the glassy-winged sharpshooter led the CDFA to implement several new initiatives, including the creation of nursery, bulk grape and citrus regulations requiring industry to ensure that shipments are sharpshooter-free. While these regulations impact business operations, cooperation has been commendable. Very few nursery shipments are infested with the sharpshooter and nurseries are working hard to prevent the spread. This is verified by the fact that less than one-half of one percent of 57,000 shipments this year carried viable life stages of the sharpshooter.

The accomplishments in research have been very encouraging. Research priorities have been identified, the experts to perform the projects have been identified and 65 research projects are underway. Most significantly, the genome of *Xylella fastidiosa* bacteria has been mapped allowing scientists for the first time to distinguish between strains of the bacteria (for example: citrus variegated chlorosis and Pierce's disease). Demonstration projects have already developed tools for industry to use in their management practices and have established a foundation for significant future accomplishments.

The ongoing development of the biological control element is critical to the success of an integrated pest management approach. Identification and release of natural enemies of the sharpshooter will help to minimize pesticide treatments. Although the limited pesticide treatments

applied this year appear effective, their impact won't be fully known until next spring when the sharpshooter populations typically increase.

A key challenge is the availability of resources. State and local government resources are being stretched and are in growing demand. The federal government recognized the importance of a solution by committing $22 million and has indicated future support. An estimated $8.5 million is earmarked by the United States Congress for the program's next fiscal year. Continued support will be necessary to ensure that sufficient resources are available to combat Pierce's disease and its vectors.

In 2000, the program emphasis was on the urgent need to prevent artificial movement of the glassy-winged sharpshooter and to delimit the areas infested with this pest. In 2001, program activities expanded to include additional elements to combat Pierce's disease, such as survey and identification methodology and training.

The CDFA will continue to focus on the ongoing development of biological control, improving statewide surveys, and enhancing our research efforts. To reach our objectives, we will continue to rely on the dedication and initiative of County Agricultural Commissioners and the many stakeholders. The CDFA is confident that stakeholder cooperation will lead us closer to a long-term solution for Pierce's disease.

Financial Statement

	FY 2000/01	FY 2001/02
BEGINNING BALANCE	3,523,000	6,967,311
REVENUE		
State (Budget Act)	6,900,000	8,287,500
Federal (USDA)	13,040,000	5,239,000
Research (AB 1232)	750,000	750,000
Total Revenue	20,690,000	14,276,500
TOTAL RESOURCES	24,213,000	21,243,811
EXPENDITURES		
Salaries & Wages	1,442,710	1,909,632
Staff Benefits	162,672	415,000
General Expense	302,413	150,000
Printing	66,677	72,000
Communications	67,463	65,000
Postage	19,182	24,000
Insurance	0	4,400
Travel In-State	246,399	270,000
Travel Out-State	13,582	24,000
Training	5,468	20,000
Facility Operations	75,045	880,000
Utilities	1,690	42,000
Consult/ProSrvs -Intrastate	1,215,973	950,332
Consult/ProSrvs -External	440,080	240,634
Data Processing	407,998	65,000
Intradepartmental Charges	329,661	386,609
Indirect State Admin Costs	10,899	0
Equipment	575,129	415,135
Other (inc. research)	842,680	1,375,050
County Payments	11,019,968	13,043,000
Total Expenditures	17,245,689	20,351,792
FUND BALANCE	6,967,311	892,019

Appendices Contents

Board, Task Force and Advisory Panel Members

Pierce's Disease/Glassy-Winged Sharpshooter Board

Kevin Andrew
Sun World International
Bakersfield, CA

Dennis J. Atkinson
Tejon Ranch Company
Lebec, CA

Gregory Coleman
E&J Gallo Winery
Modesto, CA

Edgar "Pete" Downs
Kendall-Jackson Wine Estates
Santa Rosa, CA

Ben Drake
Drake Enterprises
Temecula, CA

Bradford Lange
Lange Twins
Acampo, CA

Frank Leeds
Chavez & Leeds Winery
Rutherford, CA

Steve McIntyre
Monterey Pacific
Soledad, CA

Dana Merrill
Mesa Vineyard Management
Coastal Valley Management Company
Paso Robles, CA

Albert Rossini
Rossini Farming Company
Ceres, CA

Herb Schmidt
Robert Mondavi Winery
Napa, CA

Robert Steinhauer
Beringer Blass
Wine Estates
St. Helena, CA

Paul Wulf
Wulf Vineyards
Fresno, CA

James Glen Unti
Canandaigua Wine
Madera, CA

Pierce's Disease Advisory Task Force

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Bakersfield, CA

Ted Batkin
Citrus Research Board
Visalia, CA

Larry Bezark
California Department of
Food & Agriculture
Sacramento, CA

Robert Crudup
Valley Crest Tree Nursery
Sunol, CA

Ben Drake
Drake Enterprises
Temecula, CA

Patrick Gleeson
American Vineyard
Foundation
Napa, CA

Chris Heintz
Almond Board of California
Sacramento, CA

Scott Hudson
San Joaquin County
Stockton, CA

Andrew Johnson
Beringer Wine Estates
St. Helena, CA

Terry Lee
E & J Gallo Winery
Modesto, CA

John McCaull
American Farmland Trust
Davis, CA

Steve Pavich
Pavich Farms
Terrabella, CA

Vincent Petrucci
Fresno State University
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Corky Roche
Roche Consulting
Salinas, CA

James Wallace
Riverside County
Department of Agriculture
Riverside, CA

Craig Weaver
Callaway Vineyards
Temecula, CA

Dr. Robert Webster
University of California -
Davis, CA

Dr. Lloyd Wendel
USDA - Western
Region Office
Sacramento, CA

Paul Wenger
California Farm Bureau
Federation
Sacramento, CA

David Whitmer
Napa County Department
of Agriculture
Napa, CA

Science Advisory Panel

Dr. Alex Purcell
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Dr. Beth Grafton-Cardwell
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Parlier, CA

Dr. Rick Redak
University of California
Riverside, CA

Dr. James Kamas
Texas A & M University
Fredricksburg, TX

Dr. Phil Phillips
University of California
Ventura, CA

Dr. John Kabashima
UC Cooperative Extension
Los Angeles, CA

Mr. William Peacock
UC Cooperative Extension
Tulare, CA

Dr. Russ Mizell
University of Florida
Monticello, FL

Citrus Subcommittee

Craig Armstrong
Coachella Valley
Citrus
Thermal, CA

Tom Avinelis
Agricare
Lindsey, CA

Ted Batkin
Citrus Research Board
Visalia, CA

Doug Carman
Paramount
Delano, CA

Lenord Craft
Tulare County
Department
of Agriculture
Tulare, CA

Ted Davis
Kern County
Department
of Agriculture
Bakersfield, CA

Don Dillon, Jr.
Four Winds Growers
Fremont, CA

John Gless
Gless Ranch
Riverside, CA

Jim Gorden
Pest Management
Associates
Exeter, CA

David Padilla
Padilla Farm Labor,
Inc.
Lindsey, CA

Josh Pinkerton
Pinkerton Ranch
Ventura, CA

Mike Richardson
Quality Ag
Fillmore, CA

Chris Taylor
Limoneira
Santa Paula, CA

Bruce Wileman
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Porterville, CA

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Tri Citrus
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Bulk Grape Movement Subcommittee

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Robert Mondavi Winery
Woodbridge, CA

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Sun World International
Bakersfield, CA

Phil Bava
E&J Gallo Winery
Modesto, CA

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Delicato Family Vineyards
Manteca, CA

Kirk Brown
Golden State Vintners
Parlier, CA

Pete Camarda
The Wine Group
Ripon, CA

Nat Dibuduo
Allied Grape Growers
Fresno, CA

Pete Downs
Kendall-Jackson Vineyards
& Winery
Santa Rosa, CA

Ben Drake
Drake Enterprises
Temecula, CA

Fred Franzia
Bronco Wine Company
Ceres, CA

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Galleano Winery
Mira Loma, CA

Hal Huffsmith
Sutter Home
St. Helena, CA

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Vino Farms
Lodi, CA

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Gary Hayakawa
Three Star Nursery
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Orange, CA

Chris Ono
Mitsuwa Nursery
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Cato Fiksdal
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Department of Agriculture
El Monte, CA

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California Table Grape Commission
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Terry Lee
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Cliff Ohmart
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Dr. Robert Webster
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Dr. Lloyd Wendel
USDA Western Region
Sacramento, CA

Pierce's Disease Control Program Research Projects

Principal Investigator & Affiliation	Research Project Title
Douglas Adams, UC Davis, Department of Viticulture and Enology	Identification of Molecular Markers in the Grapevine's Response to Infection by *Xylella fastidiosa*
Elaine Backus, University of Missouri, Columbia	Sharpshooter Feeding Behavior in Relation to Transmission of Pierce's Disease Bacterium
David Gilchrist, UC Davis, CEPRAP and the Department of Plant Pathology	Application of *Agrobacterium rhizogenes*-Mediated Transformation Strategies for a) Rapid High Through Put Screen for Genetic Resistance to Pierce's Disease in Grape that Maintains Clonal Integrity of the Recipient Host, and b) Rapid Screening for Virulence Determinants in *Xylella fastidiosa*
Carole Meredith, UC Davis, Department of Viticulture and Enology	Genetic Transformation to Improve the Pierce's Disease Resistance of Existing Grape Varieties
Bruce Kirkpatrick, UC Davis, Department of Plant Pathology	Production and Screening of *Xylella fastidiosa* Transposon Mutants and Microscopic Examination of Xf-Resistant and Susceptible *Vitus* Germplasm
Bruce Kirkpatrick, UC Davis, Department of Plant Pathology, Alexander H. Purcell, UC Berkeley, Division of Insect Biology, Edward A. Weber, UC Cooperative Extension, Napa, M. Andrew Walker, UC Davis, Department of Viticulture & Enology, Peter C. Andersen, University of Florida, Quincy	Biological, Cultural, and Chemical Management of Pierce's Disease
Edwin L. Civerolo, USDA Crops Pathology and Genetics Research Unit, Davis	Epidemiology of *Xylella fastidiosa* Diseases in California: Relationship between Pierce's Disease and Almond Leaf Scorch, and the Relationship of Stone Fruits and Citrus to the Epidemiology of these Diseases.
Edwin L. Civerolo, USDA Crops Pathology and Genetics Research Unit, Davis	Genome Sequence of a Pierce's Disease Strain of *Xylella fastidiosa*
Carole Meredith, UC Davis, Department of Viticulture and Enology	A Genetic Map of *Vitis vinifera*: A Foundation for Improving the Management of Disease and Flavor
Andrew Walker, UC Davis, Department of Viticulture and Enology, David Ramming, USDA, Fresno	The Genetics of Resistance to Pierce's Disease and Breeding Pierce's Disease Resistant Table and Raisin Grapes
Valley Stewart, UC Davis, Division of Biological Sciences	Regulation of *Xylella fastidiosa* Exoploysaccharide Gene Expression
Richard A. Redak, UC Riverside, Department of Entomology	Controlling the Spread of *Xylella fastidiosa* the Causal Agent of Oleander Leaf Scorch by Disrupting Vector Acquisition and Transmission

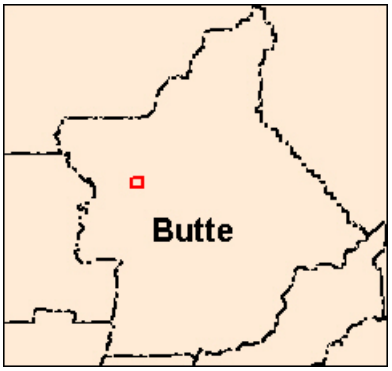
Principal Investigator & Affiliation	Research Project Title
Ronald H. Brlansky, Citrus Research and Education Center, Lake Alfred, FL	Transmission of the CVC bacterium, *Xylella fastidiosa,* with the Glassy-winged Sharpshooter, *Homalodisca coagulata*.
Thomas M. Perring, UC Riverside, Department of Entomology	Epidemiology of Pierce's Disease in the Coachella Valley
Donald A. Cooksey, UC Riverside, Department of Plant Pathology	Epidemiology of Pierce's Disease in Southern California: Identifying Inoculum Sources and Transmission Pathways
Heather S. Costa, Donald A. Cooksey, UC Riverside, Department of Entomology/Plant Pathology	Incidence of *Xylella fastidiosa* in Glassy-winged Sharpshooter Populations and the Impact of Multiple Strain Infections on Acquisition and Transmission
John M. Labavitch, UC Davis, Department of Pomology, Mark A. Matthews, UC Davis, Department of Viticulture and Enology	The Development of Pierce's Disease in Xylem: The Roles of Vessel Cavitation, Cell Wall Metabolism and Vessel Occlusion
Steven E. Lindow, UC Berkeley, Department of Plant and Molecular Biology	Role of *Xylella fastidiosa* Attachment on Pathogenicity
Neil P. Price, State University of New York, Department of Chemistry	Bacterial Polysaccharides Expressed by Infective *Xylella fastidiosa* during Pierce's Disease
Bruce Kirkpatrick, UC Davis, Department of Plant Pathology	Studies on Bacterial Canker and Almond Leaf Scorch
Donald A. Cooksey, UC Riverside, Department of Plant Pathology	Biological Control of Pierce's Disease with Non-pathogenic Strains of *Xylella fastidiosa*
Donald A. Cooksey, UC Riverside, Department of Plant Pathology	Control of Pierce's Disease Through Degradation of Xanthan Gum
Carol R. Lauzon, California State University, Hayward, Department of Biological Sciences	A Survey of Insect Vector's of Pierce's Disease (PD) and PD Infected Plants for the Presence of Bacteriophage that Infect *Xylella fastidiosa*
Richard A. Redak, UC Riverside, Department of Entomology	Developing an Integrated Pest Management Solution for Pierce's Disease Spread by the Glassy-winged Sharpshooter in Temecula
Matthew J. Blua, Greg P. Walker,UC Riverside, Department of Entomology	Impact of Sub-Lethal Doses of Neonicotinoids on Glassy-winged Sharpshooter Feeding and Transmission of Pierce's Disease
T. Miller, J. Peloquin, C. Lauzon, D. Lampe, D. Cooksey, F. Richards, UC Riverside, Department of Entomology	Insect-Symbiotic Bacteria Inhibitory to *Xylella fastidiosa* in Sharpshooter
John J. Peloquin, UC Riverside, Department of Entomology	Sharpshooter-Associated Bacteria that may Inhibit Pierce's Disease
James Hagler, USDA, Kent Daane, UC Berkeley, Heather Costa, UC Riverside	A Monoclonal Antibody Specific to Glassy-winged Sharpshooter Egg Protein: A Tool for Predator Gut Analysis and Early Detection of Pest Infestation

Principal Investigator & Affiliation	Research Project Title
D. Luvisi, UC Cooperative Extension Kern County, Bakersfield	Glassy-winged Sharpshooter and Pierce's Disease Research
Richard A. Redak, UC Riverside, Department of Entomology	Impact of Layering Control Tactics on the Spread of Pierce's Disease by the Glassy-winged Sharpshooter
Mark Hoddle, Serguei Triapitsyn, Robert Luck, Richard Redak, UC Riverside, Department of Entomology	Biocontrol of Glassy-winged Sharpshooter in California: One Cornerstone for the Foundation of an IPM Program
Roger A. Leopold, USDA Biosciences Research Lab., Fargo	Cold Storage of Parasitized and Unparasitized Eggs of Glassy-winged Sharpshooter, *Homalodisca coagulata*
Russell F. Mizell, III, University of Florida, Department of Entomology and IPM	Keys to Management of Glassy-winged Sharpshooter: Interactions between Host Plants, Malnutrition and Natural Enemies
Bruce D. Hammock, Shizuo G. Kamita, UC Davis, Department of Entomology	Isolation and Characterization of Glassy-winged Sharpshooter Pathogenic Viruses
Philip Philips, UC Cooperative Extension Ventura County	Surveys for More Effective Glassy-winged Sharpshooter Parasitoids
Walker Jones, USDA, Beneficial Insects Research Lab, Waslaco, TX	Classical Biocontrol of Glassy-winged Sharpshooter, *Homalodisca coagulata*
Walker Jones, USDA Mission, Gary Puterka USDA Kearneysville, Matthew Ciomperlik, Ed Civerolo, USDA Crops Pathology and Genetics Research Unit, Davis	Test Biorational Insecticides on Glassy-winged Sharpshooter
Elizabeth Grafton-Cardwell, UC Riverside, Department of Plant Pathology	Efficacy of Insecticides used for Glassy-winged Sharpshooter Control in Citrus
Elizabeth Grafton-Cardwell, UC Riverside, Department of Plant Pathology	Evaluation of Efficacy of Sevin Treatments in Porterville Glassy-winged Sharpshooter Infestation
T. J. Henneberry, D. H. Akey, S. J. Castle, USDA Western Cotton Research Laboratory, Pheonix, Nilima Prabhaker, UC Riverside, Ed Civerolo, USDA Crops Pathology and Genetics Research Unit, Davis	Potential of Biorationals for Glassy-winged Sharpshooter Control
Gary Puterka, Matthew Ciomperlik, Michael Glenn, Ed Civerolo, USDA Crops Pathology and Genetics Research Unit, Davis	Repellents and Biorationals for Control of Glassy-winged Sharpshooter
Nick Toscano, UC Riverside, Department of Entomology, Steve Castle, USDA Western Cotton Research Lab	Laboratory and Field Evaluations of Imidacloprid and Thiamethozam Against Glassy-winged Sharpshooter on Citrus and Grapes

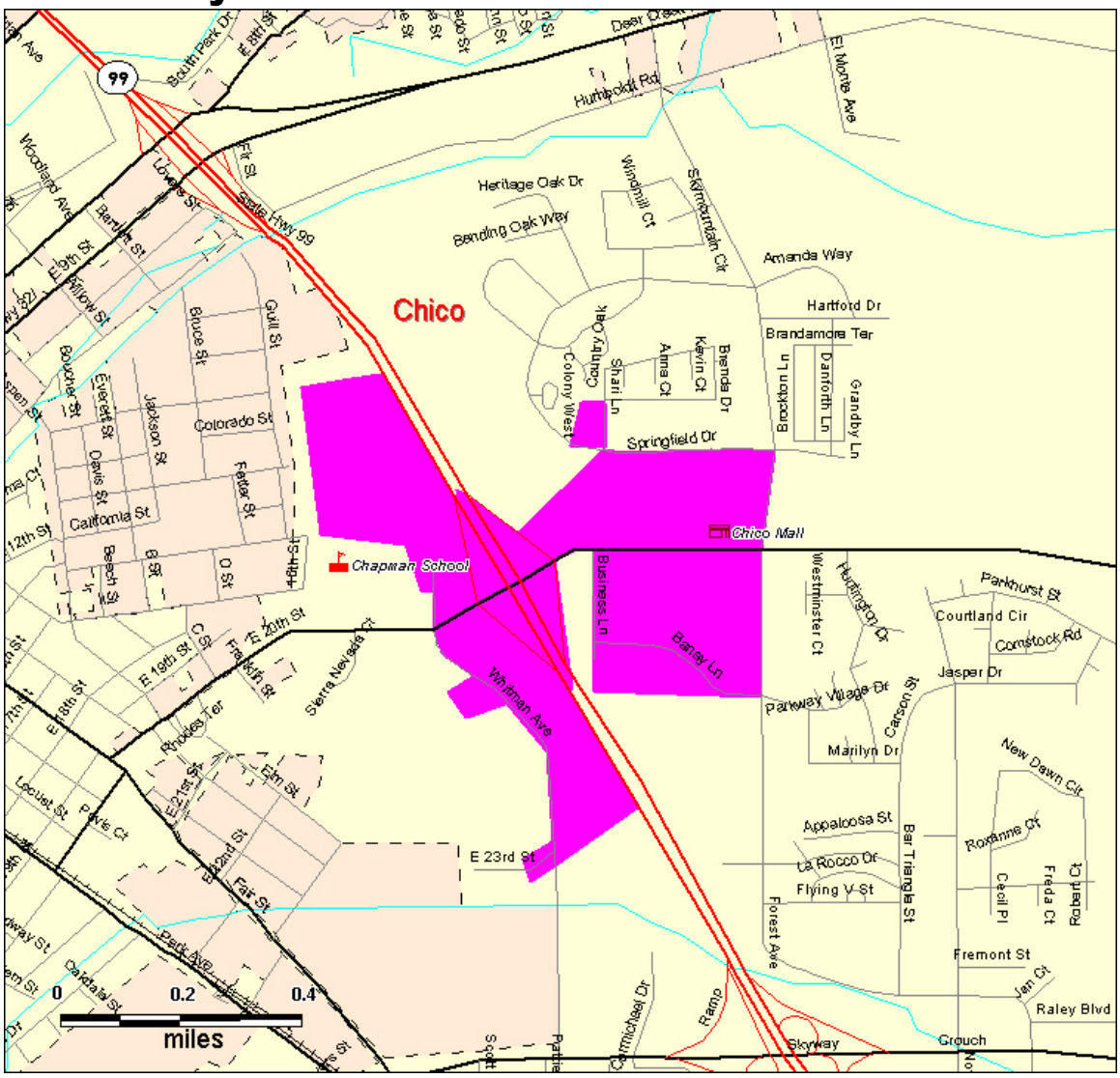
Principal Investigator & Affiliation	Research Project Title
Nick Toscano, Rick Redak, Matthew Blua, Raymond Hix, UC Riverside, Department of Entomology	Area Wide Abatement of Glassy-winged Sharpshooter, a Pierce's Disease Vector
Nick Toscano, UC Riverside, Department of Entomology	Chemical Control of Glassy-winged Sharpshooter: Establishment of Baseline Toxicity and Development of Monitoring Techniques for Detection of Early Resistance to Insecticides
Walter S. Leal, UC Davis, Department of Entomology, Frank G. Zalom, UC Davis, Department of Entomology, Statewide IPM Project	Developing a Novel Detection and Monitoring System for the Glassy-winged Sharpshooter
Steven Lindow, UC Berkeley, Department of Plant and Microbial Biology	Management of Pierce's Disease of Grape by Interfering with cell-cell Communication in *Xylella fastidiosa*
Robert R. Luck, UC Riverside, Department of Entomology	Spatial and Temporal Relations Between Glassy-winged Sharpshooter Survival and Movement, Xylem Flux Patterns and Xylem Chemistry in Different Host Plants
Donald Dahlsten, UC Berkeley, Center for Biological Control	The Effects of Vegetation Management for Pierce's Disease on Vertebrates in Riparian Zones
Randy E. Hunt, Indiana University Southeast, Department of Biology	Mating Behavior of the Glassy-winged Sharpshooter, *Homolodisca coagulata*
Russell F. Mizell, III, University of Florida, Department of Entomology and IPM	Host Selection Behavior and Improved Detection for Glassy-winged Sharpshooter, *Homalodisca coagulata* (Say)
Christine Peng, UC Davis, Department of Entomology	Reproductive Biology and Physiology of the Glassy-winged Sharpshooter
Alexander H. Purcell, UC Berkeley, Department of Environment Science, Policy and Management	Characterization and Studies on the Fundamental Mechanisms of *Xylella fastidiosa* Transmission to Grapevines by the Glassy-winged Sharpshooter
Alexander H. Purcell, UC Berkeley, Department of Environmental Science, Policy and Management	Transmission of *Xylella fastidiosa* to Almonds by the Glassy-winged Sharpshooter
Richard A. Redak, UC Riverside, Department of Entomology	Basic Information on the Spread of Pierce's Disease by the Glassy-winged Sharpshooter and Investigate Plant Protection Tactics
Richard A. Redak, UC Riverside, Department of Entomology	Developing an Integrated Management Solution for Pierce's Disease Spread by the Glassy-winged Sharpshooter in Temecula
Jerome Siebert, UC Berkeley, Department of Agricultural and Resource Economics	Economic Impact Data Gathering for Pierce's Disease
J. L. Blackmer, S. J. Castle, J. R. Hagler, S. E. Naranjo, USDA, N. C. Toscano, UC Riverside, Department of Entomology	Sampling, Seasonal Abundance and Distribution of Glassy-winged Sharpshooter in Citrus and Grapes

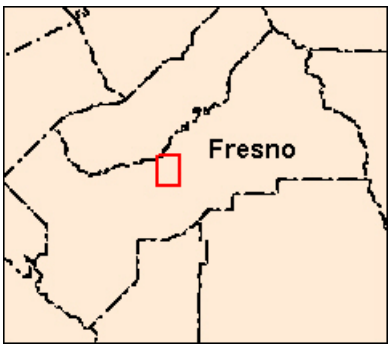
Principal Investigator & Affiliation	Research Project Title
Jiang Lu, Center of Viticulture, Florida A&M University, Peter Cousins, USDA Cornell University	Rootstock Influence of Pierce's Disease
Kent Daane, UC Berkeley	Biology and Ecology of Glassy-winged Sharpshooter in the San Joaquin Valley
Dean W. Gabriel, University of Florida, Department of Plant Pathology	Role of Type 1 Secretion in Pierce's Disease
Raymond L. Hix, UC Riverside, Department of Entomology	Development of Trapping Systems to Trap the Glassy-winged Sharpshooter *Homalodisca coagulata* Adults and Nymphs in Grape
Mark Hoddle, Robert Luck, Richard Redak, UC Riverside, Department of Entomology	Seasonal Changes in the Glassy-winged Sharpshooter Age Structure, Abundance, Host Plant use and Dispersal
Allen C. Cohen, USDA Mississippi State	Development of An Artificial Diet for the Glassy-winged Sharpshooter
Alexander H. Purcell, UC Berkeley, Department of Environmental Science, Policy and Management	Pruning for Control of Pierce's Disease
Roman Rakitov, Center for Biodiversity, Illinois Natural History Survey, Champaign	The Evolution of The Proconiini Leafhoppers, Major Vectors of Pierce's Disease

Treatment Sites

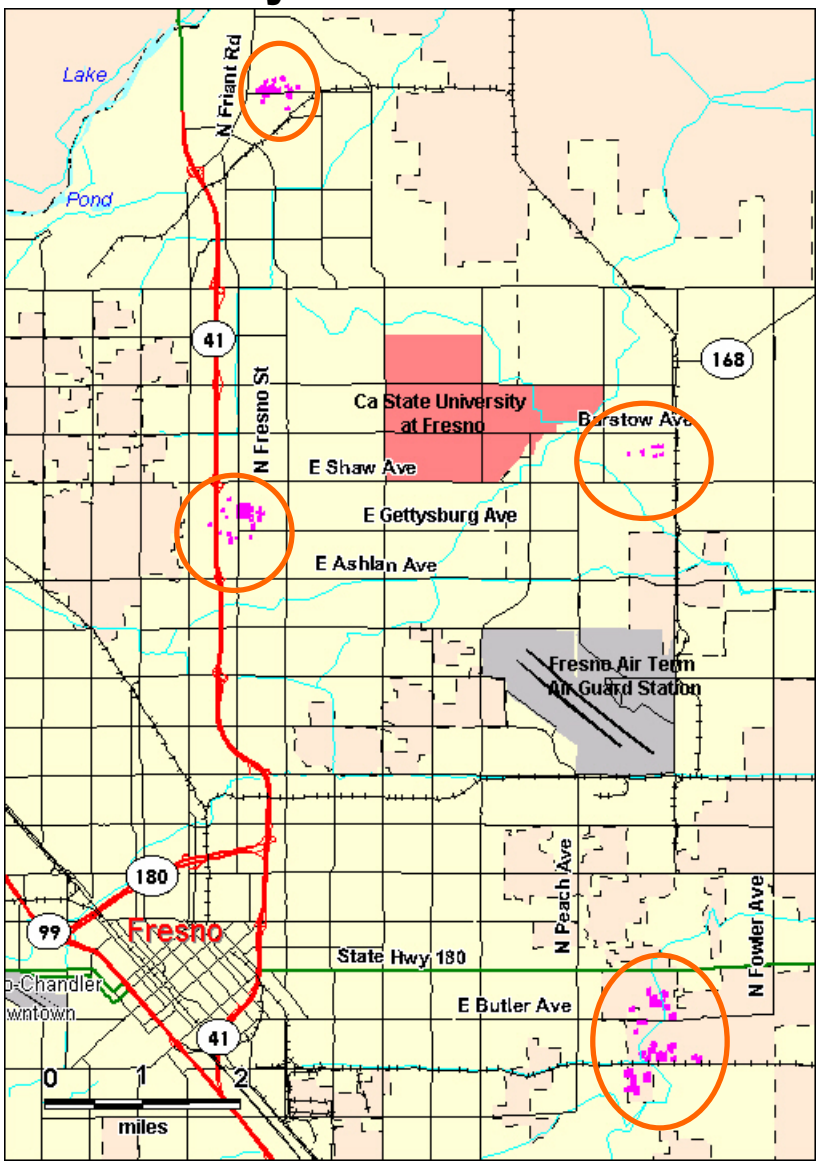


Butte County

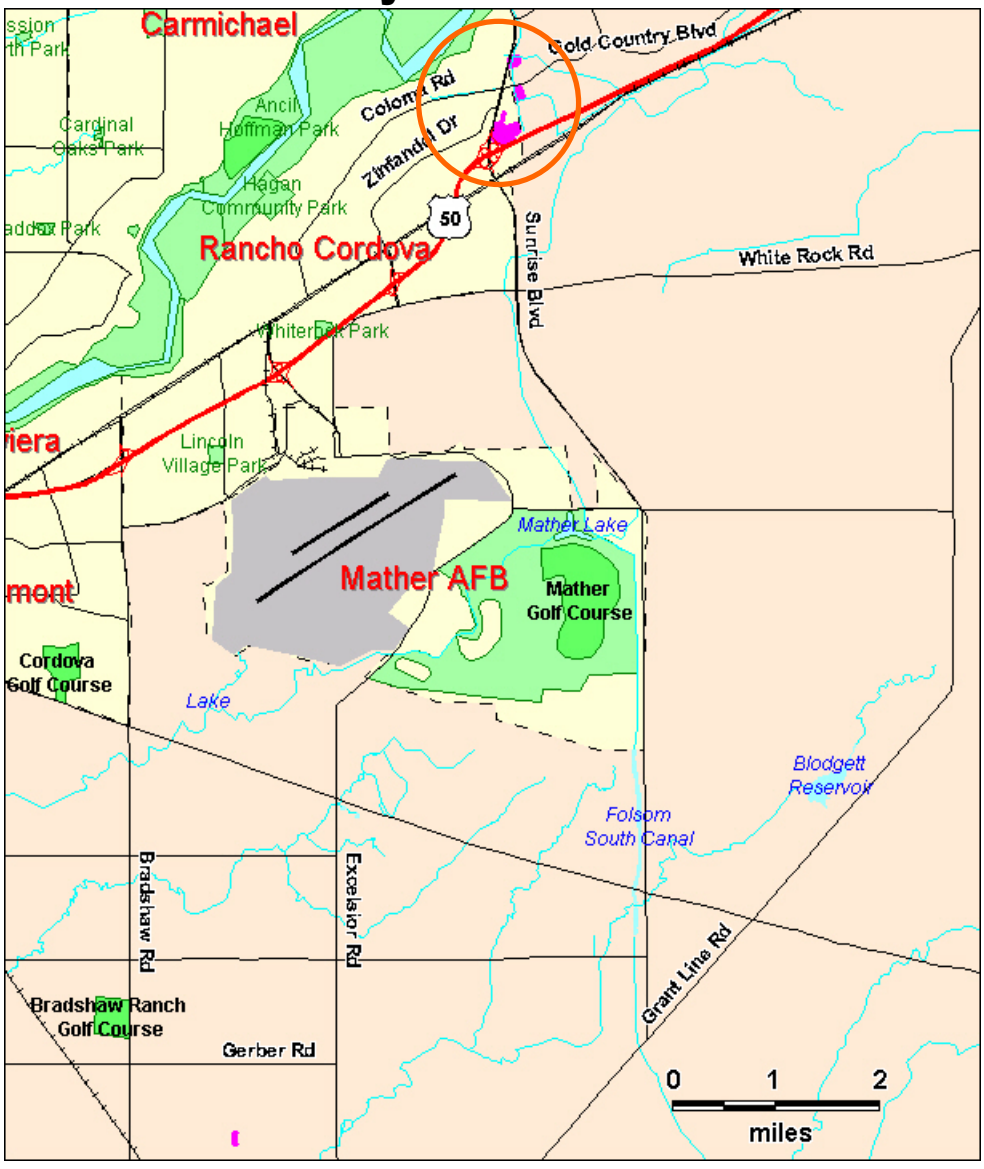




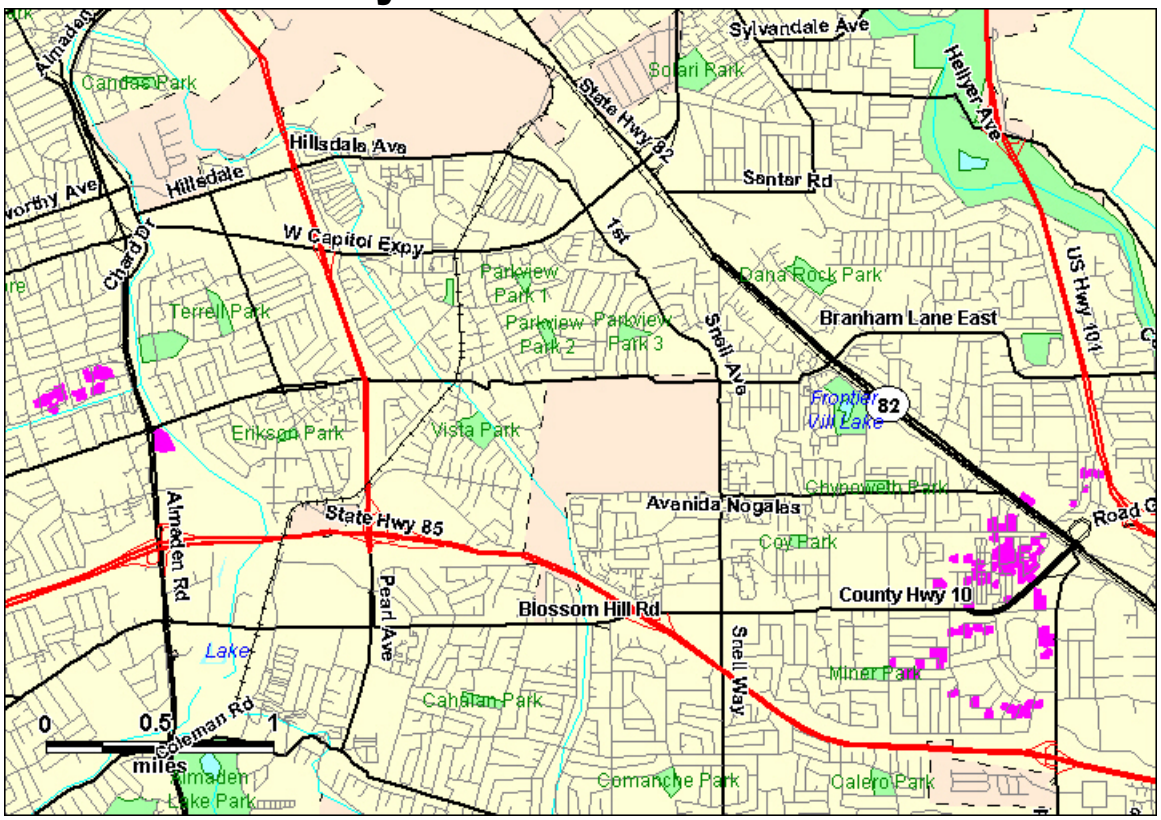
Fresno County

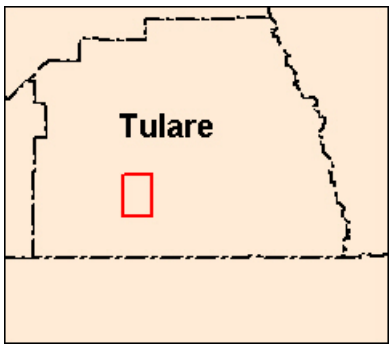


Sacramento County



Santa Clara County





Tulare County