



# PIERCE'S DISEASE CONTROL PROGRAM



## REPORT TO THE LEGISLATURE FOR CALENDAR YEAR 2017

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## STATEMENT OF THE SECRETARY

Our Pierce's Disease Control Program and Pierce's Disease/Glassy-winged Sharpshooter (PD/GWSS) Board have reached a level of success and maturity that bears some retrospective appreciation. We've kept the disease at bay in the vast majority of California's grape-growing regions, and in those where it has encroached we have maintained an unwavering focus on detection, removal, and vigilance. Solutions are in the pipeline, and the board has even expanded its focus to other vineyard threats that are best addressed by the forum and the framework that our PD/GWSS research and outreach efforts provide.

This past year, many of our grape growers, winemakers, vineyard workers, and colleagues fought yet another threat – wildfires. And as they did years ago at the beginning of this program, farmers and their families pulled together. Aid was offered, resources were shared, and doors were thrown open to welcome neighbors in need. The time I spent in fire-ravaged areas as we assembled California's response and recovery efforts served to remind me that as much as agriculture is a business, it is also a community. We embrace a fundamental shared experience of working the land, and we know that when a threat to that common good comes along – whether it's fire or pests or disease – facing it together is to our shared advantage.

As you read this report on our continued progress, be mindful of the role farmers, ranchers and their employees have in your local region, and in our larger agricultural community. It comes naturally to them to pull together in these times of need, and in that vein our state's experience with Pierce's disease has become a model of cooperative response.

Karen Ross, Secretary  
California Department of Food and Agriculture




# EXECUTIVE SUMMARY

2017 was another successful year for the Pierce's Disease Control Program (PDCP). When the glassy-winged sharpshooter (GWSS) arrived in California it had few natural enemies. Left unchecked, its populations built up rapidly. This insect is an aggressive vector of Pierce's disease (PD), a fatal bacterial disease of grapevines. Before much was understood about the GWSS, acres of grapevines began dying in southern California due to the combination of PD and its new vector.

With the future of the grape and wine industry in the balance, and with the essential cooperation of that industry, the California Department of Food and Agriculture responded in the year 2000 to the threat of PD and GWSS with the creation of the PDCP. The five major components of the program (contain the spread, statewide survey and detection, rapid response, outreach, and research) and the cooperative and coordinated nature of the program have made the PDCP a model for subsequent pest prevention and response programs. The PDCP also developed a biological control program that rears and releases tens of thousands of natural enemies each year that help reduce GWSS populations.

This program has evolved over the years, improving methods and techniques. The yellow panel trap used to detect GWSS has proven to be a reliable detection tool. Rapid response activities have successfully eradicated 18 separate incipient GWSS infestations throughout the state. An approved treatment protocol has been very successful at reducing the risk of moving GWSS on nursery stock. In infested areas, area-wide treatment programs in vast agricultural sectors of the southern San Joaquin Valley battle to keep GWSS populations in check.

The PDCP relies upon federal assistance and California winegrape assessments to fund operations and research. The Pierce's Disease and Glassy-winged Sharpshooter Board advises on the use of assessment funds and has been instrumental in funding scientific research to develop lasting solutions to Pierce's disease and its vectors. The PDCP also relies upon the network of state, federal, and county agencies along with private entities and stakeholders that together have built a viable and successful program.



**The five major components of the PDCP & the cooperative & coordinated nature of the program have made it a model for subsequent pest prevention and response programs.**



## BACKGROUND



Pierce's disease (PD) is a fatal bacterial disease of grapevines that is spread by certain types of insects, such as leafhoppers. It has been present in California for more than 100 years and in the past has caused sizable losses to viticulture in localized "hotspot" areas of the state. Until recently, it did not pose a severe threat to the majority of areas currently under grape production. This situation changed dramatically with the arrival of glassy-winged sharpshooter (GWSS), an aggressive insect vector of PD.

Because of this insect, viticulture in traditionally safe growing regions is now at risk from the disease. Considering only grapes, the disease now threatens a crop production value of \$4.95 billion and associated economic activity within California of approximately \$57.6 billion. Other crop and ornamental plant resources such as almonds (\$5.33 billion) and susceptible types of citrus (\$776 million), stone fruits (\$842 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 (PDCP) was established within the California Department of Food and Agricultural (CDFA) to minimize the statewide impact of PD.

### Pierce's Disease

PD in grapevines was first noted in California near Anaheim around 1884. The disease is caused by a strain of the bacterium *Xylella fastidiosa* that kills grapevines by triggering cell death in the plant. 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. The University of California (UC) reported that the disease destroyed over 1,000 acres of grapevines in Northern California between 1994 and 2000, causing \$30 million in damages. There is currently no known cure for PD.

### The Glassy-Winged Sharpshooter

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

California's first indication of the severe threat posed by this new disease and vector combination occurred in Temecula, Riverside County, in August of 1999, when over 300 acres of grapevines infested with GWSS were destroyed by PD. Losses continued to mount in Temecula and other infested areas in following years, eventually exceeding 1,100 acres statewide by 2002.

The GWSS clearly has the potential to increase both the incidence and severity of PD in California. As observed in the Temecula infestation, the sharpshooter:

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

The combination of PD and GWSS 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.

## Abbreviations & Acronyms

ATP	Approved Treatment Program
CACASA	California Agricultural Commissioners and Sealers Association
CDFA	California Department of Food & Agriculture
EGVM	European grapevine moth
GWSS	Glassy-winged sharpshooter
PD	Pierce's disease
PD/GWSS Board	Pierce's Disease and Glassy-winged Sharpshooter Board
PDCP	Pierce's Disease Control Program
UC	University of California
USDA	United States Department of Agriculture



Vines showing symptoms of PD



Exposed eggs, nymph, and adult female GWSS





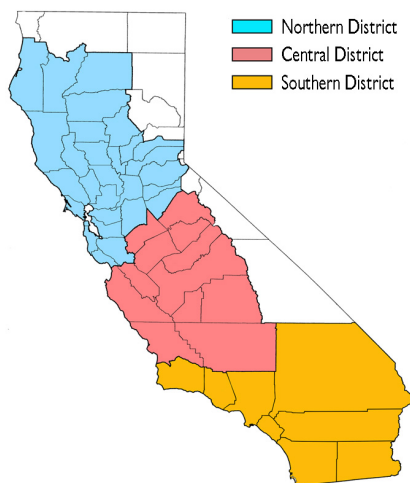
# PROGRAM DESCRIPTION

## Organization

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

A Statewide Coordinator directs the program in accordance with the policies and priorities established by the Secretary of the CDFA. Program staff are located throughout the state and are responsible for coordinating and implementing the elements of the program. 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 Plant Pest Diagnostics Center provide pest identification services. Biological control agents are produced at a facility in Arvin and released where needed. Researchers throughout the state and elsewhere conduct research geared towards finding solutions to Pierce's disease (PD).

PIERCE'S DISEASE CONTROL PROGRAM DISTRICTS



The PDCP works to minimize the impact of PD in California by slowing or stopping the spread of GWSS while short- and long-term solutions to PD are developed. This strategy relies upon the following elements:



**Contain  
the Spread**



**Statewide Survey  
and Detection**



**Rapid Response**



**Outreach**



**Research**



## County Workplans

The County Agricultural Commissioners are responsible for conducting local PDCP activities.

These activities are guided by workplans developed by the County Agricultural Commissioners and submitted to the CDFA for approval. As stated in the law (CDFA Code Section 6046), county workplans must include the following elements:

1. Outreach presentations and training in local communities that respond to local concerns;
2. Ongoing training of employees in the biology, survey, and treatment of PD and its vectors;
3. Identification of a local coordinator;

4. Proposed response to the discovery of the disease and its vectors (including delimitation and treatment); and
5. A system to track and report new infestations.

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

## Advisory Groups

Several groups advise the PDCP. These include the following:

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

The PD/GWSS Board is composed of 14 representatives from the winegrape industry, plus one member from the public. It provides recommendations to the Secretary of CDFA on the use of funds collected under the PD/GWSS winegrape assessment, a statewide value-based assessment which has raised approximately \$55 million over the last 16 years. The Board is advised by committees established to focus on specific areas and issues.

### Pierce's Disease Advisory Task Force

Composed of County Agricultural Commissioners, scientists, agricultural representatives, and other experts, the Task Force reviews program progress and develops recommendations for the Secretary. Similar to the PD/GWSS Board, the Task Force is advised by committees established to focus on specific areas and issues.

### Pierce's Disease Research Scientific Advisory Panel

Composed of university scientists with expertise in research areas directly applicable to PD and its vectors, the Advisory Panel provides input and expertise on the research effort.

### Pierce's Disease Research Symposium Planning Group

Composed of representatives from the USDA, UC, industry and the CDFA, this group assists with planning the Pierce's Disease Research Symposium by providing input on the format, content, and schedule of the event.

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

Composed of agricultural commissioner representatives from each of the five CACASA area groups in the state, this group meets periodically to discuss issues of statewide and regional concern and to promote program consistency and good communication among state and county cooperators.



## CONTAIN THE SPREAD

This program element is designed to prevent the spread of glassy-winged sharpshooter (GWSS) to uninfested areas of the state 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. Shipments of bulk grapes are no longer regulated since they were found to not be a pest risk. Regulations on bulk citrus were added later, following finds of live sharpshooters in bulk citrus shipments. Permanent program regulations were adopted in July 2003. In areas already infested with GWSS, area-wide management programs and biological control releases are conducted to suppress GWSS populations and thereby reduce their damage and spread.

### Nursery

Nursery stock is a high-risk commodity for spreading the GWSS. Approximately 53% of California's 13,000 licensed nurseries are located in sharpshooter-infested counties. Many of these nurseries ship to the non-infested areas of the state. Activities to mitigate the risk of moving the GWSS on nursery stock include:

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

#### INSPECTION RESULTS

In 2017, there were 36,700 shipments of nursery stock from infested areas to non-infested areas. Viable life stages of GWSS were discovered at destination in only six of these shipments. Origin county inspectors stopped 108 egg masses, nine nymphs, and six adults from moving in nursery stock shipments.

Over 90% of all rejections between 2001 and 2017 have been for viable GWSS egg masses. The table on the following page presents the results of the ongoing nursery inspection and shipment certification program.



*Nursery plants being inspected for GWSS and GWSS egg masses before being shipped*



## 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. Shippers and receivers who violate nursery stock regulations are subject to fines. In 2017, one administrative penalty was levied against a company for \$6,500.

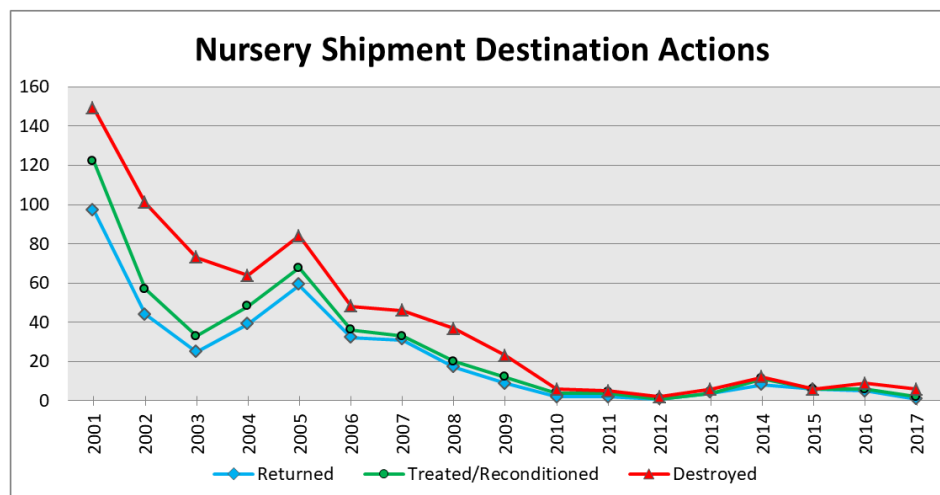
Actions that can be taken at the origin:

- **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 destination:

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

YEAR	NUMBER OF SHIPMENTS	GWSS FOUND AT DESTINATION	% FREE OF GWSS AT DESTINATION
2001	57,600	149	99.74%
2002	65,800	77	99.88%
2003	65,000	40	99.94%
2004	76,700	64	99.92%
2005	72,600	84	99.88%
2006	69,000	47	99.93%
2007	73,100	46	99.94%
2008	62,600	37	99.94%
2009	53,700	23	99.96%
2010	50,600	6	99.99%
2011	44,500	4	99.99%
2012	44,600	2	99.99%
2013	45,800	6	99.99%
2014	44,000	12	99.97%
2015	38,000	6	99.98%
2016	36,000	9	99.97%
2017	36,700	6	99.98%



## NURSERY STOCK APPROVED TREATMENT PROGRAM

The Nursery Stock Approved Treatment Program (ATP) was implemented in June 2008 following the successful three-year Nursery Treatment Pilot Program. With the ATP, qualified nurseries are allowed to ship nursery stock, treated with specified materials, to non-infested areas without an origin inspection. These materials are 100% efficacious at killing emerging GWSS nymphs.

In 2017, eight participating nurseries shipped approximately 3.37 million plants in 12,796 shipments from 26 yards. Forty-six counties received plant material from ATP nurseries throughout the year, with no viable GWSS found in any shipments.

Trapping is conducted in ATP nurseries to ensure pest-free standards are met. Yard traps are maintained at two traps per acre in all ATP nurseries. If a trap exceeds the threshold of 10 GWSS within a two-week period, then all host plant material within a 100-foot radius is placed on hold and must be treated within five days. If a hold treatment is not conducted within five days, plants within the 100-foot radius must be held for a minimum of two weeks from the time the next treatment is applied.

All trapping at ATP nurseries is conducted by county or Pierce's Disease Control Program (PDCP) staff. The 2017 trapping effort included 2,917 traps deployed in 1,370 acres across 26 nursery yards, with 609 traps exceeding the 10 GWSS threshold.

Nursery stock being shipped under this program must be treated with carbaryl or fenprothrin. All treatments are witnessed by licensed county inspectors. Additional monitoring of treatments includes quality control checks by PDCP staff using water-sensitive paper. Yellow sheets of water-sensitive paper are placed within the nursery stock shipment at various heights and locations. When the pesticide droplets make contact with the paper, it turns from yellow to blue. After treatment, the sheets are checked to see if they were hit by the spray.

In 2017, PDCP staff placed water-sensitive paper in shipments at each participating nursery a minimum of once a month. Out of 215 water-sensitive papers inspected only seven indicated the need for retreatment of the shipment.

Under the ATP program, county inspectors may choose to monitor GWSS egg masses found at destination on treated shipments of nursery stock. In 2017, a total of 45 egg masses from four ATP yards were monitored in insect rearing sleeves by destination counties. There was no viable GWSS emergence.



*Water sensitive paper*



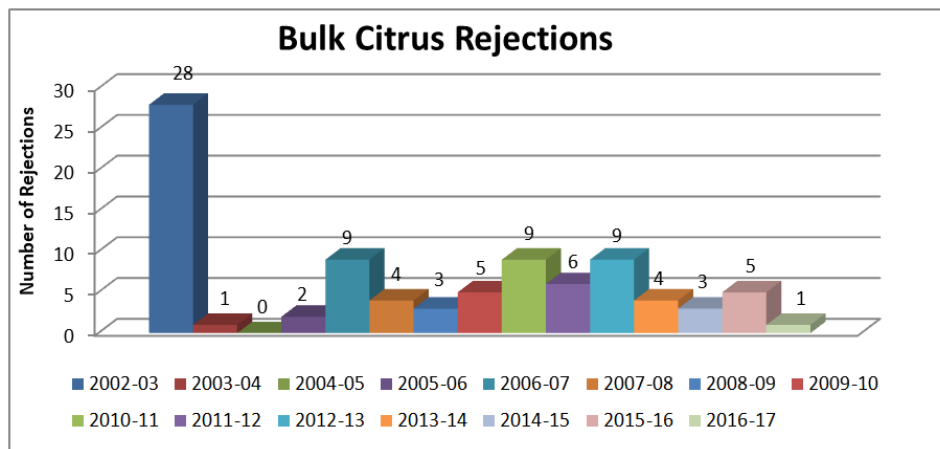
*Insect rearing sleeves*



# Bulk Citrus

Citrus trees are a preferred host for the GWSS 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 2016 through September 2017), live GWSS were found in only one out of approximately 19,143 certified shipments of bulk citrus. This shipping season achieved a success rate of 99.99%. This success is attributed to the cooperative efforts of bulk citrus program participants.



*Citrus being harvested, inspected and readied for bulk shipment*

# Area-Wide Management Programs

Coordinated GWSS management efforts in large, agriculturally diverse grape and citrus production areas.

## MADERA COUNTY

There were three GWSS finds in 2017 and three finds in 2016. About 120 acres of citrus were treated for GWSS in 2017.

## FRESNO COUNTY

Area-wide trapping for GWSS in citrus groves was implemented in 2003. In 2011 traps were added to grapes near the existing infested area and the San Joaquin River. In 2017, there were 205 GWSS finds in citrus and grapes, compared to 132 trap finds in 2016. About 230 acres of citrus were treated for GWSS in 2017.

## TULARE COUNTY

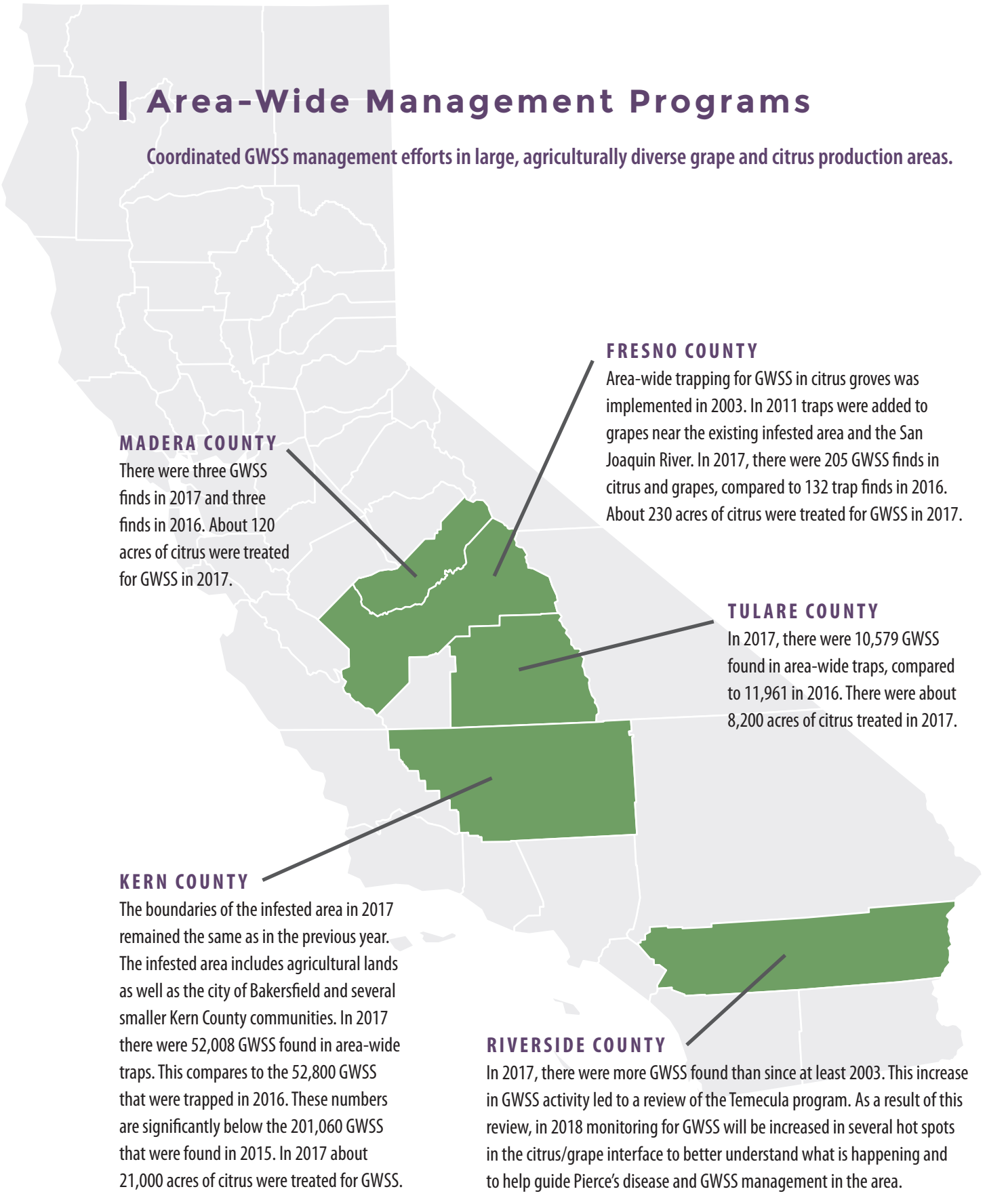
In 2017, there were 10,579 GWSS found in area-wide traps, compared to 11,961 in 2016. There were about 8,200 acres of citrus treated in 2017.

## KERN COUNTY

The boundaries of the infested area in 2017 remained the same as in the previous year. The infested area includes agricultural lands as well as the city of Bakersfield and several smaller Kern County communities. In 2017 there were 52,008 GWSS found in area-wide traps. This compares to the 52,800 GWSS that were trapped in 2016. These numbers are significantly below the 201,060 GWSS that were found in 2015. In 2017 about 21,000 acres of citrus were treated for GWSS.

## RIVERSIDE COUNTY

In 2017, there were more GWSS found than since at least 2003. This increase in GWSS activity led to a review of the Temecula program. As a result of this review, in 2018 monitoring for GWSS will be increased in several hot spots in the citrus/grape interface to better understand what is happening and to help guide Pierce's disease and GWSS management in the area.



## Biological Control

Since 2001, the PDCP has used biological control as an important component of its integrated pest management approach to controlling GWSS. The GWSS biological control agents used are tiny, parasitic wasps that specifically attack GWSS eggs. Female wasps insert their eggs inside GWSS eggs. As the new wasp develops, it feeds on and kills the GWSS egg. The wasp then emerges, mates, and searches for GWSS eggs, repeating the cycle and thus contributing to suppression of GWSS populations.

In 2017, a total of 68,503 biological control agents were produced at the California Department of Food and Agricultural (CDFA)-PDCP Arvin Biological Control facility in Kern County and 46,953 were released at sites in seven counties (Fresno, Kern, Madera, San Diego, Santa Clara, Tulare, and Ventura). Since the start of the Program, approximately 2.61 million biological control agents have been released at agricultural, riparian, and urban sites in California.

Release and post-release surveys were conducted at 75 sites in five counties (Fresno, Kern, Madera, Tulare, and Ventura) approximately every two weeks to monitor the activity of biological control agents in the field.



Napa Ag Dept

*Parasitoid emergence holes*



*Parasitoid emerging from GWSS egg mass*

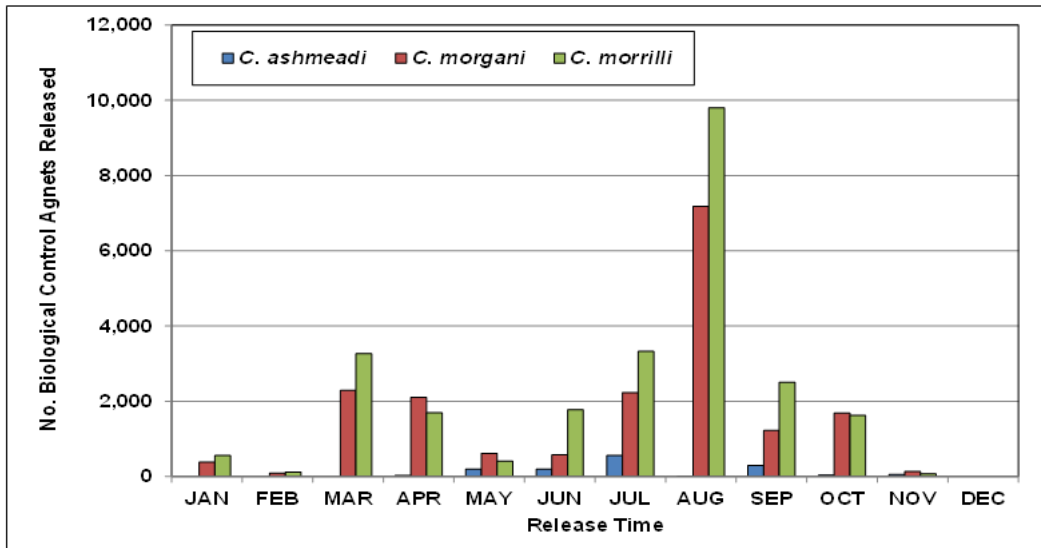
### Wasp Species Used for Biological Control of the Glassy-Winged Sharpshooter

NEW NAME	PREVIOUS NAME	NOTES
<i>Cosmocomoidea ashmeadi</i>	<i>Gonatocerus ashmeadi</i>	Currently under production. Releases since 2001. California native.
<i>Cosmocomoidea fasciata</i>	<i>Gonatocerus fasciatus</i>	Previous releases in 2002-2005. Introduced from the SE USA.
<i>Cosmocomoidea incompta</i>	<i>Gonatocerus incomptus</i>	Previously recovered (uncommon).
<i>Cosmocomoidea morgani</i>	<i>Gonatocerus morgani</i>	Currently under production. Releases since 2008. California native.
<i>Cosmocomoidea morrilli</i>	<i>Gonatocerus morrilli</i>	Currently under production. Introduced from the SE USA. Releases since 2001.
<i>Cosmocomoidea novifasciata</i>	<i>Gonatocerus novifasciatus</i>	Occasional recovery from coastal area.
<i>Cosmocomoidea triguttata</i>	<i>Gonatocerus triguttatus</i>	Previous releases in 2001-2012. Introduced from the SE USA.



**BIOLOGICAL CONTROL AGENTS RELEASED IN 2017**

COUNTY	NUMBER OF SITES	SPECIES			TOTAL SPECIES RELEASED
		<i>C. ASHMEADI</i>	<i>C. MORGANI</i>	<i>C. MORRILLI</i>	
Fresno	16	290	2,244	3,127	<b>5,661</b>
Kern	22	203	4,204	5,753	<b>10,160</b>
Madera	2	0	399	595	<b>994</b>
Tulare	19	281	4,077	5,674	<b>10,032</b>
Ventura	16	573	7,564	9,969	<b>18,106</b>
Santa Clara	6	0	0	600	<b>600</b>
San Diego	3	200	1,200	0	<b>1,400</b>
<b>2017 TOTAL</b>	<b>84</b>	<b>1,547</b>	<b>19,688</b>	<b>25,718</b>	<b>46,953</b>



The number of biological control agents released in 2017 (combined data)



*C. ashmeadi*



*C. morgani*



*C. morrilli*

In 2017, 1,514 GWSS egg masses were collected in Fresno, Kern, Tulare, and Ventura County. As observed in previous years, *C. ashmeadi* was the predominant species over the wider geographic area, and both *C. morrilli* and *C. morgani* were recovered from sites in Kern, Tulare, and Ventura County. Other species recovered included *C. walkerjonesi*, *C. novifasciata*, and *Ufens* spp. Yearly parasitism rates were estimated to be 52%, 65%, 50% and 51% of the GWSS eggs sampled from Fresno, Kern, Tulare, and Ventura County, respectively. Overall, the pooled data from all four counties showed that 56% of GWSS eggs were parasitized in the field.

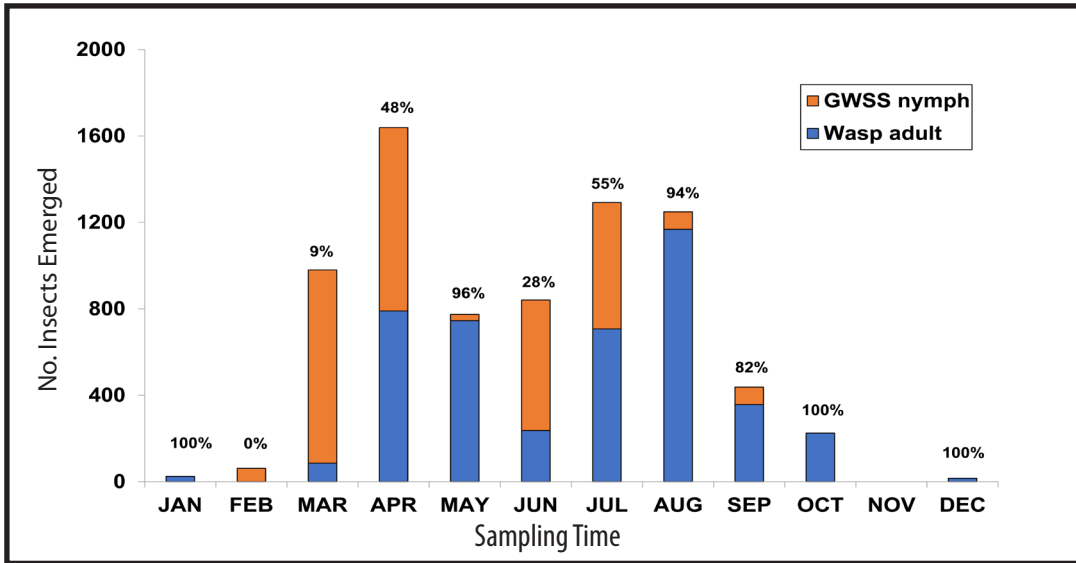
Seasonally, the parasitism was low in early spring but stayed above 50% otherwise except in March and June, when the reproductive GWSS adults could have outnumbered the biocontrol agents. The parasitism rate stayed over 80% in August and thereafter. This finding indicates that the parasitic wasps contribute significantly to the suppression of GWSS populations.

### BIOLOGICAL CONTROL AGENTS RECOVERED IN POST-RELEASE SURVEYS IN 2017

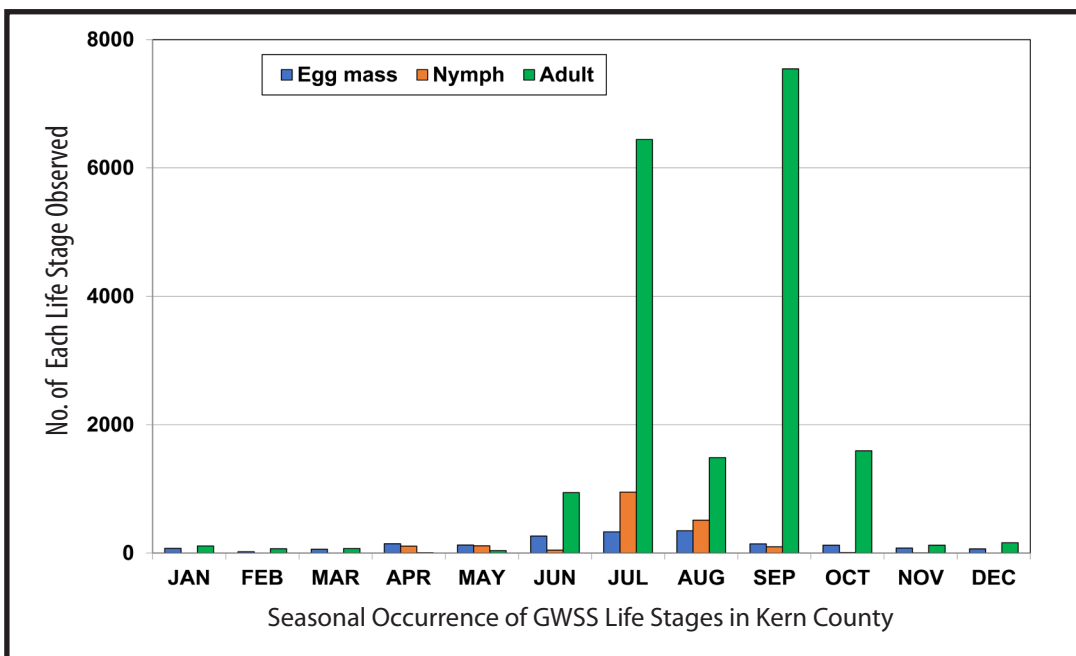
COUNTY	NUMBER OF SITES	SPECIES			TOTAL
		<i>C. ASHMEADI</i>	<i>C. MORGANI</i>	<i>C. MORRILLI</i>	
Fresno	16	329	0	0	<b>329</b>
Kern	22	1,210	15	8	<b>1,233</b>
Madera	2	0	0	0	<b>0</b>
Tulare	19	457	4	27	<b>488</b>
Ventura	16	396	32	92	<b>520</b>
<b>2017 TOTAL</b>	<b>75</b>	<b>2,392</b>	<b>51</b>	<b>127</b>	<b>2,570</b>

In 2017 the Biological Control group monitored the seasonal occurrence of GWSS life stages in Kern County to support the area-wide management program there, where GWSS populations have been persistent. Using visual survey and beat-net methods, GWSS life stages were monitored weekly at multiple sites in citrus orchards. GWSS adults and eggs were detected over the entire season but nymphs were observed only in April through mid-November. Fresh

egg masses were found late February through September. Adult GWSS collected in October–December did not produce eggs when provisioned with host plants under greenhouse conditions. These findings indicate that GWSS adults in the field stopped egg laying in October. The monitoring data provided more complete information on local GWSS populations for the area-wide management program.

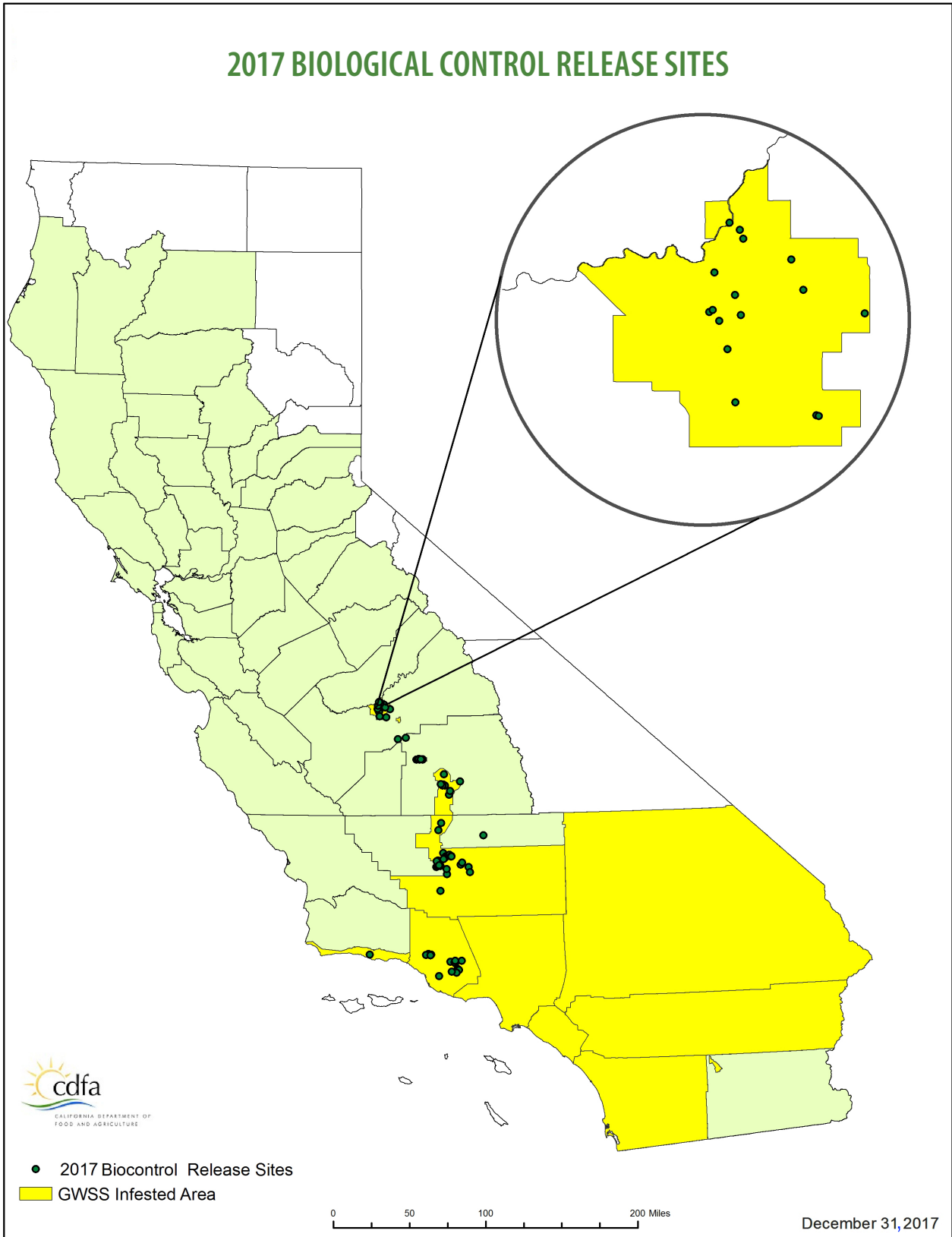


The number of insects emerged from GWSS eggs collected in 2017 during post-release survey (pooled data). Percentage data indicated the estimated parasitism each month.





## 2017 BIOLOGICAL CONTROL RELEASE SITES





## STATEWIDE SURVEY AND DETECTION

**This program element is designed to locate new GWSS infestations quickly and to confirm that uninfested areas remain free of infestation.**

The activities of this element focus on systematically trapping urban and residential areas and nurseries to determine if glassy-winged sharpshooter (GWSS) are present. GWSS are detected by using yellow panel traps that are deployed in 43 counties that are not infested or are only partially infested with GWSS. The GWSS are attracted to the trap's bright yellow color and become stuck on the adhesive surface. County and state personnel service traps on a regular basis during the trapping season.

Each trap is checked every second or third week and moved to a new location every six weeks. New traps are used as needed. Detection and delimitation protocols were updated and distributed to each county participant in the spring of 2017. During the peak of the trapping season, approximately 33,000 traps were deployed and serviced statewide for GWSS detection and survey.

During 2017, the Pierce's Disease Control Program (PDCP) staff provided detection training to 533 employees from 34 counties, California Department of Food and Agricultural (CDFA), Approved Treatment Protocol Program (ATP) participating nurseries, and citrus packing houses. Staff assisted county personnel with field surveys and also conducted quality control inspections of county trapping programs. These inspections are done to ensure trap placement, host selection, servicing schedules, and record keeping are performed properly.



*Yellow panel trap in crape myrtle*



*Nursery personnel training*



## RAPID RESPONSE

This program element involves responding quickly to new GWSS detections in partially-infested or non-infested counties.

When one or more glassy-winged sharpshooter (GWSS) are found in a new area, a delimitation survey is conducted by county biologists, sometimes with Pierce's Disease Control Program (PDCP) assistance, to determine if an infestation is present and, if so, to identify its boundaries. Delimitation surveys consist of high density trapping and visual inspections of preferred host plants in the areas. If an infestation is present and treatments are necessary, residents of the area are notified. Treatments in urban and residential areas are applied under the supervision of the County Agricultural Commissioner and funded by the PDCP. In agricultural settings, treatments are the responsibility of the grower and must be conducted in a manner approved by the County Agricultural Commissioner.

In 2017, the last of six GWSS infestations in Santa Clara County were declared eradicated, making the county once again a GWSS free county for the first time since 2000. (Over the life of the program 18 GWSS infestations have been eradicated throughout California.) Also in 2017, one new GWSS infestation was found, in the city of Exeter in Tulare County. Statewide, GWSS were found on approximately 800 residential properties in the partially-infested counties of Fresno, Madera, and Tulare in 2017. In response, approximately 7,550 properties (infested plus adjacents) were treated.



*Visual survey conducted in response to new GWSS find*

## Pre-treatment Communication

Specific steps are taken before an infested area is treated to ensure residents are properly advised and environmental concerns are addressed.

- A public meeting or other outreach efforts for community members precedes treatment in urban and residential areas. This provides residents the opportunity to learn about and discuss the treatment process with program and environmental health 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 advance notification of the treatment date and time, information on the material 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 Wildlife, the California Department of Pesticide Regulation, the California Department of Health Services, and other agencies are notified prior to treatment.



## Treatment

Public safety is CDFA's number one concern whenever 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 GWSS. It is used in treatment programs in urban and residential settings and can be used for both foliar and soil treatment applications.



*Soil injection treatment of a tree by a pest control operator in response to a GWSS find*

## Treatment Monitoring

The Environmental Monitoring Branch of the California Department of Pesticide Regulation has monitored pesticide treatments to determine resulting residue levels. This information is used by the PDCP to assess application rates and coverage. Sampling results and related monitoring reports are available on the Department of Pesticide Regulation's website at <http://www.cdpr.ca.gov/docs/emon/epests/gwss/>.



## OUTREACH

### County Agricultural Commissioner

In 2017, local county agricultural staff and industry members played key roles in maintaining program visibility and stakeholder awareness. County public outreach and education efforts included the distribution of Pierce's disease (PD) and glassy-winged sharpshooter (GWSS) informational material to local retail, production, and shipping nurseries, landscape companies, and members of the grape growing community and others. Industry trade publications, cooperative extension newsletters, and media interviews also proved to be successful methods of outreach. Some counties also participated in continuing education seminars and conducted training for landscapers, pest control operators, nursery employees, and nursery association members.

### Website

The CDFA launched a highly successful website focused on PD and the GWSS in March 2000. It features information on program activities, survey guidelines, regulatory guidelines, announcements of upcoming meetings and events, the GWSS host list, and other information. In addition, the website provides an interactive interface that allows direct activity reporting by county cooperators. It continues to be used as an effective tool for providing current and reliable information to interested parties.

[www.cdfa.ca.gov/pdcp](http://www.cdfa.ca.gov/pdcp)

### PD/GWSS Board Outreach & Education

The PD/GWSS Board initiated its outreach and education program in 2004. It has since maintained a communications effort to keep winegrape growers informed about activities that are funded by the winegrape grower assessment, as well as other related activities.

The main objectives of the program in 2017 were to update growers on research field trials, inform winegrape growers of the research milestones accomplished on their behalf, and educate growers on any newly designated pests and diseases.

This year, as in 2016, the situation with PD in the North Coast seemed to be on every winegrape grower's mind across much of Northern and Central California. Vine mealybug and red blotch also appeared to be hot topics at winegrape grower gatherings.

A video showing how nursery employees are trained and the protections that are in place to ensure that nursery stock can safely be transported from GWSS-infested areas to uninfested areas without transporting the pest in the process was produced and posted on the PD/GWSS Board YouTube channel.

The continued successes of the Board's research program were highlighted in quarterly newsletter articles and monthly e-newsletters. An infographic on how gene stacking stops PD in vines was prepared and used in a video, slide presentations, and articles on the subject. Videos on gene stacking and the use of the benign strain of *Xylella fastidiosa* to prevent PD were produced and posted on the PD/GWSS Board YouTube Channel.

The following materials were prepared or updated in 2017:

- Newsletters (quarterly)
- Website message board
- Facebook page
- YouTube video channel
- “Solutions Are At Hand To Pierce’s Disease” brochure
- Stock photography
- Videotaped researcher interviews
- Monthly e-newsletter
- Fact sheets on newly designated pests and diseases
- Trade show display

The e-newsletter is sent monthly to over 1,200 interested stakeholders, with over 600 of those being California winegrape growers. It has proven to be useful for getting program information out to all stakeholders. Information from the e-newsletter was often reprinted verbatim in some of the wine trade publications. In addition to the monthly e-newsletter, a quarterly newsletter was produced, printed, and mailed directly to California’s 7,000+ winegrape growers, as well as other stakeholders.

## Other Designated Pests & Diseases

Besides PD and GWSS, the PD/GWSS Board has designated other pests and diseases that are a threat to California’s winegrape industry. The list now includes the European grapevine moth, brown marmorated stink bug, all mealybug pests of winegrapes, and red blotch, leafroll, and fanleaf virus.

As part of the outreach and education efforts, information regarding these threats was communicated to winegrape growers around the state through brochures, a trade show display, videos, speaking engagements, website, and special fact sheets. During the year, the monthly e-newsletter contained information about PD and GWSS as well as information about these designated pest and disease threats.



*Brown marmorated stink bug*





## RESEARCH

### Research holds the key to long-term solutions to Pierce's disease

The flurry of research activity that began at the start of the program continued in 2017, with approximately 27 projects being worked on by some of the nation's top plant health researchers. Projects ranged from lab-based investigations at the molecular and genomic levels to field trials in experimental and commercial vineyards. The information being generated is providing valuable insight into the biology, ecology, and behavior of Pierce's disease (PD) and its vectors. Additionally, 14 projects on other pests and diseases of winegrapes were in progress in 2017, increasing the knowledge base available for developing management solutions to these pests and diseases.

This extensive and sustained research effort has yielded discoveries and approaches that show good potential for leading to solutions. These include using conventional plant-breeding methods to develop grapevines resistant to PD, using non-virulent strains of *Xylella fastidiosa* to displace and out compete pathogenic strains, identifying the mechanisms and processes leading to bacterial infection and spread, and elucidating the biochemical pathways which result in disease symptoms and death.

Scientists have developed plant metabolites that block damage-causing pathways and processes, and are experimenting with ways to introduce them into the plants via specially-developed rootstocks, topical applications, and other means. Several grapevine scions and rootstocks bred for resistance to PD using traditional methods have been field tested and provided to Foundation Plant Services at University of California Davis for possible commercialization, and in April 2017, five cultivars were pre-released to nurseries for propagation testing purposes. Small lots of wine have been produced from some of these

new disease-resistant cultivars and have tested well in wine tastings. Field testing of grapevine plant material developed using transgenic approaches began in 2010 and continued through 2017.

Looking back, it is clear that solutions to PD are getting very close relative to where we were 18 years ago.

## Research Proposal Solicitation & Review

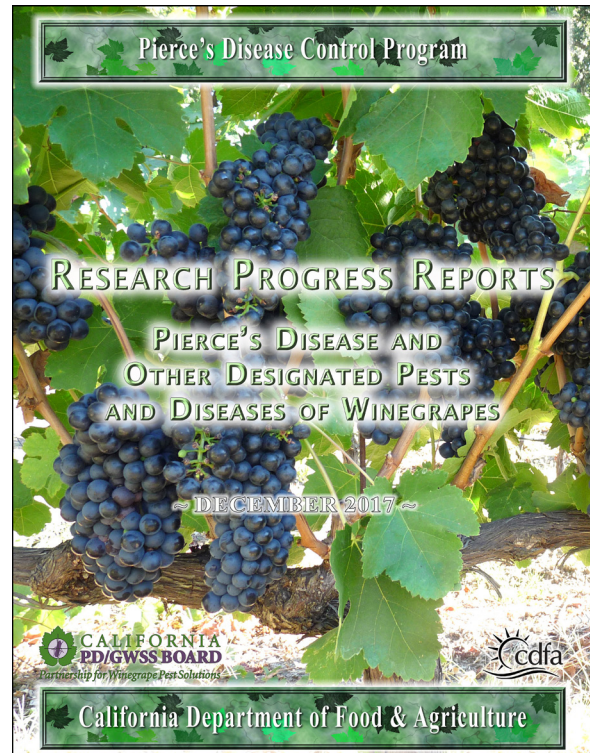
In 2017, the Pierce's Disease Control Program (PDCP) partnered with the Unified Grant Management for Viticulture and Enology Program at UC Davis to conduct its research proposal solicitation and review process. In addition to calling for research proposals on PD and its vectors, the request for proposals also called for research proposals on other designated pests and diseases of winegrapes.

A total of 24 proposals were received and reviewed, with 13 research projects totaling \$2.4 million selected for funding using California PD/GWSS Board winegrape assessment funds. In addition, 14 ongoing projects were approved to continue for another fiscal year.

## Research Symposium

The PDCP has organized 15 annual research symposia since 2001 to foster communication and information sharing among scientists and stakeholders on the latest research progress and findings on PD. Although a symposium was not held in 2017, a compilation of progress reports on current research projects on PD and GWSS was still prepared by the PDCP. The compilation included reports for research projects on other winegrape pests and diseases that have been designated as serious threats to California winegrapes by the CDFA PD/GWSS Board.

The 2017 compilation of research progress reports is available online at [www.cdfa.ca.gov/pdcp/Research](http://www.cdfa.ca.gov/pdcp/Research).



# ENVIRONMENTAL COMPLIANCE

In 2017, the California Department of Food Agriculture (CDFA) continued its efforts to ensure that the Pierce's Disease Control Program (PDCP) is conducted in an environmentally protective and responsible manner. These efforts included adhering to a special notification and consultation process with federal and state environmental stewardship agencies prior to treatment and ensuring that pesticide applications are performed by licensed pest control professionals in strict accordance with pesticide laws and regulations.

A statewide program environmental impact report was released for the PDCP in mid-2003. A legal challenge was filed against the environmental impact report shortly thereafter. Although a trial court found the environmental impact report to be adequate, the State Appeals Court later reversed the trial court's ruling.

In 2010, the CDFA contracted with an environmental consulting firm and began preparing the environmental analyses, documents, and risk assessments called for by

the Appeals Court. In 2012 it was decided to combine the efforts of this project with a similar one being conducted for the Department's Statewide Plant Health and Pest Prevention Program. This work continued through 2014 and in late December the final EIR for the CDFA statewide plant pest prevention program, including the PDCP, was certified by the Secretary of CDFA. The full document can be found at [www.cdfa.ca.gov/plant/peir/index](http://www.cdfa.ca.gov/plant/peir/index).

A legal challenge was filed against this EIR and the court issued its ruling in early January 2018, invalidating portions of the document. CDFA has filed an appeal in the Third District Court of Appeal for California seeking to overturn the lower court order and requesting that the court lift an injunction on certain CDFA activities. The Department remains committed to fulfilling its legislative mandate to prevent the spread of harmful pests while complying with the California Environmental Quality Act to ensure the protection of agriculture, the environment and other natural resources.

# FINANCIAL STATEMENT

REVENUE	FY 2016-17 (ACTUAL)	FY 2017-18 (BUDGETED)
Federal (United States Department of Agriculture)	\$15,574,754	\$15,574,754
CDFA (General Fund)		\$5,000,000
Industry (PD/GWSS Board winegrape assessment)	\$4,527,210	\$4,705,000
<b>TOTAL REVENUE</b>	<b>\$20,660,679</b>	<b>\$25,279,754</b>

EXPENDITURES	FY 2016-17 (ACTUAL)	FY 2017-18 (BUDGETED)
Personal Services	\$3,204,602	\$3,300,00
Operating Expenses	\$6,515,600	\$9,979,754
Total County Payments	\$10,940,477	\$12,000,000
<b>TOTAL EXPENDITURES</b>	<b>\$20,660,679</b>	<b>\$25,279,754</b>