



**Pierce's Disease Control Program**

# **REPORT TO THE LEGISLATURE**

*for calendar year 2020*

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# STATEMENT OF THE SECRETARY

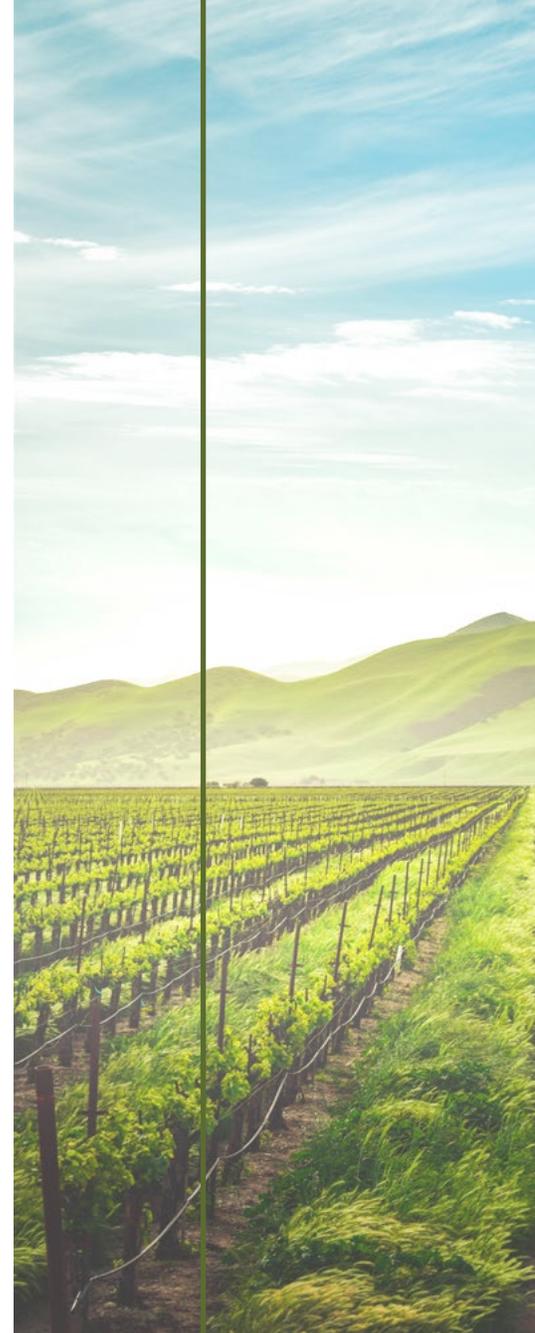
Two decades have now passed since California grape growers, researchers and regulatory officials first sounded the alarm about Pierce's disease and the glassy-winged sharpshooter. In some ways, the past year for our Pierce's Disease Control Program has been stable and "as expected"—for starters: nursery inspections, vineyard vigilance, research investments, and the continuing development and rollout of commercially available PD-resistant vines. We have seen trap counts rise precipitously in our largest and most focal management areas in the Central Valley—and with growers' guidance and help, we have plans in place to respond with targeted treatments and heightened monitoring. It's exactly the kind of flexibility and responsiveness you've come to count on from this program.

In so many ways, 2020 has been the year with the giant asterisk. Growers, researchers, treatment coordinators, and everyone else aligned with this program have participated in countless online meetings and calls to help us figure out how to get the job done in this new paradigm—and you all did that while adjusting your own companies' working arrangements, customer expectations, and pretty much every other aspect of business, all thanks to COVID-19. So, thank you for your willingness to continue your support of this cooperative program. Its continuing success belongs to you, our growers, wineries, and stakeholders, more now than ever.

I encourage you to use this report not just as a summary of a single year but also as a progressive reflection on our accomplishments over two decades. What began as a rapid build-up and an urgent response to this disease has now evolved into a comprehensive, reliable, nimble program with tangible benefits for the growers who rely on it. I see it as some of our department's best work, and I look forward to what comes next.

**Karen Ross, Secretary**

**California Department of Food and Agriculture**



# EXECUTIVE SUMMARY

Pierce's disease (PD) is a lethal disease of grapevines. It is a serious threat to grapevines throughout the southern United States and is particularly threatening to California, where a thriving winegrape industry exists. The bacterial pathogen that causes PD, *Xylella fastidiosa* (*Xf*), has been present in California for more than a century. While many insects can vector *Xf*, the establishment and spread of the glassy-winged sharpshooter (GWSS) in California in the 1980s and 1990s created a new and serious threat of significant statewide damage. At risk is California's grape and wine industry, which generates annual economic activity of \$57.6 billion within the state and \$114 billion nationally. The Pierce's Disease Control Program (PDCP) works to halt the spread of GWSS until research finds solutions to PD.

PDCP's operational approach relies on five major components: contain the spread, statewide survey and detection, rapid response, outreach, and research. Since the inception of the PDCP in 2000, these components have proven to be an effective means for slowing the spread of GWSS and minimizing the statewide impact of PD.

The PDCP implements its statewide strategy through the collaboration of several agencies and cooperators. The United States Department of Agriculture (USDA), the California County Agricultural Commissioners, the University of California, the Pierce's Disease and Glassy-winged Sharpshooter Board, and the PD Advisory Task Force all contribute to the success of the program.

Funding for the PDCP comes from three primary sources: The USDA's Animal and Plant Health Inspection Service, California's winegrape growers, and (on occasion) the State General Fund.

Many challenges were presented in 2020, due significantly to the pandemic and wildfires that affected numerous winegrape growing areas of the state. In addition to adapting to worksite changes due to COVID-19 safety protocols, the PDCP saw the retirement of two veteran management staff members in 2020. These positions are being filled as the program's important work continues.

Since 2001, the PD/GWSS Board has authorized \$48.1 million of industry funds to fund 236 research grants. Research emphasis remains targeted upon PD and the GWSS but also includes other designated pests and diseases of wine grapes, including brown marmorated stink bug, European grapevine moth, mealybugs, fanleaf virus, leafroll virus, and red blotch virus.





In addition, 2020 saw the Board designate the spotted lanternfly as a threat. Even though this invasive insect has not been found in California, the impact this pest is having on mid-Atlantic states, and particularly to winegrapes, has motivated the Board to be in a position to support research and outreach proposals on this pest in the future.

Among the many major accomplishments over the life of the program are the detection and eradication of 18 incipient infestations of GWSS. The continuing strength and vitality of grape production in California bears testimony to the effectiveness and success of the statewide cooperative PDCP.

ABBREVIATIONS AND ACRONYMS	
<b>CACASA</b>	California Agricultural Commissioners and Sealers Association
<b>CDFA</b>	California Department of Food & Agriculture
<b>GWSS</b>	Glassy-winged Sharpshooter
<b>PD</b>	Pierce's Disease
<b>PD/GWSS BOARD</b>	Pierce's Disease and Glassy-winged Sharpshooter Board
<b>PDCP</b>	Pierce's Disease Control Program
<b>UC</b>	University of California
<b>USDA</b>	United States Department of Agriculture
<b>CCVTGPDCD</b>	Consolidated Central Valley Table Grape Pest & Disease Control District
<b>Xf</b>	<i>Xylella fastidiosa</i>

# BACKGROUND

## The Threat

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 producing grapes. This situation changed dramatically with the arrival of the 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 \$5.41 billion and associated economic activity within California of approximately \$57.6 billion, and \$114.1 billion annually to the national economy. Other crop and ornamental plant resources, such as almonds (\$6.09 billion) and susceptible types of citrus (\$2.1 billion), stone fruits (\$773 million), and shade trees, are also at risk, either from the PD 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 Agriculture (CDFA) to minimize the statewide impact of PD.



Vine showing symptoms of Pierce's disease.

## 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 blocking water and nutrient movement through 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.<sup>1</sup>

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



## The Glassy-winged Sharpshooter

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.

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

- » 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.



*Adult glassy-winged sharpshooter.*



# PROGRAM DESCRIPTION

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

## 1. CONTAIN THE SPREAD

Prevent the spread of the GWSS to new areas of the state by regulating shipments of host plants and other host material to prevent artificial spread and suppressing populations to prevent natural spread.

## 2. STATEWIDE SURVEY AND DETECTION

Find new GWSS infestations quickly and confirm that uninfested areas remain free of infestation by conducting systematic trapping in uninfested at-risk areas.

## 3. RAPID RESPONSE

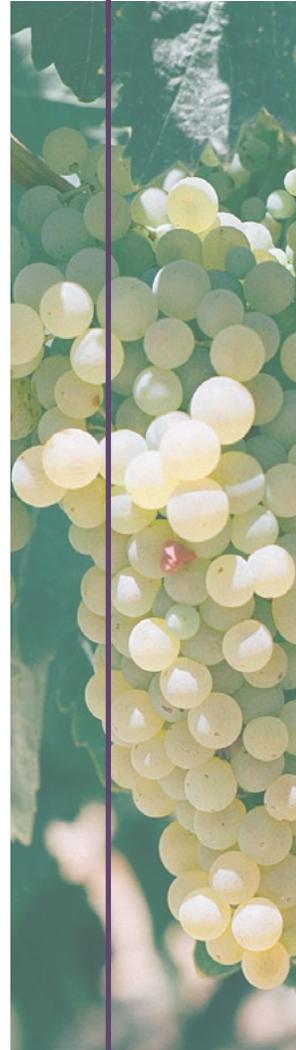
Respond quickly to detections of GWSS in new areas by intensively surveying the area and applying treatments if necessary.

## 4. OUTREACH

Raise awareness about PD and its vectors while responding to the concerns of growers and the public by conducting outreach and education activities.

## 5. RESEARCH

Develop long term, sustainable solutions to PD and its vectors by sponsoring and facilitating research and development.





## Organization

The PDCP is a partnership that includes the California Department of Food and Agriculture (CDFA), the County Agricultural Commissioners, the United States Department of Agriculture (USDA), the 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 PD.

PIERCE'S DISEASE CONTROL PROGRAM DISTRICTS



## 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 California Department of Food and Agriculture for approval. As stated in the law (California Food and Agricultural Code Section 6046), county workplans must include the following elements:

- » Outreach presentations and training in local communities that respond to local concerns;
- » Ongoing training of employees in the biology, survey, and treatment of PD and its vectors;
- » Identification of a local coordinator;
- » Proposed response to the discovery of the disease and its vectors (including delimitation and treatment); and
- » 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 the CDFA on the use of funds collected under the PD/GWSS winegrape assessment, a statewide value-based assessment which has raised approximately \$75.4 million over the last 19 years. The Board is advised by committees established to focus on specific areas and issues.

### **Pierce's Disease Advisory Task Force**

The Pierce's Disease Advisory Task Force is composed of County Agricultural Commissioners, scientists, agricultural representatives, and other experts. The Task Force 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 Symposium Planning Group**

The Pierce's Disease Research Symposium Planning Group is composed of representatives from the USDA, University of California, 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**

The California Agricultural Commissioners and Sealers Association (CACASA)/GWSS Advisory Group is 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



*Nursery employees inspecting a tree.*



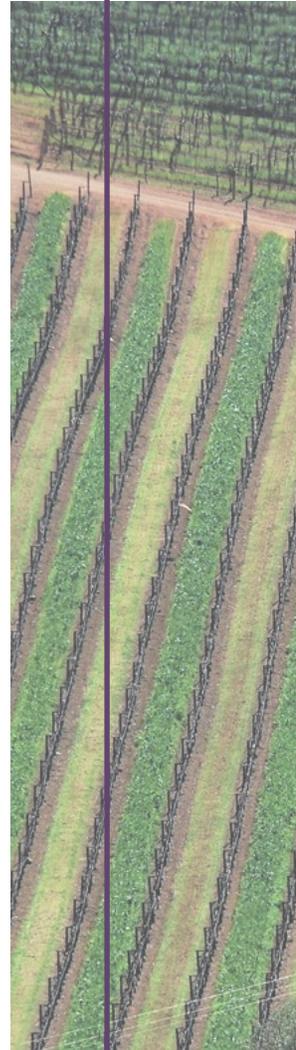
*Inspector checking for glassy-winged sharpshooter egg masses.*

The Contain the Spread element of the Program is designed to prevent the spread of the 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. 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 GWSS partially infested areas, area-wide management programs were established to suppress GWSS populations and to reduce their damage and spread.

## Nursery

Nursery stock is a high-risk commodity for spreading GWSS. Approximately 50% of California's 14,600 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 GWSS on nursery stock include:

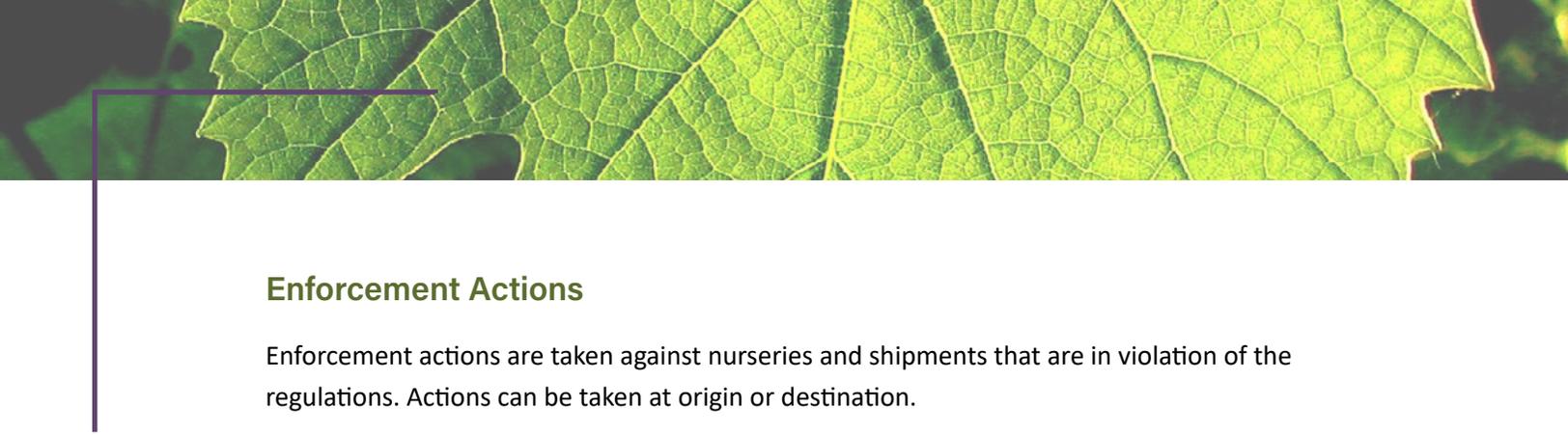
- » Inspection of nursery stock in infested areas prior to shipping to non-infested areas;
- » Treatment of nursery stock when necessary;
- » Certification of shipments;
- » Inspection of nursery stock at receiving nurseries prior to sale; and
- » Trapping in and near nurseries shipping to non-infested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



## Inspection Results

- » In 2020, there were 40,800 shipments of nursery stock from infested areas to non-infested areas. Five viable life stages of GWSS were discovered at destination. Origin county inspectors stopped 55 egg masses, six nymphs, and seven adults from moving in nursery stock shipments.
- » Over 90% of all rejections between 2001 and 2020 have been for viable GWSS egg masses. The table below presents the results of the ongoing nursery inspection and shipment certification program.

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	65,00	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%
2018	34,400	0	100%
2019	43,300	6	99.99%
2020	40,800	5	99.99%



## Enforcement Actions

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

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

» **RESTRICTION**

The nursery is restricted from shipping certain species of host material out of the infested area for a period of time.

» **SUSPENSION:**

The nursery is suspended from shipping all host material out of the infested area until the pest risk is mitigated.

» **REVOCATION:**

The nursery's compliance agreement is revoked, and it cannot ship any host material out of the infested area for an established period of time.

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

» **TREATMENT:**

The nursery shipment is treated with an effective material.

» **RETURN:**

The shipment is returned to origin.

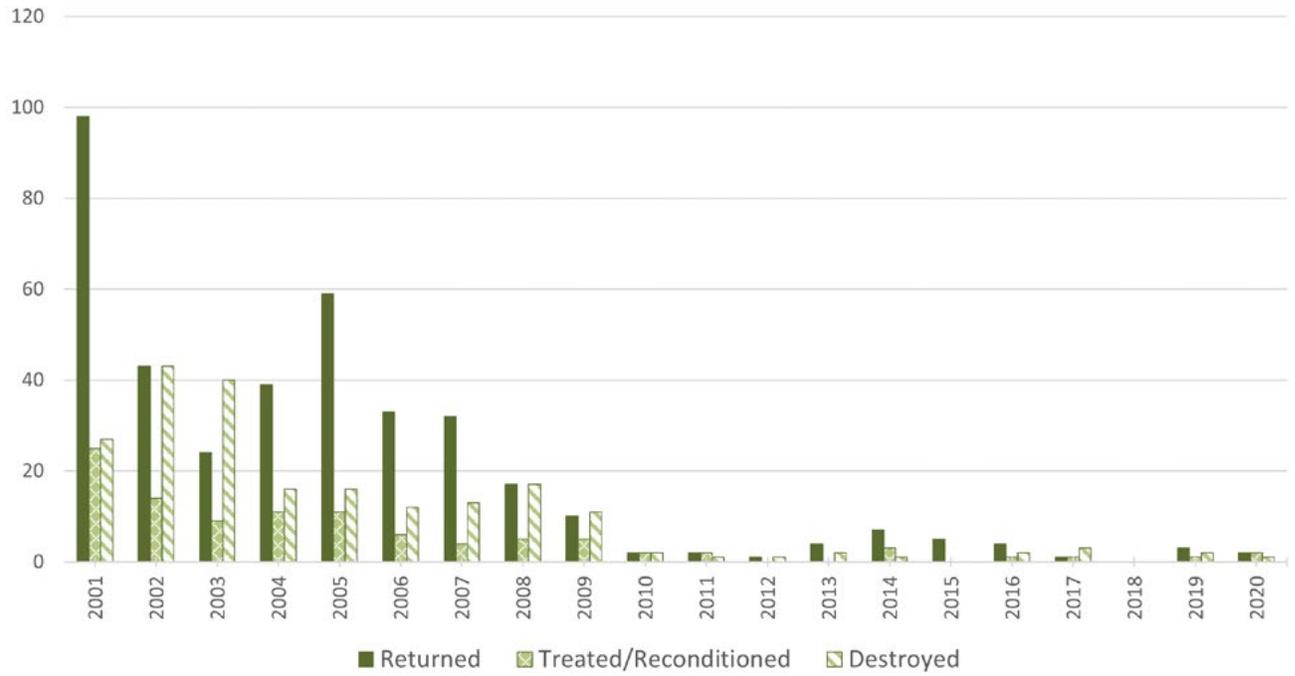
» **DESTRUCTION:**

The shipment is destroyed.

Shippers and receivers who violate nursery stock regulations are subject to fines. No administrative penalties were levied against any companies in 2020.



## Nursery Shipment Destination Actions





## Nursery Stock Approved Treatment Program

The Nursery Stock Approved Treatment Program (ATP) began in June 2008. This program was implemented following a successful three-year 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 2020, there were eight participating nurseries that shipped approximately 2.62 million plants in 10,945 shipments. There were a total of 25 yards associated with these eight nurseries. 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. 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 are 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 PDCP staff. Results from the 2020 trapping efforts are as follows:

NUMBER OF NURSERY YARDS	NUMBER OF NURSERY ACRES	NUMBER OF TRAPS DEPLOYED	NUMBER OF TRAPS WITH >10 GWSS
25	1,355	2,857	53

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 ensure proper coverage. In 2020, PDCP staff placed water-sensitive paper in shipments at each participating nursery a minimum of once a month. Out of 313 water-sensitive papers inspected only 14 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 2020, a total of 27 egg masses were monitored in insect rearing sleeves by destination counties, with no viable GWSS emergences.



## Bulk Citrus

Citrus trees are primary hosts for the GWSS throughout the year. When the weather is warm, the insects are active and will flee the disturbances associated with harvest.

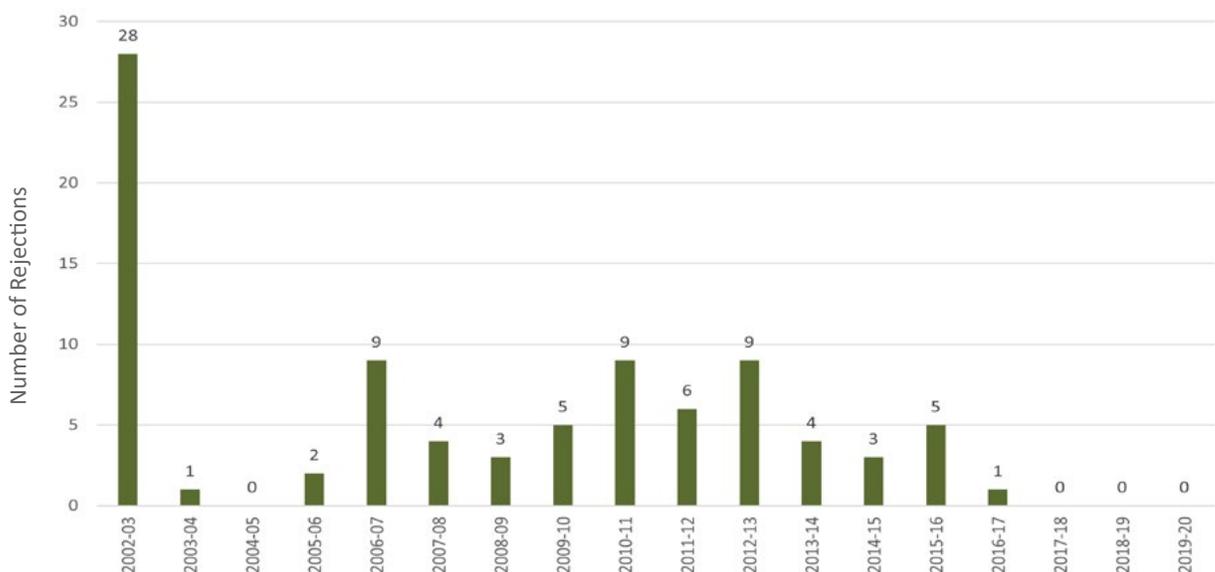
However, once the weather turns cold, the sharpshooters are relatively inactive and can end up in picking bags with harvested fruit, ultimately turning up at processing facilities in other parts of the state.

During the most recent citrus-shipping season (October 2019 through September 2020), live GWSS were found in zero out of approximately 17,573 certified destination inspections of bulk citrus. For the third consecutive season, the Program achieved a success rate of 100%. This success is attributed to the cooperative efforts of bulk citrus program participants.



*Citrus harvest and inspections.*

## Bulk Citrus Rejections





## Area-wide Management Programs

The area-wide management programs coordinate GWSS management efforts in large, agriculturally diverse grape and citrus production areas where GWSS is present. In 2020, GWSS trap finds increased in the Southern San Joaquin Valley, likely due to a combination of warmer weather, an increase in organic citrus acreage, and reduced treatments in previous years due to budget constraints. With support from the PD/GWSS Board and the Consolidated Central Valley Table Grape Pest & Disease Control District, coordinators facilitated the treatment of an additional 8,800 acres in Tulare County and 10,700 acres in Kern County to target overwintering GWSS in these areas.

### Madera County

In 2020, there were 34 GWSS found in area-wide traps, compared to 12 in 2019. No treatments occurred in citrus in 2020.

### Fresno County

Fresno County implemented area-wide trapping for GWSS in citrus groves in 2003. In 2011, traps were added to grapes near the existing infested area and the San Joaquin River. In 2020, there were 1,834 GWSS found in citrus and grapes, compared to 242 trap finds in 2019. About 294 acres of citrus were treated for GWSS in 2020.

### Kern County

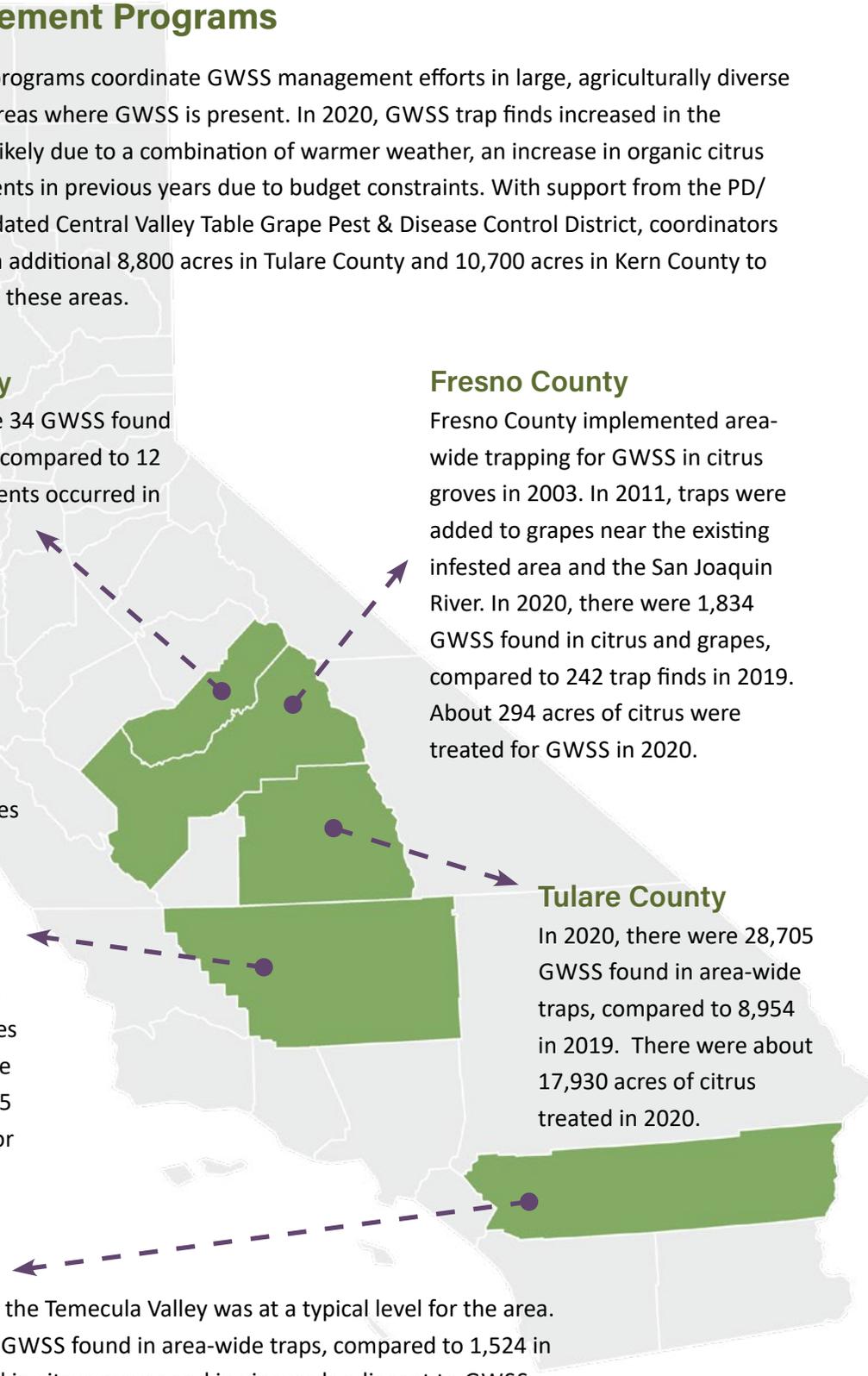
The boundaries of the Kern County infested area remained the same as last year. The infested area includes agricultural lands as well as the city of Bakersfield and several smaller Kern County communities. In 2020, there were 141,773 GWSS found in area-wide traps. This compares to the 48,035 GWSS that were trapped in 2019. About 27,865 acres of citrus were treated for GWSS in 2020.

### Tulare County

In 2020, there were 28,705 GWSS found in area-wide traps, compared to 8,954 in 2019. There were about 17,930 acres of citrus treated in 2020.

### Riverside County

The overall GWSS catch in the Temecula Valley was at a typical level for the area. In 2020, there were 1,217 GWSS found in area-wide traps, compared to 1,524 in 2019. Monitoring occurred in citrus groves and in vineyards adjacent to GWSS hot spots in citrus. Monitoring in citrus and nearby table grapes continued in the Coachella Valley in 2020 and no GWSS finds were reported.



## Biological Control

The Pierce's Disease Control Program (PDCP) has been using biological control as an important component of its integrated pest management approach to reduce the GWSS populations since 2001. GWSS biological control agents are tiny wasps, specifically parasitizing GWSS eggs (egg parasitoids). Upon adult emergence and mating, the female wasp lays its eggs inside GWSS eggs and the immature wasp completes its development by feeding on the GWSS egg. Then the wasp adult emerges from the GWSS egg and mates, and female wasps then search for more GWSS eggs in which to lay their eggs. Through the repeated life cycles, the parasitic wasps kill GWSS eggs and contribute to suppression of GWSS populations.

The onset of restrictions caused by COVID-19 impacted biological control activities at Arvin. Factors such as staff turnover, restrictions on activities, and travel limitations resulted in a setting of priorities. Production and releases were maintained wherever possible, and monitoring was given a lower priority.

Three *Cosmocomoidea* species were in production at the CDFA-PDCP Arvin Biological Control facility in Kern County in 2020. A total of 33,632 biological control agents were released at field sites in seven counties (Fresno, Kern, Madera, San Diego, Santa Barbara, Tulare, and Ventura). Since the start of the biological control program, more than 2.7 million biological control agents have been released at agricultural, riparian, and urban sites in 16 counties of California.



*Biocontrol agents laying eggs inside glassy-winged sharpshooter eggs.*



*Biocontrol agents emerging from glassy-winged sharpshooter eggs.*



*C. ashmeadi*



*C. morgani*



*C. morrilli*

*Biological Control Agents Under Production.*



Post-release field surveys were conducted at the release sites in six counties (Fresno, Kern, Madera, San Diego, Tulare, and Ventura) to determine the activity of the biological control agents in the field. In 2020, a total of 904 GWSS egg masses were sampled during the surveys. After incubating the field-collected egg masses in constant environmental conditions, insects emerging from the GWSS eggs were identified. Among *Cosmocomoidae* spp., *C. ashmeadi* was the predominant species over a wide geographic area. *Ufens* species were also found in four counties. Other species that emerged were *C. morgani*, *C. morrilli*, *C. novifasciata* and *C. walkerjonesi*.

Parasitism rates for the egg samples were estimated to be 100, 33, 12, 2 and 71 % for Fresno, Kern, Tulare, Ventura, and San Diego Counties, respectively. In 2020, combined data showed that 36% of the eggs had been parasitized in the field, which was lower than findings from past years (i.e., 64% in 2018 and 62% in 2019).



Field release of biological control agents.

## Number of Biological Control Agents Released in 2020

COUNTY	NUMBER OF SITES	BIOLOGICAL CONTROL AGENTS			TOTAL
		<i>C. ashmeadi</i>	<i>C. morgani</i>	<i>C. morrilli</i>	
Fresno	10	142	12	360	514
Kern	63	11,401	4,216	4,955	20,572
Madera	3	120	141	15	276
San Diego	5	4,416	638	1,800	6,854
Santa Barbara	1	300	200	300	800
Tulare	18	931	684	877	2,492
Ventura	14	1,008	496	620	2,124
<b>Total</b>	<b>114</b>	<b>18,318</b>	<b>6,387</b>	<b>8,927</b>	<b>33,632</b>

Staff turnover and COVID-19 restrictions limited sampling at distant locations so the lower parasitism rate may not accurately reflect field performance of biological control agents in 2020 for yearly comparison. Further monitoring data would help to better understand if other environmental factors may have been involved.

Biological Control staff continued to monitor GWSS life stages in Kern County to support the area-wide management program. Using visual survey and beat-net methods, field occurrences of GWSS life stages were monitored weekly at multiple field sites in Kern County. In 2020, GWSS adults and egg masses (including parasitized or old eggs) were detected year-round, while nymphs were observed only in April - November. Fresh egg masses laid by overwintered adults were first found in early March. Seasonal occurrences of eggs and nymphs showed two distinctive peaks in April and August. A total of 47,417 adults and 4,581 nymphs were found in 2020, compared to 33,015 adults and 1,866 nymphs in 2019. Field-collected GWSS adults in late October - December did not lay eggs promptly under favorable greenhouse conditions, which indicates that the GWSS adults may have become reproductively inactive.

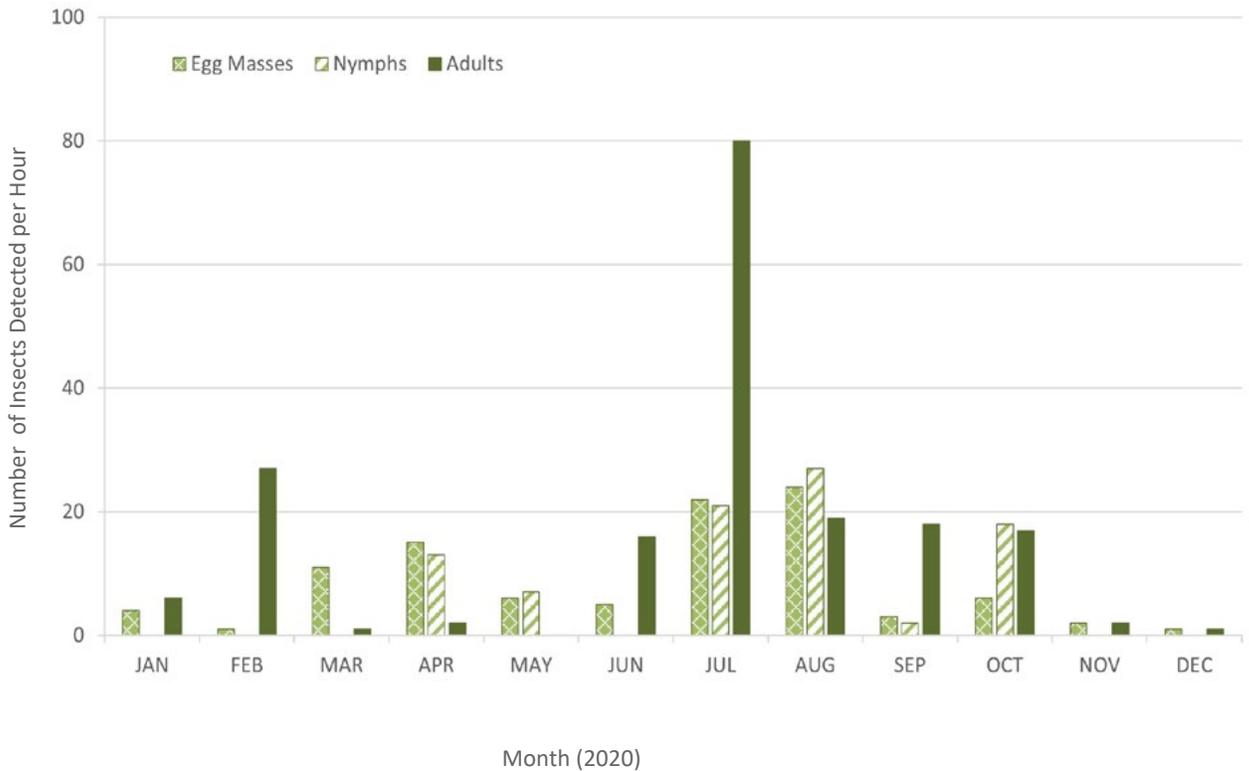


*Production of GWSS host plants, GWSS adults and egg masses, and biological control agents.*

## Number of Biological Control Agents Emerged from Field-Collected GWSS Egg Samples in 2020

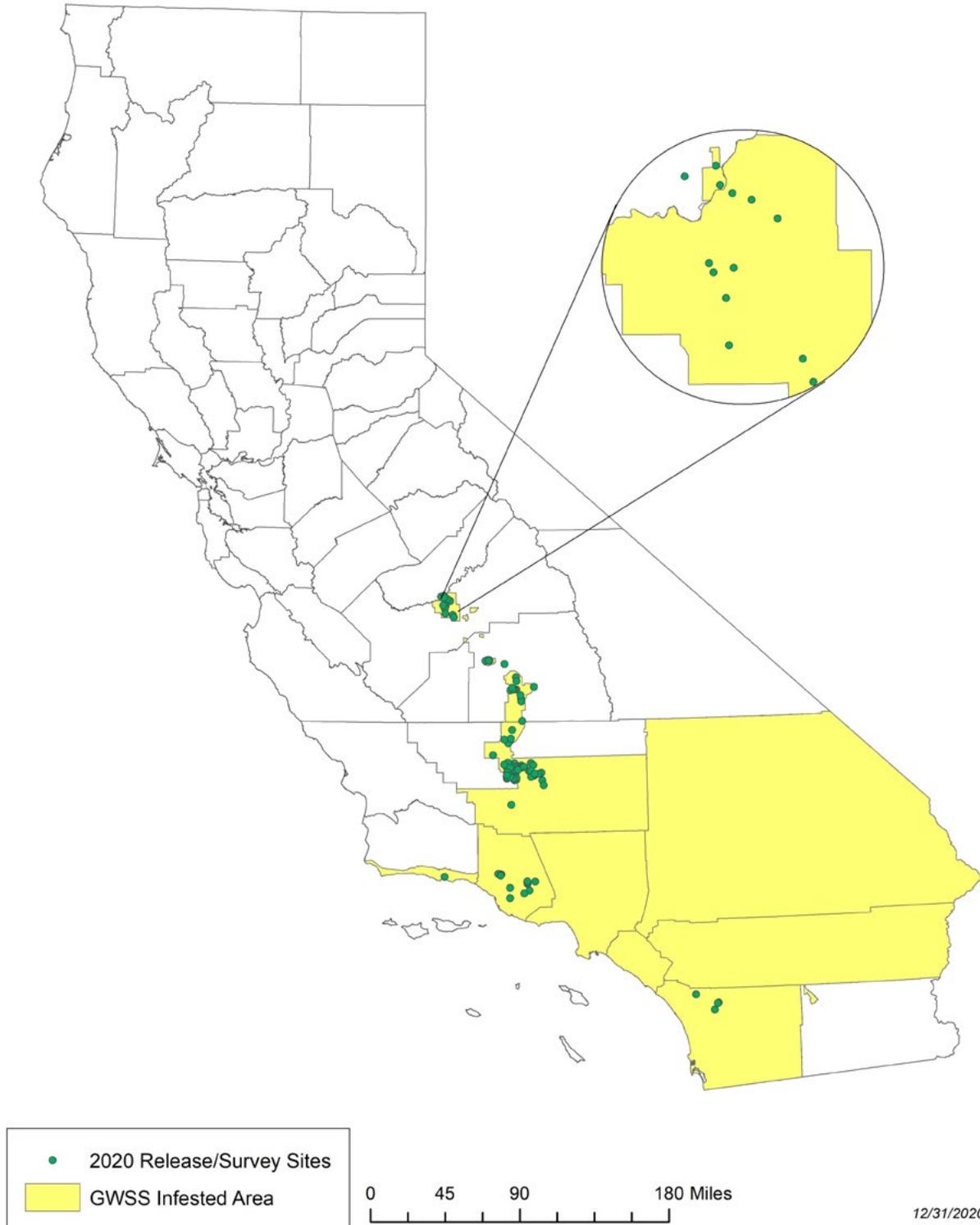
COUNTY	NUMBER OF SITES	BIOLOGICAL CONTROL AGENTS							TOTAL
		<i>C. ashmeadi</i>	<i>C. morgani</i>	<i>C. morrilli</i>	<i>C. novifasciata</i>	<i>C. walker-jonesi</i>	<i>C. incompta</i>	<i>Ufens spp.</i>	
Fresno	10	8	0	0	0	0	0	0	8
Kern	63	564	5	0	0	0	0	199	768
Madera	3	0	0	0	0	0	0	0	0
San Diego	5	401	0	21	0	178	0	15	615
Tulare	18	2	0	0	0	0	0	20	22
Ventura	14	0	0	0	11	0	0	19	30
<b>TOTAL</b>	<b>113</b>	<b>975</b>	<b>5</b>	<b>21</b>	<b>11</b>	<b>178</b>	<b>0</b>	<b>253</b>	<b>1,443</b>

## Seasonal Occurrence of GWSS Life Stages in Kern County, 2020





## 2020 Biological Control Sites



# STATEWIDE SURVEY AND DETECTION



*Glassy-winged sharpshooter inspectors.*

The Statewide Survey and Detection element of the Program is designed to locate new glassy-winged sharpshooter (GWSS) infestations quickly and confirm that non-infested areas remain free of infestation. The activities of this element focus on systematically trapping urban and residential areas and nurseries to determine if GWSS are present.

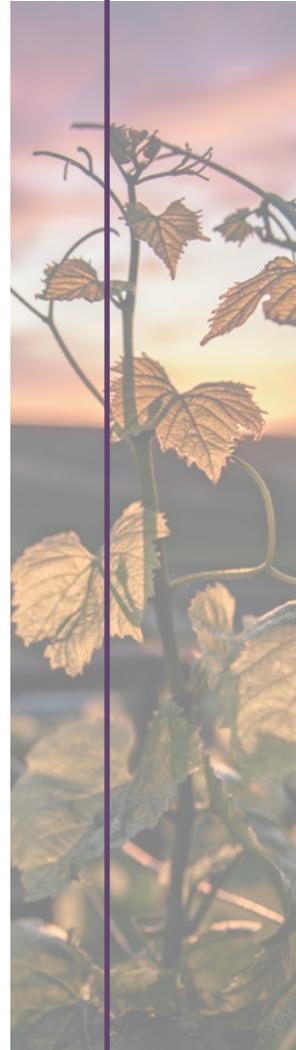
GWSS are detected by using yellow panel traps that are deployed in 43 counties that are not infested or are only partially infested with GWSS. The GWSS are attracted to the trap's bright yellow color and become stuck on the adhesive surface. County and state personnel service traps on a regular basis during the trapping season.



*Yellow panel trap.*

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 2020. During the peak of the trapping season, approximately 33,000 traps were deployed and serviced statewide for GWSS detection and survey.

During 2020, PDCP staff provided detection training to 239 employees from 33 counties as well as approved nurseries and citrus packing houses. Much of this was done virtually via remote meeting platforms. Staff conducted quality control inspections of county trapping programs when feasible. These inspections are done to ensure that proper identification of target insects, trap placement, host selection, servicing schedules, and record-keeping are being performed correctly and at the desired levels.



# RAPID RESPONSE



*Pest management technicians treat around a home in an area infested with glassy-winged sharpshooters.*

The Rapid Response element of the Program involves responding quickly to detections of glassy-winged sharpshooters (GWSS) in new areas. When one or more 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 the boundaries. Delimitation surveys consist of high-density trapping and visual inspections of preferred host plants

in the area. If an infestation is present and treatment is 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 2020, one new GWSS infestation was found, in the Trimmer Springs Area of Fresno County, and one existing infested area was expanded -- in Madera County near the Fresno County line along Highway 41. The infested area now includes the Rolling Hills area. Statewide, GWSS were found on approximately 1,067 properties in these partially infested counties. In response, approximately 5,951 properties (infested plus adjacents) were treated.

## **Pre-Treatment Communication with Residents of Treatment Areas**

Extensive public outreach and communication activities are conducted to ensure residents in affected areas are kept well informed of program and treatment activities.

A public meeting or other outreach activity 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 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. In 2020, residents in the proposed treatment areas were invited to participate in virtual public meetings.

To help protect area wildlife, a database of threatened and endangered species is consulted to determine if any listed species are present in the treatment area. All appropriate federal and state agencies are notified prior to treatment.



*Soil drench treatment of host material in a glassy-winged sharpshooter infested area by a pest control operator.*

## Treatment

Public safety is the department'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.

## Treatment Monitoring

The Environmental Monitoring Branch of the California Department of Pesticide Regulation has previously 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 <https://www.cdpr.ca.gov/docs/emon/pubs/ehapreps.htm>.

# RESEARCH



*Sample processing for composite testing procedures.*

Research continues to be an integral part of the Pierce's Disease Control Program (PDCP). In 2020, the flurry of research activity on Pierce's disease (PD) and its vectors that began at the start of the program continued, with approximately 17 active 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 PD and its vectors. Additionally, 18 projects on other Board-designated pests and diseases of winegrapes were in progress in 2020, increasing the knowledge base available for developing management solutions to these pests and diseases. The pandemic did delay some work and led to a handful of no cost extensions being approved so researchers could adjust to new working protocols.

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 outcompete 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. Field testing of grapevine plant material developed using transgenic approaches began in 2010 and continued through 2020. In 2013 a Technology Facilitator was brought in to advise on developing and commercializing these promising discoveries, and in 2014, the services of a Viticulture Consultant were obtained to ensure the field trial test vineyards were properly managed. Looking back, it is clear that solutions to PD are getting very close relative to where we were 20 years ago. Presently, the PD/GWSS Board is pursuing the hiring of a Research Coordinator to monitor, guide, and facilitate the Board's research funding program.





## Research Symposium

The PDCP has organized 15 research symposia since 2001 to foster communication and information sharing among scientists and stakeholders on the latest research progress and findings on PD. Early in 2020 plans were being made for a symposium, but due to the pandemic, it was decided not to hold one. Although there was no symposium, a compilation of progress reports on current research and outreach projects on PD, the GWSS, and other winegrape pests and diseases was still prepared. All proceedings documents can be viewed online at <https://www.cdfa.ca.gov/pdcp/Research.html>.

Additional research progress reports are available on another website that is maintained by the Program ([piercesdisease.cdfa.ca.gov](http://piercesdisease.cdfa.ca.gov)).

## Research Proposal Solicitation and Review

In 2020, the PDCP partnered with the Unified Grant Management for Viticulture and Enology Program at UC Davis to conduct its research and outreach proposal solicitation and review process. In addition to calling for proposals on PD and its vectors, the request for proposals also called for proposals on other serious pests and diseases of winegrapes. A total of 17 proposals were received and reviewed, with 12 projects totaling \$2.4 million selected for funding using PD/GWSS winegrape assessment funds. In addition, 23 ongoing projects were approved to continue for another fiscal year, including some receiving no cost extensions due to delays caused by the pandemic.



*Camminare noir, one of five PD-resistant grape varieties developed by Board-funded researcher Dr. Andrew Walker, UC Davis.*



*Researcher grinding tissue for single sample testing.*

# OUTREACH

## County Agricultural Commissioner Outreach Activities

In 2020, local county agricultural staff and industry members played key roles in maintaining program visibility and stakeholder awareness. Due to the pandemic, many of these activities were conducted virtually. County public outreach and education efforts included the distribution of PD and GWSS informational material to local retail, production, and shipping nurseries; landscape companies; 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.



*Screenshot of the Pierce's Disease Control Program website.*

at [www.cdfa.ca.gov/pdcp](http://www.cdfa.ca.gov/pdcp) and in 2020 continued to be used as an effective tool for providing current and reliable information to interested parties.

## Website

In March 2000, the CDFA activated a website focused on PD and the GWSS. 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 local entities. This website is located





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

The past few years have been challenging for California winegrape growers, and this continued in 2020. Growers are facing stark economic conditions brought on by wildfires, pests, and disease pressures, and these were made even more challenging by the unprecedented COVID-19 pandemic. The public health crisis has also disrupted existing marketing and distribution channels, and driven major shifts in communications best practices.

Growers who are committed to staying in the industry are having to make tough choices. Framing the PD/GWSS assessment as a wise and nominal investment in protecting their vineyards for preventing grapevine losses from pests and diseases is more important than ever. The most resounding measure of success for the program was the passage of the PD/GWSS Referendum, conducted in spring 2020, with 78% approval of winegrape growers. All winegrape producer entities that paid the assessment on grapes crushed in 2019 received ballots and 49 percent cast ballots. The PD/GWSS Referendum is conducted every five years by law and will take place again in 2025.

Strategies for the outreach and education program in 2020 included:

- » Informing audiences of ongoing activities and successes in the search for solutions to PD and its vectors
- » Informing audiences of ongoing activities and research efforts addressing other designated pests and diseases of winegrapes
- » Providing information and news on pest detections, rapid responses, and other containment efforts
- » Providing information on how the industry assessment, and federal and state funds have been used to protect the California winegrape industry
- » Promoting the Board's capacity to leverage grower-committed funding by drawing down state and federal governmental support

A solid, consistent, and strategic communications approach speaks to the sensibilities of growers, and a variety of communication vehicles are utilized to reach them in the most appropriate, cost-effective, and convenient manner. The following communications activities were used to connect with growers in 2020:

» **QUARTERLY NEWSLETTER:**

Highlights Board actions and research advances and is mailed to over 7,000 winegrape growers and industry stakeholders. When California’s stay-at-home orders went into place in the spring of 2020, the Board quickly shifted to delivering the quarterly newsletters electronically.

» **MONTHLY E-NEWSLETTER:**

Shares Board activities, PDCP reports on containment and treatments, and relevant media coverage, and is sent to over 1,200 winegrape growers and industry stakeholders.

» **WEBSITE:**

Provides comprehensive information on the Board, PD/GWSS winegrape assessment, pests and diseases designated by the Board, and research projects funded by the Board.

» **SOCIAL MEDIA:**

Shares Board news, research advancements and applications, and relevant media coverage through Facebook and YouTube.

» **MEDIA OUTREACH:**

Maintained regular relations with key wine and agricultural media to keep them apprised of story opportunities, research successes, and Board activities; provided background information and images to assist media in properly reporting Board news and research; and developed and distributed press releases, including news about the PD/GWSS Referendum and the newly designated spotted lanternfly. There were 27 news reports about the Board, including the PD/GWSS assessment and referendum, research advances, PD-resistant vines, the area-wide treatment program, and designating the spotted lanternfly.



Screenshot of the Winter 2020 quarterly newsletter.



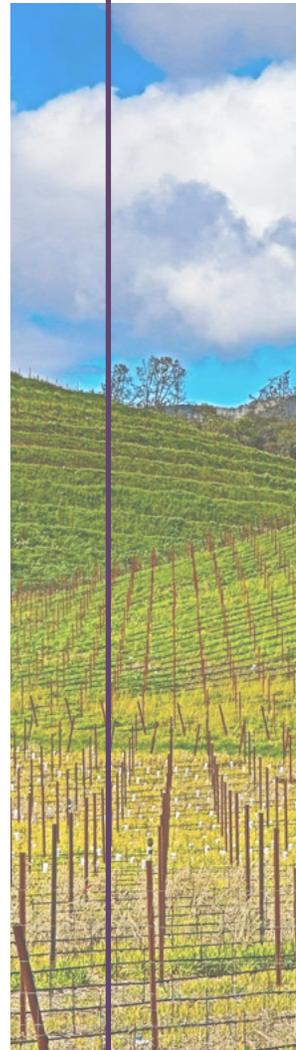
Screenshot of the December 2020 monthly E-newsletter.

# ENVIRONMENTAL COMPLIANCE

In 2020, 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 responsible manner. These efforts included holding public meetings in advance of treatment activities, 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 California pesticide laws and regulations.

A statewide programmatic environmental impact report (EIR) 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. The full document can be found at <http://www.cdfa.ca.gov/plant/peir/index.html>.

Following the December 2014 final EIR completion, a legal challenge was filed against it. In early 2018, the trial court ruled in favor of the plaintiffs and issued an injunction to the PDCP and CDFA to stop all urban treatment activities. The CDFA is appealing the decision of the trial court, and in May 2018, a stay to the treatment injunction was granted. The appeal process continued in 2020 and into 2021.



# FINANCIAL STATEMENT

REVENUE	FY 2019-20 (ACTUAL)	FY 2020-21 (BUDGETED)
Federal (United States Department of Agriculture)	\$15,538,323	\$15,574,754
California Department of Food Agriculture (General Fund)	\$1,786,844	\$0
California Department of Food Agriculture (Reserve)	\$10,960	\$90,000
Industry (PD/GWSS Board Winegrape Assessment)	\$2,703,712	\$4,421,000
Industry (CCVTGPDCD)	\$0	\$600,000
<b>TOTAL REVENUE</b>	<b>\$20,039,839</b>	<b>\$20,685,754</b>

EXPENDITURES	FY 2019-20 (ACTUAL)	FY 2020-21 (BUDGETED)
Personal Services	\$3,650,622	\$3,500,028
Operating Expenses	\$4,729,691	\$5,741,095
Total County Payments	\$11,659,526	\$11,444,631
<b>TOTAL EXPENDITURES</b>	<b>\$20,039,839</b>	<b>\$20,685,754</b>

