CALIFORNIA DEPARTMENT OF FOOD AND AGRICULTURE

OFFICIAL NOTICE
FOR CITY OF SAN GABRIEL
PLEASE READ IMMEDIATELY

AMENDMENT TO THE NOTICE OF TREATMENT FOR THE ASIAN CITRUS PSYLLID

Between March 10 and April 18, 2016 the United States Department of Agriculture (USDA) confirmed the presence of the causative bacterial agent of the citrus disease huanglongbing (HLB) from citrus tree tissue and insect vectors collected in the city of San Gabriel, Los Angeles County. HLB is a devastating disease of citrus worldwide and is spread through feeding action by populations of the Asian citrus psyllid (ACP), *Diaphorina citri* Kuwayama. In order to determine the extent of the infestation, and to define an appropriate response area, additional survey took place for several days over a ten-square mile area, centered on the detection site. The results of this additional survey indicated that the infestation is sufficiently localized to be amenable for effective implementation of the California Department of Food and Agriculture's (CDFA) current ACP and HLB response strategies, which include treatment for ACP and removal of any infected host plant.

A Program Environmental Impact Report (PEIR) has been certified which analyzes the ACP and HLB treatment program in accordance with Public Resources Code, Sections 21000 et seq. The PEIR is available at http://www.cdfa.ca.gov/plant/peir/. The treatment activities described below are consistent with the PEIR.

In accordance with integrated pest management principles, the CDFA has evaluated possible treatment methods and determined that there are no cultural or biological control methods available to control ACP and to eliminate HLB from this area.

The treatment plan for the HLB infestation will be implemented within an 800-meter radius of each detection site, as follows:

- Tempo® SC Ultra (cyfluthrin), a contact insecticide for controlling the adults and nymphs of ACP, will be applied from the ground using hydraulic spray equipment to the foliage of host plants; and

- Merit® 2F or CoreTect™ (imidacloprid), a systemic insecticide for controlling the immature life stages of ACP, will be applied to the soil underneath host plants. Merit® 2F is applied from the ground using hydraulic spray equipment, whereas CoreTect™, if used in place of Merit® 2F, is applied by inserting the tablets into the ground and watering the soil beneath the host plants.

- HLB-infected host plant removal – All host plants found to be infected with HLB will be removed and destroyed using mechanical means in order to stop the spread of the disease. Stumps may be physically removed or may be treated with Roundup® (containing glyphosate) in order to prevent re-sprouting.

Public Notification:
Residents of affected properties may be invited to a public meeting where officials from CDFA, the Department of Pesticide Regulation, the Office of Environmental Health Hazard Assessment, and the county agricultural commissioner's office will be available to address residents' questions and concerns. Residents are notified in writing at least 48 hours in

advance of any treatment in accordance with the Food and Agricultural Code, Section 5779 and 5401-5404. Following the treatment, completion notices are left with the residents detailing precautions to take and post-harvest intervals applicable to the citrus fruit on the property. Treatment information is posted at http://cdfa.ca.gov/plant/acp/treatment_maps.html. Press releases, if issued, are prepared by the CDFA information officer and the county agricultural commissioner, in close coordination with the program leader responsible for treatment. Either the county agricultural commissioner or the public information officer serves as the primary contact to the media.

For any questions related to this program, please contact the CDFA toll-free telephone number at 800-491-1899 for assistance. This telephone number is also listed on all treatment notices.

Enclosed are the findings regarding the treatment plan and a map of the treatment area.

Attachments

FINDINGS REGARDING A TREATMENT PLAN FOR THE ASIAN CITRUS PSYLLID

Between March 10 and April 18, 2016, the California Department of Food and Agriculture (CDFA) confirmed the presence of the causative bacterial agent of the citrus disease huanglongbing (HLB) from citrus tree tissue and insect vectors collected in the city of San Gabriel, Los Angeles County. HLB is a devastating disease of citrus worldwide and is spread through feeding action by populations of the Asian citrus psyllid (ACP), *Diaphorina citri* Kuwayama. Based on the survey data, pest biology, information from California's Huanglongbing Task Force, recommendations provided to me by the Department's Primary State Entomologist and Primary State Plant Pathologist, and experience gained from the United States Department of Agriculture's (USDA) control efforts in the southeastern United States, I have determined that an infestation of HLB-infected ACPs and of HLB exists.

ACP is an exotic insect that is originally from Asia. It has been introduced into Central and South America, the Caribbean, and Mexico. In the United States, ACP has been found in Alabama, Arizona, Florida, Georgia, Hawaii, Louisiana, Mississippi, South Carolina, Texas, and California (Fresno, Imperial, Kern, Los Angeles, Madera, Orange, Riverside, San Benito, San Bernardino, San Diego, San Joaquin, San Luis Obispo, Santa Barbara, Santa Clara, Tulare, Kings, San Mateo, Stanislaus, and Ventura counties). ACP feeds on members of the plant family Rutaceae, primarily on *Citrus* and *Murraya* species, but is also known to attack several other genera. The psyllids cause injury to their host plants via the withdrawal of large amounts of sap as they feed and via the production of large amounts of honeydew, which coats the leaves of the tree and encourages the growth of sooty mold, which blocks sunlight from reaching the leaves. However, the most serious damage caused by ACP is due to its vectoring the phloem-inhabiting bacteria in the genus *Candidatus* Liberibacter, the causal agents of huanglongbing (HLB). HLB is considered one of the most devastating diseases of citrus in the world, because it causes trees to produce inedible fruit and results in the eventual death of infected trees. Symptoms of HLB include yellow shoots with mottling and chlorosis of the leaves, misshapen fruit, fruit that does not fully color, and fruit that has a very bitter taste making it inedible for human consumption.

These pests present a major threat to citrus grown within the State. California is the top citrus-producing state in the U.S., with total production valued at over $2.2 billion. Additionally, the establishment of ACP in currently uninfested areas of California would increase the need for pesticide use by commercial and residential citrus producers, as well as require enforcement of quarantine restrictions. Recent studies in Florida have shown that the presence of HLB increases citrus production costs by up to 40 percent and has resulted in a loss of over $7 billion and 6,600 jobs over the last five years. HLB would have severe consequences to both the citrus industry and to the urban landscape via the decline and the death of citrus trees.

This decision to proceed with treatment is based upon a realistic evaluation that it may be possible to address the threat posed by HLB-infected ACP and HLB using currently available technology in a manner that is recommended by California's HLB Task Force. In making this decision, the CDFA has evaluated possible treatment methods. In accordance with integrated pest management principles, the following is the list of options that I have considered for the treatment of this ACP and HLB infestation: 1) physical controls; 2) cultural controls; 3) biological controls; and 4) chemical controls.

Based upon input from my professional staff, including memorandums from the Primary State Entomologist and Primary State Plant Pathologist, and the input of experts familiar with ACP and HLB, I have concluded that there are no cultural or biological control methods that are effective to

treat the ACP and HLB that allow the CDFA to meet its statutory obligations. To treat ACP and HLB in this area, I am ordering applications of pesticides be made using ground-based equipment to all ACP hosts within an 800-meter radius around the HLB detection site and any subsequent sites, and removal of all HLB-infected trees with the option of applying an herbicide to kill any remaining stump or root material. The ACP option selected is a chemical control measure that involves the use of insecticides targeting both the adult and immature stages of ACP, while that for HLB-infected trees is a physical control measure which may be combined with a chemical one to remove or kill all HLB-infected plant material. These options were selected based upon biological effectiveness, minimal public intrusiveness, cost, and minimal impacts to the environment.

A Program Environmental Impact Report (PEIR) has been prepared which analyzes the ACP and HLB treatment program in accordance with Public Resources Code (PRC), Sections 21000 et seq. The PEIR was certified in December 2014, and is available at http://www.cdfa.ca.gov/plant/peir/. The PEIR addresses the treatment of the ACP and HLB at the program level and provides guidance on future actions against the ACP and HLB. It identifies feasible alternatives and possible mitigation measures to be implemented for individual ACP and HLB treatment activities. The ACP and HLB program has incorporated the mitigation measures and integrated pest management techniques as described in the PEIR. In accordance with PRC Section 21105, this PEIR has been filed with the appropriate local planning agency of all affected cities and counties. No local conditions have been detected which would justify or necessitate preparation of a site specific plan.

Sensitive Areas

The treatment area has been reviewed by consulting the California Department of Fish and Wildlife's California Natural Diversity Database for threatened or endangered species. The CDFA also consults with the United States Fish and Wildlife Service, the National Marine Fisheries Service and the California Department of Fish and Wildlife when rare and endangered species are located within the treatment area. Mitigation measures will be implemented as needed. The CDFA will not apply pesticides to bodies of water or undeveloped areas of native vegetation. All treatment will be applied to residential properties, common areas within residential development, non-agricultural commercial properties, and right-of-ways.

Work Plan

The proposed program area encompasses those portions of Los Angeles County which fall within a one-square-mile area around the property on which HLB-infected ACP and/or HLB have been detected, and any subsequent detection sites within the program boundaries. A map of the project boundaries is attached. The work plan consists of the following elements:

1. ACP Monitoring. Yellow panel traps will be placed within an 800-meter radius around each HLB detection site to monitor post-treatment ACP populations. Traps will be placed at a density of 100 traps per square mile and will be serviced on a regular schedule, generally once every two weeks.

2. ACP and HLB Visual Survey. All host plants will be inspected for ACP and for HLB symptoms within an 800-meter radius around each HLB detection site, at least twice a year. ACPs and HLB-symptomatic plant tissue will be collected and forwarded to the CDFA Plant Pest Diagnostic Center (PPDC) for identification and analysis.

3. HLB Disease testing. All collected symptomatic host tree tissues and ACP life stages will be tested by the PPDC for the presence of HLB.

4. Treatment. All properties with host plants within an 800-meter radius around each HLB detection site will be treated according to the following protocol to control ACP:

   a. Tempo® SC Ultra, containing the contact pyrethroid insecticide cyfluthrin, will be applied by ground-based hydraulic spray equipment to the foliage of host plants for controlling the adults and nymphs of ACP. Treatment may be re-applied up to six times annually if additional ACPs are detected.

   b. Either Merit® 2F or CoreTect™, containing the systemic insecticide imidacloprid, will be applied to the root zone beneath host plants for controlling developing nymphs and providing long term protection against reinfestation. Merit® 2F is applied as a soil drench, while CoreTect™ tablets are inserted two to five inches below the soil surface and watered in to initiate tablet dissolution. CoreTect™ is used in place of Merit® 2F in situations where there are environmental concerns about soil surface runoff of the liquid Merit® 2F formulation, such as host plants growing next to ponds and other environmentally sensitive areas. Treatment may be re-applied once annually if additional ACPs are detected.

5. HLB-infected host plant removal. All host plants found to be infected with HLB will be destroyed in order to stop the spread of the disease. Infected host plants will be removed and destroyed using mechanical means. Stumps may be physically removed or may be treated with Roundup® (containing glyphosate) in order to prevent re-sprouting.

Public Information

Residents of affected properties may be invited to a public meeting where officials from the CDFA, the California Department of Pesticide Regulation, the Office of Environmental Health Hazard Assessment, and the county agricultural commissioner's office will be present to address residents' questions and concerns. Residents are notified in writing at least 48 hours in advance of any treatment in accordance with the Food and Agricultural Code (FAC), Section 5779. After treatment, completion notices are left with the residents detailing precautions to take and post-harvest intervals applicable to the citrus fruit. Information concerning the ACP program will be conveyed directly to local and State political representatives and authorities via letters, emails, and/or faxes. Treatment information is posted at http://cdfa.ca.gov/plant/acp/treatment_maps.html. Press releases, if issued, are prepared by the CDFA information officer and the county agricultural commissioner, in close coordination with the program leader responsible for treatment. Either the county agricultural commissioner or the public information officer serves as the primary contact to the media.

For any questions related to this program, please contact the CDFA toll-free telephone number at 800-491-1899 for assistance. This telephone number is also listed on all treatment notices.

Duty to Act

Under my statutory authority, as Secretary of the California Department of Food and Agriculture, I have decided, based upon the likely environmental and economic damage that would be inflicted by

an established infestation of HLB in this area, that it is incumbent upon me to attempt to address this threat.

My duty to act, and this decision, is based upon authority set forth in Sections 24.5, 401.5, 403, 407, 408, 5401-5405, and 5761-5764 of the FAC, authorizing and mandating the Secretary to: thoroughly investigate the existence of the pest; determine the probability of the pest spreading to other areas; adopt regulations (Title 3 of the California Code of Regulations, Section 3591.21) as are reasonably necessary to carry out the provisions of this code; abate a pest from the established treatment area; and, to prevent further economic damage. The project work plan above describes the CDFA's actions that are necessary to mitigate the effects of this pest.

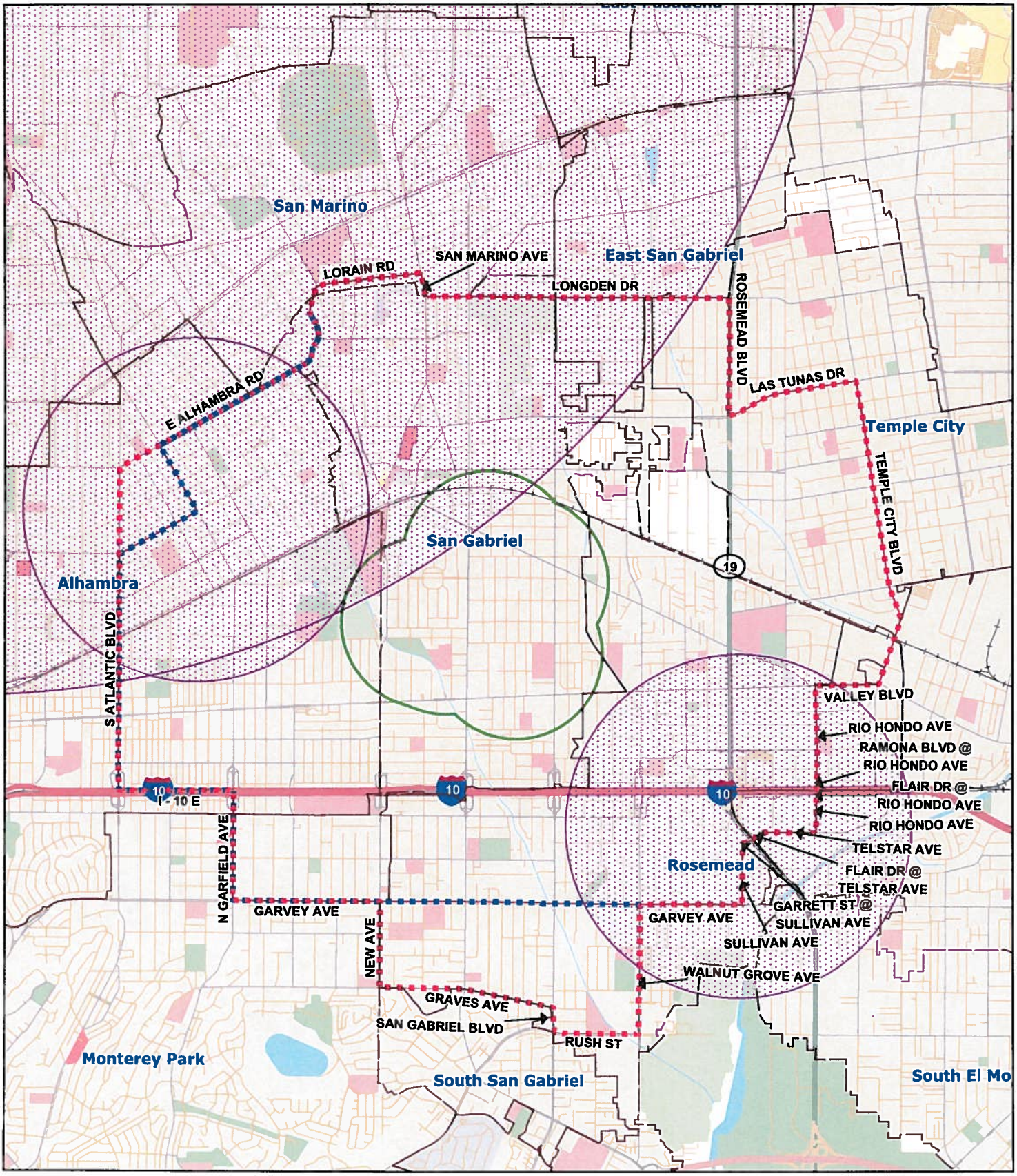
Karen Ross

Karen Ross, Secretary

5-10-16

Date

ASIAN CITRUS PSYLLID
SAN GABRIEL, LOS ANGELES COUNTY
2016



cdfa

MAXIMUM PROGRAM BOUNDARY

PREVIOUS MAXIMUM PROGRAM BOUNDARY

PROPOSED 800M TREATMENT BOUNDARY

SENSITIVE ENVIRONMENTAL AREA / TREATMENT MITIGATIONS IN PLACE

HLB Response Plan

Introduction

The primary threat to California's citrus trees, both commercial and residential, is a deadly disease known as huanglongbing (HLB) or citrus greening. It is spread by the Asian citrus psyllid (ACP) *Diaphorina citri* (Kuwayama), which has become established in the eight southernmost counties of California and has been found in limited numbers in Tulare, Kern, Santa Clara, San Joaquin, Madera, San Benito and San Luis Obispo Counties. ACP has the potential to spread the disease-causing bacterium *Candidatus Liberibacter asiaticus* (*CLas)* to any or all of California's citrus growing areas, including both commercial and residential citrus. HLB is the most devastating disease of citrus in the world. Symptoms of HLB include yellow shoots, with mottling and chlorosis of the leaves. The juice of the infected fruit has a bitter taste and the fruit may be misshapen with the fruit's skin retaining some green coloration even though it is ripe. The fruit quality degrades until it becomes unmarketable, and infected trees eventually die of the disease. The ACP/HLB vector-disease complex has brought economic devastation to Florida's citrus industry and carries the same potential for California's citrus growing areas.

To date (as of October, 2015) there has been two confirmed positive HLB areas, one infected tree in 2012 in the Hacienda Heights area of Los Angeles County and on 10 trees in 2015 in the city of San Gabriel, also in Los Angeles County. The infected trees were removed and destroyed. A 180-square mile quarantine is now in place in the Los Angeles Basin, which includes 177-square miles of Los Angeles County and 3-square miles of Orange County to prevent citrus hosts from moving out of the quarantine area into HLB free areas.

Survey Activities for HLB

Determination of HLB Survey Sites

Using risk modeling provided by Dr. Tim Gottwald, USDA, Agricultural Research Service (ARS), the following factors are considered when determining risk associated with HLB:

1. Residential citrus population and distribution
2. Weather effects
3. Citrus transportation routes
4. Potential to spread the Asian citrus psyllid (ACP) from commercial nurseries, big box stores and citrus green waste
5. Areas infested with ACP
6. Proximity to commercial citrus groves
7. Human population dynamics

Using these risk factors, total risk is determined for each square mile grid, resulting in a recommended sampling density as shown in table below. Each square mile map is identified by the section, township, range (STR) ID (the

unique index). Each STR ID is assigned a Sample Density from Table 1, which is used to determine the number of sites to survey per square mile.

Table 1. Recommended Sampling Density and Number of Survey Sites for HLB in California.

Recommended Sampling Density	Actual # of Sites to Survey	# of Square Miles with the Recommended Density	Total # of Sites to Survey
0-5	5	1,926	9,630
6-20	10	1,392	13,920
21-40	25	1,168	29,200
41-80	50	1,111	55,550
81-160	100	324	32,400
161+	200	105	21,000
Total Number of Sites			**161,700**

CDFA will use this method to determine the number of sites to sample for each survey cycle. Locations (addresses and latitude and longitude) obtained from the survey are submitted to the USDA to verify that the Global Position System (GPS) points are within the assigned STR, and then forwarded to Dr. Gottwald. Following Dr. Gottwald's analysis, in subsequent survey cycles, additional sites or STR's will be surveyed so that the recommended sampling density will be achieved.

Inspection of Hosts at Survey Site

1. All members of the plant family Rutaceae at the site, primarily *Citrus* and *Murraya* species and any other hosts of ACP should be identified.
2. Each host tree is visually sectioned into quadrants. Each quadrant is inspected for all ACP life stages (adults, nymphs, and eggs). All detected life stages are collected.
3. All hosts at the site are inspected for HLB symptoms. The most common symptom is the blotchy mottle on the leaves (which occurs on all host varieties). The symptoms are better observed in the interior part of the canopy where sun is less likely to obscure the symptoms.
4. Plant material should be collected from all hosts displaying symptoms of HLB.
5. If HLB symptoms are not observed, but there is a high population of ACP on the host(s), plant material should be collected from the tree(s) that have a high population of ACP.
6. All collected plant material and ACP samples will be processed and shipped to CDFA's Plant Pest Diagnostics Center (PPDC) for analysis.

Submission of ACP Samples

1. A pipette is used to transfer the ACP into a vial containing 95% non-denatured ethanol. Adult ACP from different hosts on the same property may be mixed in the same vial.
2. Nymphs are collected with a small paint brush or forceps and placed in a vial with 95% non-denatured ethanol. Nymphs from different hosts will not be mixed in the same vial.
3. Samples will be placed in a cooler with ice packs.
4. The cooler will be sent to the PPDC with appropriate chain of custody documentation.

Submission of plant parts

1. Twenty (20) symptomatic leaves per tree should be collected.
2. Clippers, if used, will be disinfected with alcohol after every sample collection.
3. All plant samples submitted to the PPDC must be free of all insects.
4. Plant samples are wrapped in a paper towel, double Ziploc bagged and placed in a cooler with ice packs.
5. The cooler will be sent to the PPDC with appropriate chain of custody documentation.

Response Activities

Because HLB is the most devastating disease of citrus worldwide, California cannot afford to allow the spread of HLB through our state. The presence of this disease in areas such as Asia, Brazil, Texas and Florida has afforded us the opportunity to learn from their experiences, including the best available options to prevent the spread and establishment of this pathogen.

Experts worldwide agree on three critical steps in HLB control:

1. Abatement procedures to remove infected trees. See appendix for approved removal methods.
2. Area-wide ACP control.
3. Replant with disease-free trees, necessitating that all citrus nursery stock be produced under protective structures.

Host plant tests positive for HLB-associated Liberibacter

Each instance will be evaluated on a case by case basis and response activities may include the following:

1. Upon confirmation of an HLB infected plant, apply foliar insecticides to the infected plant and apply both foliar and systemic insecticides to all host plants within 800 m. See Appendix for approved insecticides.
2. After treatment, remove and destroy the diseased citrus tree or host plant

following the abatement procedures. Completely remove any stumps if size permits or treat stump with approved stump treatment to prevent re-sprouting. See Appendix for approved herbicides.

3. Collect all trace back information on the source of the diseased plant. All genetically related material must be placed on hold, and tested for HLB – associated bacteria.
4. Initiate standard ACP delimitation survey and use the spoke model to a distance of 10 miles, if appropriate as well as visual inspection or P-vac or stem tap sampling for psyllids at trap properties.
5. Test 100 percent ACPs collected for the pathogen. All citrus trees and host plants within 800 m must be tested for HLB – associated bacteria.
6. If nursery stock tests positive for the pathogen, trace back and trace forward activities will identify related plant materials to be held and tested. Following the abatement procedure, infected trees must be destroyed and all host plants within 800 m must be tested for HLB-associated bacteria.
7. If HLB is detected in a commercial grove, apply foliar insecticides to the infected tree and apply both foliar and systemic insecticides to all host material within 800 m. Following the abatement procedure, remove and destroy the diseased tree. Completely remove stump if size permits or treat stump with approved stump treatment to prevent re-sprouting.
8. Survey and test host trees following the hierarchical sampling method. Collect 20 leaf samples from each of 25 percent of the trees in an orchard. Select trees to be sampled in groups of four, with 80 leaves being collected from the four trees. The four trees, a quadrat, are surveyed as one unit, either by sampling two trees in each of two rows to form a square or sampling four trees in a linear fashion in one row. In both scenarios, the quadrats will be separated by unsampled trees. To determine the total number of samples to be collected in an orchard being surveyed, the following formula was used: Number of trees per acre x number of acres of trees in the orchard/4. All trees with symptomatic leaves should be sampled regardless of the survey protocol. Perimeters and edges of open spaces should receive an added focus as HLB is often found in higher concentrations in these areas.
9. Examine all host plants for evidence or presence of ACP and collect and analyze all specimens found for HLB-associated bacteria.
10. Take appropriate steps to clean fruit of any ACP (all life stages) and remove leaves and stems before fruit moves away from the orchard.
11. Initiate a treatment program to suppress ACP densities and continue testing leaf tissue for HLB-associated bacteria until it is determined that no additional infections exist.

ACP tests positive for HLB-associated Liberibacter

1. Initiate ACP delimitation survey.
   a. In residential situations, test all host plants on the property and adjacent properties for the HLB – associated bacteria. Initiate standard radius ACP delimitation survey and use the spoke model to a distance of 10 miles, if appropriate as well as visual inspection or P-vac or stem tap sampling for psyllids at trap properties.
   b. In commercial groves, survey and test host trees following the hierarchical sampling method. Collect 20 leaf samples from each of 25 percent of the trees in an orchard. Select trees to be sampled in groups of four, with 80 leaves being collected from the four trees. The four trees, a quadrat, are surveyed as one unit, either by sampling two trees in each of two rows to form a square or sampling four trees in a linear fashion in one row. In both scenarios, the quadrats will be separated by unsampled trees. To determine the total number of samples to be collected in an orchard being surveyed, the following formula was used: Number of trees per acre x number of acres of trees in the orchard/4. All trees with symptomatic leaves should be sampled regardless of the survey protocol. Perimeters and edges of open spaces should receive an added focus as HLB is often found in higher concentrations in these areas.
2. All ACP found will be tested for HLB-associated bacteria.
3. If the inoculative psyllid is found in a trap, test citrus tree or other host plant in which the trap was placed and host plants within an 800 meter radius. In residential situations, sample and test all trees on the property and all host plants within an 800 meter radius.
4. If the inoculative ACP is found in the nymphal stage or as an adult feeding on a host plant, test that tree and all immediately adjacent host plants for HLB-associated bacteria, regardless of the presence or absence of symptoms. The plant on which the insect was found feeding should be considered "highly" suspect for HLB and routinely monitored. Test all host plants within an 800 meter radius for HLB-associated bacteria.
5. Complete an intensive visual survey for symptomatic trees. Test all symptomatic trees for HLB -associated bacteria.
6. Initiate a treatment program to suppress ACP densities and continue testing leaf tissue for HLB-associated bacteria until it is determined that no additional infections exist.

Treatment Protocols

A Program Environmental Impact Report (PEIR) has been certified which analyzes the ACP treatment program in accordance with Public Resources Code, Sections 21000 et seq. The PEIR is available at http://www.cdfa.ca.gov/plant/peir. The treatment activities described below are consistent with the PEIR

In accordance with the integrated pest management principles, the CDFA has evaluated possible treatment methods and determined that there are no physical, cultural, or biological control available to eliminate ACP from an area.

In general, when treatment has been deemed appropriate, CDFA applies pesticides to host trees (residential, urban, or non-agricultural commercial) that are within 400 to 800 meters around each detection site. Only ACP host plants are treated.

The treatment protocol consists of both a foliar and a systemic insecticide. Foliar insecticides are useful for immediate reduction of the adult population in order to eliminate dispersal, while systemic insecticides are necessary to kill the sedentary nymphs and provide long term protection against reinfestation. Treatment frequency is dependent on the insecticide applied and severity of the infestation. Treatments will end no later than two years after the last psyllid detection in the treatment area. The Program uses registered pesticides, follows the label directions, including mitigations and restrictions and in some circumstances may adjust the treatment protocol and use only the foliar or systemic pesticide.

Foliar Treatment

A foliar treatment may be made with Tempo® SC Ultra (cyfluthrin), which is a pyrethroid contact insecticide. Treatment will initially occur once, and subsequent applications may occur for up to six times annually if additional psyllids are detected. This material will be applied to the foliage of all host plants using hydraulic spray or hand spray equipment.

Soil Treatment

A systemic soil application may be made using either Merit® 2F or CoreTect™.

> Merit® 2F (imidacloprid), is a neonicotinoid systemic insecticide. Treatment will initially occur once, and a subsequent application may occur annually if additional psyllids are detected. This material will be applied to the soil within the root zone of host plants.
>
> CoreTect™ (imidacloprid) is a neonicotinoid systemic insecticide. It is used in place of Merit® 2F in situations where there are environmental

concerns about soil surface runoff of the liquid Merit® 2F formulation, such as where host plants grow next to ponds and other environmentally sensitive areas. Treatment will initially occur once, with a subsequent application once on an annual basis if additional psyllids are detected. This material is a pelletized tablet and is inserted into the soil and watered in within the root zone of host plants.

Public Notification

A Notice of Treatment (NOT) will be issued for all new treatment areas, distributed to the appropriate authorities and posted on the CDFA website. Residents of affected properties may be invited to a public meeting where officials from CDFA, the California Department of Pesticide Regulation (CDPR), the Office of Environmental Health Hazard Assessment (OEHHA), and the county agricultural commissioner's office will be available to address residents' questions and concerns. Residents are notified in writing at least 48 hours in advance of any treatment in accordance with the Food and Agricultural Code (FAC), Section 5779 and 5401-5404. Following the treatment, completion notices are left with the residents detailing precautions to take and post-harvest intervals applicable to the citrus fruit on the property. Treatment information is posted at http://cdfa.ca.gov/plant/acp/treatment_maps.html. Press releases, if issued, are prepared by the CDFA information officer and the county agricultural commissioner, in close coordination with the program leader responsible for treatment. Either the county agricultural commissioner or the public information officer serves as the primary contact to the media.

Abatement Procedures

5401. Any premises, plants, conveyances or things which are infected or infested with any pest, or premises where any pest is found, are a public nuisance, and shall be prosecuted as such in all actions and proceedings. All remedies which are given by law for the prevention and abatement of a nuisance apply to such a public nuisance.

5402. It is unlawful for any person to maintain such a public nuisance. The remedies which are provided by this article are in addition to any other remedy by way of abatement which is provided in this division.

5403. If, after service of notice pursuant to this chapter a public nuisance is not abated within the time which is specified in the notice, the commissioner shall abate the nuisance by eradicating, controlling, or destroying the pest.

Environmental Consultation

Treatment areas will be reviewed through consultation with the California Department of Fish and Wildlife's (CDFW) Natural Diversity Database for threatened or endangered species. The CDFA also consults with the CDFW, United States Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) when rare and endangered species are located within the

treatment area. Mitigation measures will be implemented as needed. The CDFA will not apply pesticides to bodies of water or undeveloped areas of native vegetation. All treatment will be applied to residential properties, common areas within residential development, non-agricultural commercial properties and rights-of-ways.

Environmental Monitoring
To ensure protection of human health and the environment, the CDFA has contracted with CDPR to oversee environmental monitoring of treatment projects. Sampling media include air, leaf, soil, tank, and water. To address human health issues, CDFA has contracted with the OEHHA.

Pollinator Protection
The CDFA takes a number of beneficial actions to promote pollinator health at our program sites and throughout the state. CDFA works with the local County Agricultural Commissioner's office to identify all registered bee colonies and notifies the registered beekeeper prior to applying any pesticide. The CDPR is also consulted to ensure that label directions are interpreted properly and that the applications are made safely. CDFA staff conduct a visual survey of each property prior to making an application and take appropriate precautions to mitigate hazards to pollinators. During treatment activities, CDFA staff follow all label directions; appropriate best management practices and makes every effort to assure proper timing of applications. Staff remain on site until all of the water is absorbed into the soil to prevent pollinators from visiting any standing water.

Quarantine Protocols for HLB
No unapproved movement of host plants within or outside of quarantine area, including fruit with leaves or stems, propagative materials, and host plants of any size.

1. Nursery stock not produced and maintained in approved protective structures will be placed on hold until determined to be free of HLB, this would include being moved into an insect resistant structure and testing free of HLB for 2 years. (Current information indicates it can take up to two years from the time of infection to detect HLB in potted citrus.) Upon confirmation that plants meet the above requirements, plants may only be moved within the quarantine area.
2. Nursery stock produced and maintained in approved protective structures undergoing aggressive ACP control, regular testing for HLB – associated bacteria and monitored by regulatory officials may be approved for movement within or outside the quarantine area.
3. All nursery stock must be treated with an effective systemic pesticide. Every plant must have a tamper-resistant label indicating the treatment date. Based on the efficacy of systemic pesticides on containerized citrus nursery stock, the treatment will be considered valid for 12 weeks. After

that period of time, the label will be considered expired. No plants will be sold with expired treatment labels.

There are several early detection technologies (EDT's) being researched and developed; however none of the EDTs have been shown to be reliable yet. Efforts are under way to validate whether and if any can be reliably used.

Detection of HLB-associated pathogens is extremely difficult for the following reasons:

1. The pathogen(s) is unevenly distributed within the tree increasing the risk of missing it when collecting samples for analyses;
2. The latency period (time from infection to expression of disease symptoms) can be as long as 5 or more years in mature trees and up to 2 years in potted citrus;
3. Huanglongbing symptoms may be similar to those of other endemic diseases such as citrus stubborn;
4. Huanglongbing symptoms mimic nutritional deficiencies and chemical toxicities; and
5. Seasonal fluctuations in pathogen titer in both the plant and psyllid or variations in the time it takes for a psyllid to acquire the pathogen are currently unknown for California conditions.

Appendix

1. Foliar insecticides: Cyfluthrin (trade name Tempo SC Ultra)

2. Systemic insecticide: Imidacloprid (trade name Merit 2F or CoreTect)

3. Stump Treatment: Glyphosate (trade name Round Up)

4. Tree removal: Removal methods may include but are not limited to cutting and burning on site, defoliation and burn standing, cut and buck up for double bagging and disposal at landfill, burial, or other yet unidentified method of destruction that is approved by the regulatory officials.

ASIAN CITRUS PSYLLID WORK PLAN

1. Urban and Rural Residential Detection Trapping and Visual Survey

This is a cooperative State/county trapping program for ACP to provide early detection of any infestation in a county. Traps are serviced by agricultural inspectors. The trap used for ACP detection is the yellow panel trap, which is a two-sided board coated with stickum. ACP becomes entangled on the sticky capture surface. Yellow panel traps have proven successful at detecting infestations of ACP. At all locations where traps are placed, the host plant is visually inspected for ACP. If there is evidence that ACP exists, the host will be visually surveyed for ACP samples.

- Trap Density: Five to 16 traps/square mile.
- Trap Servicing Interval: Every two to four weeks.
- Trap Relocation and Replacement: Traps should be replaced and relocated every four to eight weeks to another host at least 500 feet away if other hosts are available.
- Visual surveys and tap sampling are conducted once at each trapping site when the trap is placed or relocated at that site.

2. Delimitation Trapping and Visual Survey Outside of the Generally Infested Area

The protocols below are the actions in response to the detection(s) of one or more Asian citrus psyllids (ACP) in the area outside of the generally infested area. The detection of a single ACP remains a quarantine trigger.

a. Response to a single ACP <u>not</u> within 1.5 miles of commercial citrus

Trapping

Density will be 100 traps per square mile in a 1.5 mile radius, to form a nine square mile delimitation area. Traps will be serviced weekly for two months. After that, the traps will be serviced monthly for two years past the identification date. Additional detections may increase the size of the delimitation survey area and will restart the two-year clock on the trap servicing requirement.

Visual Survey

All find sites and adjacent properties will be visually surveyed for ACP and HLB. The remainder of the delimitation area will be visually surveyed out to100 meters. Additional sites may be surveyed as part of the risk-based survey.

b. Response to 2 or more ACP within 1.5 miles of each other, detected within 6 months of each other, or 1 or more ACP within 1.5 miles of commercial citrus

Trapping

Same as for one ACP, centered on each detection site.

Visual Survey

All properties within 400 meters will be visually surveyed for ACP and HLB.

3. Commercial Grove Trapping
In counties with substantial commercial citrus production, traps are placed within the groves at the density of one trap per 40 acres. Traps are replaced every month and submitted for screening.

In generally infested areas (currently Orange, western Riverside, San Bernardino, and San Diego counties), the traps are removed and replaced with HLB survey and ACP collection for HLB testing.

4. Treatment
CDFA's treatment activities for ACP vary throughout the state and depend on multiple factors. Factors CDFA considers prior to treatment include the proximity of the infestation to commercial citrus, and whether or not coordinated treatment activities are conducted by growers. Prior to initiating treatment in a new area, CDFA will review the situation and to determine if eradication or suppression of ACP is feasible in the area and consistent with the overall goal of protecting the state's commercial citrus production.

Currently, CDFA has identified four scenarios throughout the state in which treatment will occur.

1. In areas with commercial citrus production that are generally infested with ACP and where all growers are treating on a coordinated schedule, CDFA may conduct residential buffer treatments to suppress ACP populations.

2. In areas with commercial citrus production that are not generally infested, CDFA will conduct residential treatments in response to ACP detections as long as all growers are treating on a coordinated schedule.

3. In any area where ACP and HLB have been detected (e.g. Hacienda Heights, Los Angeles County), CDFA will conduct residential treatments to suppress ACP populations.

4. In any area where ACP has not been previously detected or where ACP has been detected at low densities, CDFA will conduct residential treatments to eradicate, prevent establishment, or suppress populations. In order for eradication to be feasible, the eradication area must be protected from established ACP populations that can spread naturally into the area and from the artificial movement of ACP from infested areas.

CDFA's current policy is to not conduct treatments in areas that are generally infested if there is no commercial citrus production in the area, or if all growers in the area are not treating.

Treatment Protocols

A Program Environmental Impact Report (PEIR) has been certified which analyzes the ACP treatment program in accordance with Public Resources Code, Sections 21000 et seq. The PEIR is available at http://www.cdfa.ca.gov/plant/peir. The treatment activities described below will be consistent with the PEIR

In accordance with the integrated pest management principles, the CDFA has evaluated possible treatment methods and determined that there are no physical, cultural, or biological control available to eliminate ACP from an area.

In general, when treatment has been deemed appropriate, CDFA applies pesticides to host trees (residential, urban, or non-agricultural commercial) that are within 100 to 800 meters around each detection site. Only ACP host plants are treated.

For single ACP detections not within 1.5 miles of commercial citrus, all properties within 100 meters will be treated and a Notice of Treatment (NOT) will be issued. If the find is within 1.5 miles of commercial citrus, or if multiple ACP are detected within six months of each other, the treatment area will be 400 meters.

In response to HLB detections all properties within 800 meters will be treated and a NOT will be issued

The treatment protocol consists of both a foliar and a systemic insecticide. Foliar insecticides are useful for immediate reduction of the adult population in order to eliminate dispersal, while systemic insecticides are necessary to kill the sedentary nymphs and provide long term protection against reinfestation. Treatment frequency is dependent on the insecticide applied and severity of the infestation. Treatments will end no later than two years after the last psyllid detection in the treatment area. The Program uses registered pesticides, follows the label directions, including mitigations and restrictions and in some circumstances may adjust the treatment protocol and use only the foliar or systemic pesticide.

Foliar Treatment

Tempo® SC Ultra (cyfluthrin) is a pyrethroid contact insecticide. Treatment will initially occur once, and subsequent applications may occur for up to six times annually if additional psyllids are detected. This material will be applied to the foliage of all host plants using hydraulic spray or hand spray equipment.

Soil Treatment

A systemic soil application will be made using either Merit® 2F or CoreTect™.

- Merit® 2F (imidacloprid), is a neonicotinoid systemic insecticide. Treatment will initially occur once, and a subsequent application may occur once on an annual basis if additional psyllids are detected. This material will be applied to the soil within the root zone of host plants.

- CoreTect™ (imidacloprid) is a neonicotinoid systemic insecticide. It is used in place of Merit® 2F in situations where there are environmental concerns about soil surface runoff of the liquid Merit® 2F formulation, such as host plants growing next to ponds and other environmentally sensitive areas. Treatment will initially occur once, with a subsequent application once on an annual basis if additional psyllids are detected. This material is a pelletized tablet and is inserted into the soil and watered in within the root zone of host plants.

INTEGRATED PEST MANAGEMENT ANALYSIS OF ALTERNATIVE TREATMENT METHODS FOR CONTROL OF THE ASIAN CITRUS PSYLLID
January 2016

The chemical treatment program used by the California Department of Food and Agriculture (CDFA) for control of the Asian citrus psyllid (ACP), *Diaphorina citri* (Hemiptera: Psyllidae), targets multiple life stages. A contact insecticide is used for an immediate control of adults in order to prevent spread, and a systemic insecticide is used to control developing nymphs and to give the plant long term protection from re-infestation. The contact insecticide preferentially used contains the synthetic pyrethroid cyfluthrin, while the systemic insecticide contains the synthetic neonicotinoid imidacloprid. Both products have been shown to be effective against ACP elsewhere, particularly in Florida. The California Huanglongbing Task Force, a joint government, university, and industry group formed in 2007 to provide guidance to the CDFA on matters pertaining to ACP and huanglongbing has endorsed the use of these chemicals in the CDFA's treatment program.

Below is an evaluation of alternative treatment methods to control ACP which have been considered for treatment programs in California.

A. PHYSICAL CONTROL

Mass Trapping. Mass trapping of adults involves placing a high density of traps in an area in an attempt to physically remove them before they can reproduce. The current available trapping system for ACP relies on short distance visual stimulus, and is not considered effective enough to use in a mass trapping program.

Active Psyllid Removal. Adult ACPs are mobile daytime fliers, and adults could theoretically be netted or collected off of foliage. However, due to their ability to fly when disturbed, and the laborious and time-prohibitive task of collecting minute insects from several properties by hand, it would be highly unlikely that all adults could be captured and removed. Nymphs attach themselves to developing leaves and stems via their proboscis. Therefore, physical removal of the nymphs would entail removal of the growing shoots which will stunt the tree and reduce fruit production. For these reasons, mechanical control is not considered to be an effective alternative.

Host Removal. Removal of host plants would involve the large scale destruction of plants and their roots by either physical removal or phytotoxic herbicides. Additionally, host removal could promote dispersal of female psyllids in search of hosts outside of the treatment area, thus spreading the infestation. For these reasons, host removal is considered inefficient and too intrusive to use over the entirety of the treatment areas used for ACP.

B. CULTURAL CONTROL

Cultural Control. Cultural controls involve the manipulation of cultivation practices to reduce the prevalence of pest populations. These include crop rotation, using pest-resistant varieties, and intercropping with pest-repellent plants. None of these options are applicable for ACP control in an urban environment, and may only serve to drive the psyllids outside the treatment area, thus spreading the infestation.

C. BIOLOGICAL CONTROL

Microorganisms. No single-celled microorganisms, such as bacteria, are currently available to control ACP.

Nematodes. Entomopathogenic nematodes can be effective for control of some soil-inhabiting insects, but are not effective, nor are they used, against above ground insects such as psyllids.

Parasites and Predators. There have been two parasites released in Florida against ACP, but only one of these are considered somewhat successful there, namely *Tamarixia radiata* (Hymenoptera: Eulophidae). This insect has been released into the environment in southern California. The CDFA is working with the citrus industry to pursue options for incorporating this parasite into treatment programs statewide. In addition, a second wasp has been recently released by the University of California Riverside, *Diaphorencyrtus aligarhensis*.

Sterile Insect Technique (SIT). SIT involves the release of reproductively sterile insects which then mate with the wild population, resulting in the production of infertile eggs. SIT has neither been researched nor developed for ACP, nor has it been developed for any species of psyllids, and is therefore unavailable.

D. CHEMICAL CONTROL

Foliar Treatment. A number of contact insecticides have been researched for use against ACP elsewhere, particularly in Florida. Contact insecticides are more effective against adult ACPs than the sedentary nymphs because adults actively move around on plants, thereby coming into contact with residues, whereas nymphs have to be directly sprayed in order for them to come into contact. The following product has been identified for use by the CDFA, based on a combination of effectiveness against ACP, worker and environmental safety, and California registration status.

Tempo® SC Ultra is a formulation of cyfluthrin which is applied to the foliage of all host plants. Tempo® SC Ultra is a broad-spectrum synthetic pyrethroid insecticide which kills insects on contact. Tempo® SC Ultra has no preharvest interval, which makes it compatible with residential fruit-growing practices.

Soil Treatment. A number of systemic insecticides have been researched for use against ACP elsewhere, particularly in Florida. Systemic insecticides are particularly effective against psyllid nymphs because nymphs spend much of their time feeding, thereby acquiring a lethal dose. The following products have been identified for use by the CDFA, based on a combination of effectiveness against ACP, worker and environmental safety, and California registration status.

Merit® 2F is a formulation of imidacloprid which is applied to the root system of all host plants via a soil drench. Imidacloprid is a synthetic neonicotinoid insecticide which controls a number of other phloem feeding pests such as psyllids, aphids, mealybugs, etc.

CoreTect™ is a formulation of imidacloprid which is applied to the root system of all host plants via insertion of a tablet into the soil, followed by watering. It is used in place of Merit® 2F in situations where there are environmental concerns about soil surface runoff of the liquid Merit® 2F formulation, such as host plants growing next to ponds and other environmentally sensitive areas.

E. RESOURCES

Grafton-Cardwell, E. E. and M. P. Daugherty. 2013. Asian citrus psyllid and huanglongbing disease. Pest Notes Publication 74155. University of California, Division of Agriculture and Natural Resources Publication 8205. 5 pp. http://www.ipm.ucdavis.edu/PDF/PESTNOTES/pnasiancitruspsyllid.pdf.

Grafton-Cardwell, E. E., J. G. Morse, N. V. O'Connell, P. A. Phillips, C. E. Kallsen, and D. R. Haviland. 2013. UC IPM Management Guidelines: Citrus. Asian Citrus Psyllid. Pest Notes Publication 74155. University of California, Division of Agriculture and Natural Resources. http://www.ipm.ucdavis.edu/PMG/r107304411.html.

PEST PROFILE

Common Name: Asian Citrus Psyllid

Scientific Name: *Diaphorina citri* Kuwayama

Order and Family: Hemiptera, Psyllidae

Description: The Asian citrus psyllid (ACP) is 3 to 4 millimeters long with a brown mottled body. The head is light brown. The wings are broadest in the apical half, mottled, and with a dark brown band extending around the periphery of the outer half of the wing. The insect is covered with a whitish waxy secretion, making it appear dusty. Nymphs are generally yellowish orange in color, with large filaments confined to an apical plate of the abdomen. The eggs are approximately 0.3 millimeters long, elongated, and almond-shaped. Fresh eggs are pale in color, then, turn yellow, and finally orange at the time of hatching. Eggs are placed on plant tissue with the long axis vertical to the surface of the plant.

History: Asian citrus psyllid was first found in the United States in Palm Beach County, Florida, in June 1998 in backyard plantings of orange jasmine. By 2001, it had spread to 31 counties in Florida, with much of the spread due to movement of infested nursery plants. In the spring of 2001, Asian citrus psyllid was accidentally introduced into the Rio Grande Valley, Texas on potted nursery stock from Florida. It was subsequently found in Hawaii in 2006, in Alabama, Georgia, Louisiana, Mississippi, and South Carolina in 2008. ACP was first found in California on August 27, 2008 in San Diego County. Subsequent to this initial detection in San Diego County, the ACP has been detected in Fresno, Imperial, Kern, Los Angeles, Madera, Orange, Riverside, San Benito, San Bernardino, San Joaquin, San Luis Obispo, San Mateo, Santa Barbara, Santa Clara, Stanislaus, Tulare, and Ventura counties. The ACP has the potential to establish itself throughout California wherever citrus is grown.

Distribution: ACP is found in tropical and subtropical Asia, Afghanistan, Saudi Arabia, Reunion, Mauritius, parts of South and Central America, Mexico, the Caribbean, and in the U.S. (Alabama, Arizona, California, Florida, Georgia, Hawaii, Louisiana, Mississippi, South Carolina, and Texas).

Life Cycle: Eggs are laid on tips of growing shoots; on and between unfurling leaves. Females may lay more than 800 eggs during their lives. Nymphs pass through five instars. The total life cycle requires from 15 to 47 days, depending on environmental factors such as temperature and season. The adults may live for several months. There is no diapause but populations are low in the winter or during dry periods. There are nine to ten generations a year, with up to 16 noted under observation in field cages.

Hosts and Economic Importance: ACP feeds mainly on *Citrus* spp., at least two species of *Murraya*, and at least three other genera, all in the family Rutaceae. Damage from the psyllids occurs in two ways: the first by drawing out of large amounts of sap from the plant as they feed and, secondly, the psyllids produce copious amounts of honeydew. The honeydew then coats the leaves of the tree, encouraging sooty mold to grow which blocks sunlight to the leaves. However, the most serious damage caused by ACP is due to its ability to effectively vector three phloem-inhabiting bacteria in the genus *Candidatus* Liberibacter, the most widespread being *Candidatus* Liberibacter asiaticus. These bacteria cause a disease known as huanglongbing, or citrus greening. In the past, these bacteria have been difficult to detect and characterize. In

recent years, however, DNA probes, electron microscopy, and enzyme-linked immunosorbent assay tests (ELISA) have been developed that have improved detection. Symptoms of huanglongbing include yellow shoots, with mottling and chlorosis of the leaves. The juice of the infected fruit has a bitter taste. Fruit does not color properly, hence the term "greening" is sometimes used in reference to the disease. Huanglongbing is one of the most devastating diseases of citrus in the world. Once infected, there is no cure for disease and infected trees will die within ten years. The once flourishing citrus industry in India is slowly being wiped out by dieback. This dieback has multiple causes, but the major reason is due to HLB. In California, the disease has only been found in two residential areas of Los Angeles County.

Host List

SCIENTIFIC NAME	COMMON NAMES
Aegle marmelos	bael, Bengal quince, golden apple, bela, milva
Aeglopsis chevalieri	Chevalier's aeglopsis
Afraegle gabonensis	Gabon powder-flask
Afraegle paniculata	Nigerian powder-flask
Amyris madrensis	mountain torchwood
Atalantia monophylla	Indian atalantia
Atalantia spp.	
Balsamocitrus dawei	Uganda powder-flask
Bergia (=*Murraya*) *koenigii*	curry leaf
Calodendrum capense	Cape chestnut
X Citroncirus webberi	
Choisya arizonica	Arizonia orange
Choisya ternata	Mexican or mock orange
Citropsis articulata	Katimboro, Muboro, West African cherry orange
Citropsis gilletiana	cherry-orange
Citropsis schweinfurthii	African cherry-orange
Citrus aurantiifolia	lime, Key lime, Persian lime, lima, limón agrio, limón ceutí, lima mejicana, limero
Citrus aurantium	sour orange, Seville orange, bigarde, marmalade orange, naranja agria, naranja amarga
Citrus hystrix	Mauritius papeda, Kaffir lime
Citrus jambhiri	rough lemon, jambhiri-orange, limón rugoso, rugoso
Citrus limon	lemon, limón, limonero
Citrus madurensis (=*X Citrofortunella microcarpa*)	calamondin
Citrus maxima	pummelo, pomelo, shaddock, pompelmous, toronja
Citrus medica	citron, cidra, cidro, toronja
Citrus meyeri	Meyer lemon, dwarf lemon
Citrus × nobilis	king mandarin, tangor, Florida orange, King-of-Siam
Citrus × paradisi	grapefruit, pomelo, toronja
Citrus reticulata	mandarin, tangerine, mandarina
Citrus sinensis	sweet orange, orange, naranja, naranja dulce
Citrus spp.	
Clausena anisum-olens	anis
Clausena excavata	clausena
Clausena indica	clausena
Clausena lansium	wampi, wampee

Clymenia polyandra	a-mulis
Eremocitrus glauca	Australian desert lime
Eremocitrus hybrid	
Esenbeckia berlandieri	Berlandier's jopoy
Fortunella crassifolia	Meiwa kumquat
Fortunella margarita	Nagami kumquat, oval kumquat
Fortunella polyandra	Malayan kumquat
Fortunella spp.	
Limonia acidissima	Indian wood apple
Merrillia caloxylon	flowering merrillia
Microcitrus australasica	finger-lime
Microcitrus australis	Australian round-lime
Microcitrus papuana	desert-lime
X *Microcitronella* spp.	
Murraya spp.	curry leaf, orange-jasmine, Chinese-box, naranjo jazmín
Naringi crenulata	naringi
Pamburus missionis	
Poncirus trifoliata	trifoliate orange, naranjo trébol
Severinia buxifolia	Chinese box-orange
Swinglea glutinosa	tabog
Tetradium ruticarpum	evodia, wu zhu yu
Toddalia asiatica	orange climber
Triphasia trifolia	trifoliate limeberry, triphasia
Vepris (=*Toddalia*) *lanceolata*	white ironwood
Zanthoxylum fagara	wild lime, lime prickly-ash