CALIFORNIA DEPARTMENT OF FOOD AND AGRICULTURE

OFFICIAL NOTICE
FOR THE CITY OF FREMONT
PLEASE READ IMMEDIATELY

PROCLAMATION OF EMERGENCY PROGRAM FOR THE MEDITERRANEAN FRUIT FLY

On August 28, 2024, the California Department of Food and Agriculture (CDFA) confirmed that one mated adult female Mediterranean fruit fly (Medfly), *Ceratitis capitata* (Wiedemann), was trapped in the city of Fremont in Alameda County. Based on these detections, pest biology, information from the CDFA Mediterranean Fruit Fly Science Advisory Panel (MedSAP), the Primary State Entomologist, and the CDFA's "Action Plan for Mediterranean Fruit Fly *Ceratitis capitata* (Wiedemann)," the CDFA concludes that an infestation of Medfly exists in the area. This pest presents a significant, clear, and imminent threat to the natural environment, agriculture and economy of California. Unless emergency action is taken there is high potential for sudden future detections in Alameda County.

In accordance with integrated pest management principles, the CDFA has evaluated possible eradication methods and determined that there are no cultural methods available to eliminate Medfly from this area. This Proclamation of Emergency Program is valid until June 13, 2025, which is the amount of time necessary to carry out the treatment plan across three life cycles of Medfly as required by the treatment protocol for Medfly. The CDFA will employ biological and chemical controls as the primary tool and will additionally use physical control via host fruit removal when there is evidence that a breeding population exists on a property.

The detection of a Medfly described above requires immediate action to address the imminent threat to California's natural environment, agriculture and economy. More specifically, in addition to a wide variety of commercial crops, Medfly threatens loss and damage to native wildlife, private and public property, and food supplies. Because the life cycle of the Medfly detected on August 28, 2024 has not yet transpired, there is a high potential for sudden future detections in Alameda County. Therefore, the Secretary is invoking Public Resources Code Section 21080(b)(4) to carry out immediate emergency action to prevent the aforementioned loss and damage to California's resources.

The treatment plan for the Medfly infestation will be implemented as follows:

- Biological Control. The sterile insect technique (SIT) makes use of sterile medflies to prevent the production of viable offspring. The wild female medflies mate with the sterile males and lay infertile eggs, thereby disrupting the breeding cycle and causing the population to be eliminated. Sterile flies are released by aircraft within a 3.5-mile radius around each detection site. Releases are repeated every three to four days for two life cycles of the fly (typically four to six months, dependent on temperature).

- Chemical Control. Foliar bait treatments are used within 200 meters of each detection site in order to mitigate the spread of medfly by eliminating those adult life stages not directly affected by SIT (i.e., mated females and sexually immature flies). Foliar bait ground treatments are a protein bait spray that contains an organic formulation of the pesticide spinosad (GF-120 NF Naturalyte® Fruit Fly Bait) and are repeated every seven to 14 days for one life cycle of the fly (typically two to three months, dependent on temperature). Please visit the CDFA website to learn more about the treatment process at http://www.cdfa.ca.gov/plant/videos/spinosad/.

- Physical Control: If evidence that a breeding population exists on a property (i.e., immature stages, mated female, or multiple adults), all host fruit from each detection

site and all properties within a minimum of 100 meters of each detection site may be removed and disposed of in a landfill in accordance with regulatory protocols. Fruit removal will occur at the beginning of the project, but may be repeated if additional flies are detected.

Public Information:

Residents whose property will be treated via foliar bait sprays or host fruit removal will be notified in writing at least 48 hours in advance of any treatment, in accordance with the Food and Agricultural Code sections 5779. Following the treatment, completion notices are left with the residents detailing precautions to take and post-harvest intervals applicable to any fruit on the property.

Treatment information is posted at https://www.cdfa.ca.gov/plant/PDEP/treatment/medfly_treatment.html. Press releases, if issued, are prepared by the CDFA information officer and the county agricultural commissioner, in close coordination with the project leader responsible for treatment. Either the county agricultural commissioner or the public information officer serves as the primary contact to the media.

Information concerning the Medfly project shall be conveyed directly to local and State political representatives and authorities via letters, emails, and/or faxes.

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, work plan, map of the treatment area, integrated pest management analysis of alternative treatment methods, and a pest profile.

Attachments:
Findings
Work Plan
IPM Analysis
Pest Profile

FINDINGS OF AN EMERGENCY FOR
THE MEDITERRANEAN FRUIT FLY

On August 28, 2024, the California Department of Food and Agriculture (CDFA) confirmed that one female adult mated Mediterranean fruit fly (Medfly), *Ceratitis capitata* (Wiedemann), was trapped in the city of Fremont in Alameda County. This detection indicates that a breeding population exists in the area. Unless emergency action is taken during this Medflies' life cycle, then there is high potential for sudden future detections in Alameda County. The Medfly is a devastating pest of a wide variety of important fruit, vegetables, and native plants.

In order to determine the extent of the infestation, and to define an appropriate response area, an additional survey took place, centered on the detection site. Based on the survey data, and findings and recommendations from the CDFA Mediterranean Fruit Fly Science Advisory Panel (MedSAP), the Primary State Entomologist, the CDFA's "Action Plan for Mediterranean Fruit Fly *Ceratitis capitata* (Wiedemann)," and County Agricultural Commissioner representatives who are knowledgeable on Medfly, I have determined that Medfly poses a statewide imminent danger to the environment and economy.

The results of the additional survey also indicated that the local infestation is amenable to CDFA's Medfly response strategies, which include chemical treatments and removal of host fruit. These options were selected based upon minimal impacts to the natural environment, biological effectiveness, minimal public intrusiveness, and cost.

The Medfly is an insect pest native to Africa, and has appeared in southern Europe, western Australia, and Central and South America. Its distribution in the United States is restricted to the Hawaiian Islands, where it was discovered in 1910. Worldwide, the Medfly has been recorded infesting over 250 different types of fruits and vegetables. A great number of crops in California would be threatened by the introduction of this pest including apple, apricot, avocado, cherry, date, grape, grapefruit, nectarine, orange, peach, pepper, and tomato. Damage occurs when the female lays eggs in the fruit. These eggs hatch into larvae, which tunnel through the flesh of the fruit, making it unfit for consumption.

A life cycle is an estimate of insect phenology based on a heat degree day temperature driven model. Warmer temperatures lead to faster lifecycles, while colder temperatures slow lifecycle development. Daily minimum and maximum temperatures are collected from nearby regional data stations and used to calculate estimated temperature value curves. These temperature curves are used to project the length of fly lifecycles against established models specific to Medfly. Because the third (F3) life cycle of the Medfly detected on August 28, 2024, is not projected to be complete until June 13, 2025, it is likely that there are additional flies in the environment that will lead to sudden future detections.

This pest presents a significant and imminent threat to the natural environment, agriculture and economy of California. Exotic fruit flies are internal feeders of fruit, and their presence therefore makes the fruit unfit for consumption. There is a loss of marketability and ability to ship food to other states and nations. The combined 2021 gross production value of host commercial commodities potentially affected by Medfly was over $17.94 billion. The permanent establishment and spread of this pest would result in increased production and postharvest costs to safeguard commercial fruit from infestation, increased pesticide applications on both production agriculture and residential properties to mitigate damage, and lost economic activity

and jobs from trade restrictions imposed by the United States Department of Agriculture (USDA) and foreign trade partners.

This decision to proceed with treatment is based upon a realistic evaluation that it will be possible to eliminate Medfly from this area and prevent its spread using currently available technology in a manner that is based on an action plan developed in consultation with the Pest Prevention Committee of the California Agricultural Commissioners and Sealers Association, the USDA, and scientists on the MedSAP. Due to the size of the infested area and the number of flies detected, historical data indicates that eradication is possible. The first California Medfly detection occurred in Los Angeles County in 1975, and since that time, numerous re-introductions have been delimited and successfully eradicated.

The CDFA has evaluated possible treatment methods in accordance with integrated pest management (IPM) principles. As part of these principles, I have considered the following treatments for control of Medfly: 1) physical controls; 2) cultural controls; 3) biological controls; and 4) chemical controls. Upon careful evaluation of each these options, I have determined that it will be possible to address the imminent threat posed by Medfly using currently available technology in a manner that is recommended by the MedSAP.

Based upon input from the MedSAP, the Primary State Entomologist, USDA experts on Medfly, and County Agricultural Commissioner representatives who are knowledgeable on Medfly, I find there are no cultural control methods that are both effective against Medfly and allow CDFA to meet its statutory obligations, and therefore it is necessary to conduct physical, biological, and chemical control methods to abate this threat. As a result, I am ordering that sterile insect releases and ground applied foliar bait sprays be used. Releases of sterile flies will occur via aircraft, while foliar bait spray treatments consisting of an organic formulation of spinosad will be applied to host trees using ground-based equipment. Additionally, in the event of evidence of a breeding population on a property, host fruit removal shall occur.

Sensitive Areas

CDFA has consulted with the California Department of Fish and Wildlife's California Natural Diversity Database for threatened or endangered species, 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 for rare and endangered species will be implemented. The CDFA shall not apply pesticides to bodies of water or undeveloped areas of native vegetation.

Work Plan

The proposed treatment program area encompasses those portions of Alameda County which fall within a 3.5-mile radius around each property on which Medfly has been detected, and any subsequent detection sites within the program boundaries. This Proclamation of Emergency Program is valid until June 13, 2025, which is the amount of time necessary to carry out the treatment plan across three life cycles of Medflies as required by the treatment protocol for Medflies. A map of the program boundaries is attached. The work plan consists of the following elements:

1. Delimitation. Traps will be placed throughout the program area to delimit the infestation and to monitor post-treatment Medfly populations. In the core square mile, 100 ChamP™ traps, baited with three trimedlure plugs each, and 25 Multilure® traps are placed. These Multilure® traps are in addition to the normal complement of detection McPhail traps already in place. In each of the surrounding eight square miles, 50ChamP™ traps are placed. In the remaining three one-mile deep buffers, Jackson traps are placed at densities of 25, 20, and 10 traps per square mile respectively, going outward.The McPhail traps deployed for general fruit fly detection are maintained at normal detection levels in the delimitation area. Existing trimedlure Jackson traps in this nine-square mile area are removed. Five Medfly Jackson traps are maintained in each square mile of the remaining delimitation area. Additional traps may be added to further delimit the infestation and to determine the efficacy of treatments. These traps will be serviced on a regular schedule for a period equal to three Medfly generations beyond the date of the last fly detected. In addition, host fruit will be sampled for the presence of eggs and larvae in a 200-meter radius around each detection site.

2. Treatment. Any Medfly detections within the original and/or expanded eradication area(s) will be treated according to the following protocol.

- Biological Control. The sterile insect technique (SIT) makes use of sterile male Medflies to prevent the production of viable offspring. The female Medflies mate with the sterile males and lay infertile eggs, thereby disrupting the breeding cycle and causing the population to be eradicated. Sterile flies are released by aircraft within a 3.5-mile radius around each detection site. Releases are repeated every three to four days for two life cycles of the fly (typically four to six months, dependent on temperature). The goal release rate is 250,000 flies per square mile per week.

- Chemical Control. Foliar bait treatments are used within 200 meters of each detection site to mitigate the spread of Medfly by eliminating those adult life stages not directly affected by SIT (i.e., mated females and sexually immature flies). The foliage of host trees and shrubs within 200 meters of each detection site will be treated with an organic formulation of spinosad bait spray (GF-120 NF Naturalyte® Fruit Fly Bait) using hand spray or hydraulic spray equipment. Treatments are repeated every seven to 14 days for one life cycle of the fly (typically two to three months, dependent on temperature).

- Physical Control. If evidence that a breeding population exists on a property (i.e., immature stages, mated female, or multiple adults), all host fruit from each detection site and all properties within a minimum of 100 meters of each detection site will be removed and disposed of in a landfill in accordance with regulatory protocols. Fruit removal will occur at the beginning of the project, but may be repeated if additional flies are detected.

Public Information

Residents whose property will be treated via foliar bait sprays or host fruit removal will be notified in writing at least 48 hours in advance of any treatment, in accordance with the Food and Agricultural Code (FAC) sections 5779. Following the treatment, completion notices are left with the residents detailing precautions to take and post-harvest intervals applicable to any fruit on the property.

Treatment information is posted at http://www.cdfa.ca.gov/plant/PDEP/treatment/medfly_treatment.html. Press releases, if issued, are prepared by the CDFA information officer and the county agricultural commissioner, in close coordination with the project leader responsible for treatment. Either the county agricultural commissioner or the public information officer serves as the primary contact to the media.

Information concerning the Medfly project shall be conveyed directly to local and State political representatives and authorities via letters, emails, and/or faxes.

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.

Findings

Due to the detection of Medfly, there exists a significant, clear, and imminent threat to California's natural environment, agriculture, public and private property, and its economy.

Unless emergency action is taken during the life cycles of recently detected Medflies, there is high potential for sudden future detections in Alameda County.

The work plan involving biological, chemical, and physical control of this pest is necessary to prevent loss and damage to California's natural environment, fruit and vegetable industry, native wildlife, private and public property, and food supplies.

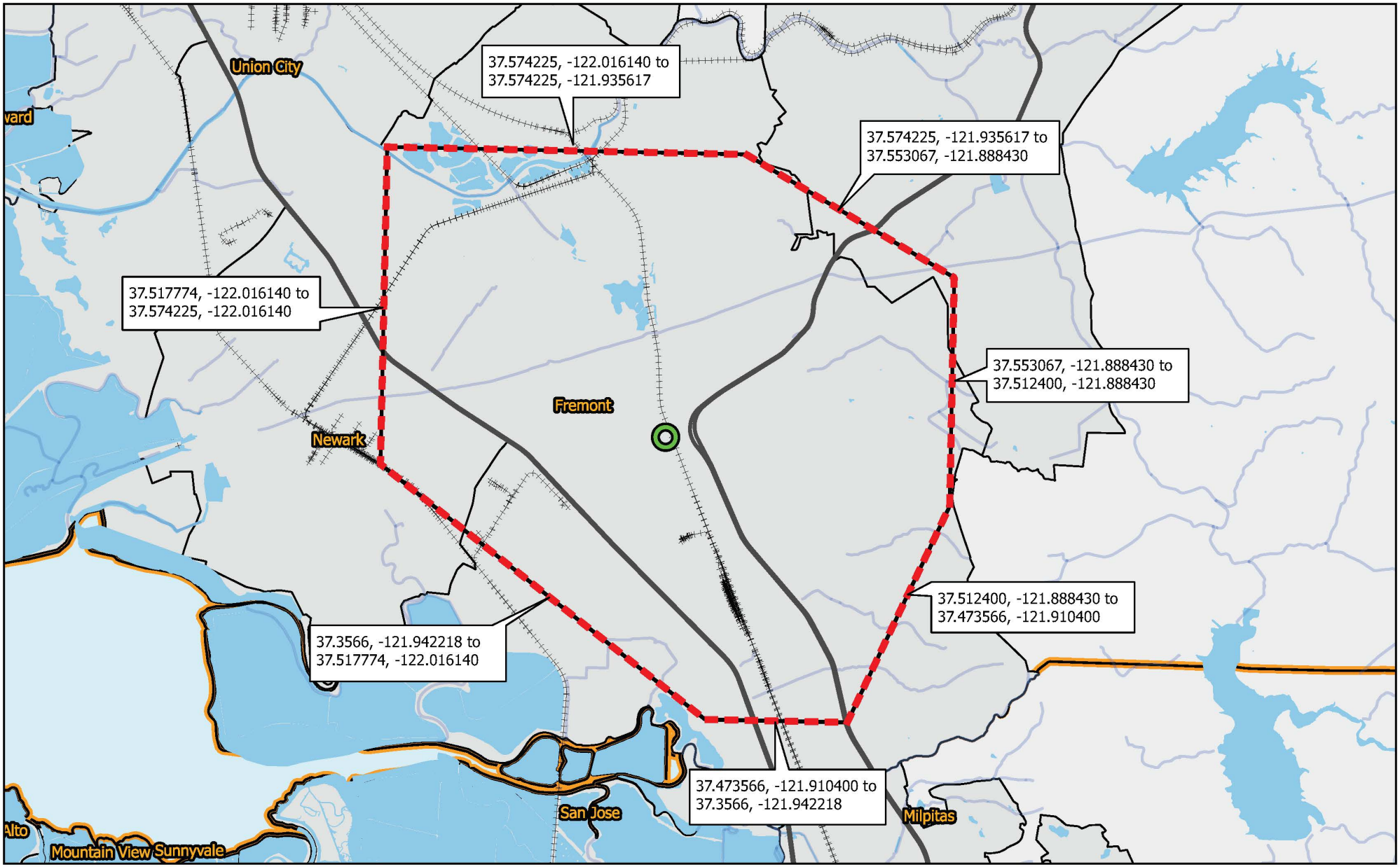
Therefore, I am invoking Public Resources Code Section 21080(b)(4) to carry out immediate emergency action to prevent this loss and damage.

My decision to adopt findings and take action is based on Sections 24.5, 401.5, 403, 407, 408, 5401-5405, and 5761-5764 of the FAC and the Title 3 California Code of Regulations section 3591.5.

Signature on File — 9/6/24

Karen Ross, Secretary — Date

Mediterranean Fruit Fly Eradication Project
Fremont, Alameda County
2024



ERADICATION PROJECT WORK PLAN FOR
MEDITERRANEAN FRUIT FLY

DETECTION

1. Detection Trapping

The California Department of Food and Agriculture (CDFA) maintains a cooperative State/County trapping program for various fruit flies to provide early detection of any infestation in the State. Traps are serviced by either County or State personnel and funded by the Department. The Mediterranean fruit fly (Medfly) program uses two types of traps: the cardboard Jackson sticky trap baited with the attractant trimedlure, and the McPhail trap, an invaginated glass flask baited with Torula yeast and borax in water. The Jackson trap is attractive to sexually maturing males, while the McPhail trap is attractive to both sexes of the fly. Traps are hung from branches of host trees at specified densities in susceptible areas of California. County or State employees inspect these traps weekly or bi-weekly throughout the year in southern California and from April or May through October or November in northern California.

2. Intensive Trapping

Intensive trapping is triggered after a single fly is detected. Following confirmation of the specimen, trap densities are increased over an 81-square mile area centered on the detection. Trap densities in the core square mile are increased to protocol levels within 24 hours, while trap placement in the remainder of the delimitation area will be completed from the core outward within 72 hours of the detection. Traps in the core are serviced daily for the first week. Traps in the first buffer zone are serviced every two days, and those in the remainder of the delimitation area are serviced at least once during the first week. After one week of negative finds, trap inspection frequency changes to weekly. Intensive trapping ends after the third complete life cycle following the last fly detected. This time period is determined by a temperature dependent developmental model run by Pest Detection/Emergency Projects Branch in Sacramento.

- Outside of a sterile release area: In the core square mile, 100 ChamP™ traps, baited with three trimedlure plugs each, and 25 Multilure® traps are placed. These Multilure® traps are in addition to the normal complement of detection McPhail traps already in place. In each of the surrounding eight square miles, 50ChamP™ traps are placed. In the remaining three one-mile deep buffers, Jackson traps are placed at densities of 25, 20, and 10 traps per square mile respectively, going outward.

- Within a preventive sterile release area: Multilure® traps baited with three-component lure are placed over a nine-square mile area around each detection site at a density of 20 per square mile in the core and first buffer, to form a 20-20 array. The McPhail traps deployed for general fruit fly detection are maintained at normal detection levels in the delimitation area. Existing trimedlure Jackson traps in this nine-square mile area are removed. Five Medfly Jackson traps are maintained in each square mile of the remaining delimitation area.

3. Post-Treatment Monitoring

The success of the eradication program is monitored by intensive trapping levels for three life cycles of the Medfly after the last fly has been detected. If no flies are caught during that time, trap densities return to detection levels.

4. **Larval Survey**

Fruit on a property where a fly has been trapped may be inspected for possible larval infestation. Small circular oviposition scars are occasionally visible indicating an infested fruit. Fruit on properties adjacent to a trap catch may also be inspected. If two or more flies are trapped close to each other, fruit cutting may be extended to all properties within a 200-meter radius of the finds, concentrating on preferred hosts.

TREATMENT

1. **Sterile Insect Technique**

The sterile insect technique (SIT) makes use of sterile male Medflies to prevent the production of viable offspring. The wild female Medflies mate with the sterile males and produce infertile eggs, thereby disrupting the breeding cycle and causing the population to be eliminated. SIT is most effective when used in conjunction with bait sprays to kill existing mated wild female Medflies and to reduce the overall wild adult population density. In order for the technique to succeed, a minimum over-flooding ratio of 100 to 1 should be maintained. The current release rate used is 250,000 males per square mile per week. Sterile flies are released by aircraft within a 1.5-3.5-mile radius around each detection site. Releases are repeated every three to four days for two life cycles of the fly (typically four to six months, dependent on temperature).

2. **Foliar Spray**

The foliage of host trees and shrubs within 200 meters of each detection site will be treated with an organic formulation of spinosad bait spray (GF-120 NF Naturalyte® Fruit Fly Bait) using hand spray or hydraulic spray equipment. Following treatment, completion notices are left with the homeowners detailing precautions to take and post-harvest intervals applicable to any fruit on the property. Treatments are repeated at seven to 14 day intervals for one life cycle of the fly (typically two to three months, dependent on temperature).

3. **Host Fruit Removal**

If evidence that a breeding population exists on a property (i.e., immature stages, mated female, or multiple adults are detected), host removal (fruit stripping) may be used in conjunction with the other treatment options. All host fruit will be removed from all properties within a 100-meter radius around the detection sites. The fruit is taken to a landfill for burial using regulatory compliance protocols. Fruit removal will occur once at the beginning of the project, but may be repeated if additional flies are detected.

SENSITIVE AREAS

The CDFA has consulted with the California Department of Fish and Wildlife's California Natural Diversity Database for threatened or endangered species, 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 for rare and endangered species 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.

PUBLIC NOTIFICATION

Residents of properties affected by foliar bait or fruit removal treatments shall be notified in writing at least 48 hours in advance of any treatment in accordance with the Food and Agricultural Code, Section 5771-5779 and 5421-5436. For SIT applications, notification is given to the general public via mass media outlets such as newspapers or press releases on CDFA's website at http://www.cdfa.ca.gov/plant/PDEP/treatment/medfly_treatment.html. For any questions related to this program, please contact the CDFA toll-free hotline at 800-491-1899 and staff will be able to assist with any questions related to the project. This telephone number is also listed on all treatment notices. Treatment information is posted on CDFA's website at http://www.cdfa.ca.gov/plant/PDEP/treatment/medfly_treatment.html.

Following foliar bait treatment, completion notices are left with residents detailing precautions to take and post-harvest intervals applicable to any fruit and vegetables on the property

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.

Information concerning the Medfly project will be conveyed directly to concerned local and State political representatives and authorities via letters, emails, and/or faxes.

INTEGRATED PEST MANAGEMENT ANALYSIS OF ALTERNATIVE TREATMENT METHODS TO ERADICATE MEDITERRANEAN FRUIT FLY
October 2016

The treatment program used by the California Department of Food and Agriculture (CDFA) for control of the Mediterranean fruit fly (Medfly), *Ceratitis capitata* (Diptera: Tephritidae), employs an area-wide sterile fly release technique, complemented with a targeted foliar bait spray treatment using an organic pesticide, and with fruit removal, as needed.

Below is an evaluation of alternatives treatment methods for Medfly which have been considered for eradication programs in California.

A. PHYSICAL CONTROL

Mass Trapping. This method involves placing a high density of traps baited with an attractive lure in an area in an attempt to physically remove the adults before they can reproduce. For Medfly, the available lures have a limited drawing range of a few yards, and mass trapping has not been shown to be effective at eradicating Medfly populations.

Physical Removal. Physical removal of one or more life stages of Medfly could reduce the population. Adults are mobile daytime fliers, and adults could be netted or collected off of plants. However, due to their ability to fly when disturbed, and the laborious and time prohibitive task of collecting flying insects from numerous properties by hand, it would be highly improbable that all of the adults could be captured and removed. Larvae live inside the fruit, so all potentially infested fruit in the entirety of the eradication area would have to be removed and disposed of in order to eliminate the larvae from the environment. Larvae drop from fruit and enter the soil for pupation, where they are impossible to detect, so soil would need to be removed from beneath trees as well. For these reasons, active removal is not considered to be an effective alternative.

Fruit Bagging. Fruit bagging involves individually enclosing each developing fruit in a bag which prevents fruit flies from laying eggs. In order to be effective, frequent monitoring of the bagged fruit is needed to identify and repair damage to the bags before female flies can enter and lay eggs. Fruit bagging is considered an economically inefficient option for area-wide treatment because it is so labor intensive. It is also intrusive to residents, who may oppose having their home grown produce confined inside bags. Additionally, this method may possibly promote the dispersal of female flies in search of egg laying sites, thus spreading the infestation if other treatments are not used outside the fruit bagging area. For these reasons, fruit bagging is not considered to be an effective alternative.

Host Fruit Removal. Removal of host fruits involves the physical removal of all suitable fruit from both the host plant and from the surrounding ground, in order to eliminate developing eggs and larvae. The fruit is collected and double-bagged before being buried in a landfill. CDFA's Medfly program performs host fruit removal within a minimum 100-meter radius of detection sites which are indicative of an active breeding area, such as those with immature stages, a mated female, or multiple adults, as a measure to reduce populations within that area and to prevent spread of flies. Fruit removal is not considered an economically efficient option for area-wide treatment because it is so labor intensive. It is also intrusive to residents, who may oppose losing their home grown produce. Additionally, this method may possibly promote the dispersal of female flies in search of egg laying sites, thus spreading the infestation if other

treatments are not used outside the fruit removal area. For these reasons, fruit removal is most useful as a complimentary treatment to one or more other treatments.

Host Plant Removal. Removal of host plants involves the large scale destruction of plants by either physical removal or phytotoxic herbicides. Host plant removal is not considered an economically efficient option for area-wide treatment because it is so labor intensive. It is intrusive to residents, who may oppose losing their plants. Additionally, this method may possibly promote the dispersal of female flies in search of egg laying sites, thus spreading the infestation if other treatments are not used outside the host plant removal area. And finally, because only the fruit becomes infested, there is no need to remove the entire plant during a temporary eradication project as long as the fruit can be removed.

B. CULTURAL CONTROL

Cultural Control. Cultural controls involve the manipulation of cultivation practices to reduce the prevalence of pest populations. These include crop rotation, early harvest (i.e., harvesting green fruit before it is suitable for oviposition), using pest-resistant varieties, and intercropping with pest-repellent plants. None of these options are applicable for Medfly eradications in an urban environment with multiple hosts, and may only serve to drive the flies outside the treatment area, thus spreading the infestation.

C. BIOLOGICAL CONTROL

Microorganisms. No single-celled microorganisms, such as bacteria, have been shown to be effective at controlling Medflies.

Nematodes. No nematodes have been shown to be effective at controlling Medflies.

Parasites and Predators. Parasites and predators are not considered an effective stand-alone eradication method because their success is density dependent; they are more effective against dense prey populations than against light populations, so their effectiveness decreases as the prey populations decline. Although several organisms, such as parasitic wasps, have been investigated as potential biological control agents against exotic fruit fly species, they have only been used in suppression programs and not in eradication programs. Since there is insufficient research documenting their efficacy in an eradication program, using these organisms could lead to the ineffectiveness of the program.

Sterile Insect Technique (SIT). The sterile insect technique (SIT) involves the production and release of reproductively sterile insects, with the goal of preventing reproduction in a pest population via the mating of the sterile insects with the existing field population. SIT is currently used in California's Medfly eradication programs as the overarching area-wide treatment, and has been used as an eradication tool in California since the first Medfly find in 1975. SIT works best when the ratio of sterile Medflies to non-sterile Medflies is high, on the order of 100 to 1. Therefore, SIT is most effective when used in combination with tactics which reduce the standing Medfly population, such as fruit removal targeting eggs and larvae and limited bait sprays targeting adults, especially already mated females. Combining SIT with these tactics has proven effective in preventing the permanent establishment of Medfly in California.

D. CHEMICAL CONTROL

Ground Applied Foliar Bait Treatment. Foliar bait treatments use an insecticide mixed with a food attractant in order to kill adults, particularly females which feed more than males. The bait makes the treatment selective for flies, and therefore biological control agents for other pests are not affected. The CDFA uses this treatment to decrease the population density and to target adult life stages which are not susceptible to SIT (e.g., already mated females) in order to contain the population while SIT drives the population to extinction. The foliage of host trees and shrubs within 200 meters of each detection site is treated with an organic formulation of spinosad bait spray (GF-120 NF Naturalyte® Fruit Fly Bait) using hand spray or hydraulic spray equipment. This treatment is repeated at seven to 14 day intervals for one life cycle beyond the last fly detected.

Aerial Applied Foliar Bait Treatment. Aerial application of insecticide and bait combinations have been used by the CDFA in the past for Medfly control, but have not been used since 1994 to 1995 due to the refinement and successful implementation of an integrated approach combining localized controls (limited bait sprays applied by ground-based applicators and host fruit removal) with the overarching area-wide control with sterile insect releases.

Foliar Cover Spray Treatment. Foliar cover spray treatments use a contact insecticide in order to kill adults. This treatment is non-selective and will affect any insects which come into contact with it, including biological control agents for other pests. In order to sufficiently cover an area, much more pesticide must be applied per area than with foliar bait sprays. For these reasons, cover sprays are not used for this program.

Soil Treatment. Contact insecticides drenched into the soil have been used against Medfly in the past. The goal is to directly kill larvae entering the soil to pupate, pupae in the soil, and adults emerging from pupae by drenching the soil surrounding host plants. The insecticide previously used for this purpose contains the organophosphate insecticide diazinon. However, this treatment has not been used since 2001 in California because of its environmental toxicity, difficulty in removing all obstructing ground clutter and debris, and a potential lack of effectiveness in the varied soil types found in urban environments.

PEST PROFILE

Common Name: Mediterranean Fruit Fly

Scientific Name: *Ceratitis capitata* (Wiedemann)

Order and Family: Diptera, Tephritidae

Description: The adult Mediterranean fruit fly (Medfly) is slightly smaller than a housefly with an average length of 3.5 to 5.0 millimeters. The top of the thorax is black with silver patches and the abdomen is yellowish with two white bands. The wings have brown, yellow, black, and white markings. The female has a pointed, slender ovipositor to deposit eggs beneath the skin of the host fruit. The egg is one millimeter in length, white, cylindrical, and about six times as long as wide. The larva is legless, creamy white in color, and may grow to a length of 10 millimeters. The pupa is encased in a dark brown cylindrical puparium.

History and Economic Importance: The Medfly is native to Africa, and has been accidentally introduced into southern Europe, western Australia, Central and South America, and Hawaii. The Medfly is known to attack over 250 types of fruits and vegetables. A great number of crops in California would be threatened by the introduction of this pest including apple, apricot, avocado, cherry, date, grape, grapefruit, nectarine, orange, peach, pepper, and tomato. Damage occurs when the female lays eggs in the fruit. These eggs hatch into larvae, which tunnel through the flesh of the fruit, making it unfit for consumption. The first California detection occurred in Los Angeles County in 1975, and since that time, additional re-introductions have been delimited and successfully eradicated.

Distribution: Medfly is originally from Africa, and has become established in southern Europe, western Australia, and Central and South America. Its distribution in the United States is restricted to the Hawaiian Islands where it was discovered in 1910.

Life Cycle: Females lay eggs in groups of one to six under the skin of host fruits, and each fly may lay as many as 1,200 eggs in her lifetime. The amount of time it takes for egg development depends on the ambient temperature. The larvae tunnel through the fruit, feeding on the pulp, shedding their skins twice, and emerge through exit holes in seven to 24 days. The mature larvae drop from the fruit and burrow beneath the soil to pupate. In eight to 46 days, the adults emerge from these puparia. The newly emerged females require four to 10 days to mature prior to egg-laying. Breeding is continuous, with several annual generations. The average life span of the adult is about 30 days. Under optimum conditions the entire life cycle may be completed in 30 days, but requires longer time intervals at lower temperatures.

Hosts and Damage: Medfly has been recorded infesting in excess of 250 different types of fruits and vegetables. Fruit that has been attacked may be unfit for consumption due to the larvae tunneling through the flesh as they feed. Decay-producing organisms then enter, leaving the interior of the fruit a rotten mass.

Partial Host List

Common Name	**Scientific Name**
Almond (with or in husk)	*Prunus dulcis* (= *P. amygdalus*)
Apple	*Malus sylvestris*
Apricot	*Prunus armeniaca*
Avocado	*Persea americana*
Black myrobalan	*Terminalia chebula*
Blueberry	*Vaccinium* spp.
Calamondin orange	*Citrus mitis*
Cherimoya	*Annona cherimola*
Cherry, sour	*Prunus cerasus*
Cherry, sweet	*Prunus avium*
Citron	*Citrus medica*
Date Palm	*Phoenix dactylifera*
Eggplant	*Solanum melongena*
Fig	*Ficus carica*
Grape	*Vitis vinifera*
Grapefruit	*Citrus paradisi*
Guava, common	*Psidium guajava*
Guava, strawberry	*Psidium cattleianum*
Kiwi	*Actinidia chinensis*
Kumquat	*Fortunella japonica*
Lemon	*Citrus limon*
Lemon, rough	*Citrus jambhiri*
Lime	*Citrus aurantiifolia*
Loquat	*Eriobotrya japonica*
Mandarin orange, tangerine	*Citrus reticulata*
Mango	*Mangifera indica*
Mock orange	*Murraya exotica*
Mountain apple	*Eugenia malaccense* (=*Syzygium malaccensis*)
Natal plum	*Carissa macrocarpa* (=*C. grandifolia*)
Nectarine	*Prunus persica* var. *nectarina*
Olive	*Olea europaea*
Orange, king	*Citrus reticulata* X *C. sinensis* (=*C. grandifolia*)
Orange, sour	*Citrus aurantium*
Orange, sweet	*Citrus sinensis*
Orange, Unshu	*Citrus reticulata* var. *unshu*
Papaya	*Carica papaya*
Peach	*Prunus persica*
Pear	*Pyrus communis*
Pepper	*Capsicum annum*
Pepper, tabasco	*Capsicum frutescens*
Persimmon, Japanese	*Diospyros khaki*
Plum, Japanese	*Prunus salicina*
Plum, prune	*Prunus domestica*
Plum, Native American	*Prunus americana*
Pomegranate	*Punica granatum*
Prickly pear cactus	*Opuntia* spp.
Pummelo	*Citrus grandis*

Quince	*Cydonia oblonga*
Rose apple	*Eugenia jambos* (=*Syzygium jambos*)
Spanish cherry, Brazilian plum	*Eugenia brasiliensis* (=*E. dombeyi*)
Surinam cherry	*Eugenia uniflora*
Tomato (pink and red ripe)	*Lycopersicon esculentum*
Walnut, butternut (with or in husk)	*Juglans* spp.
White sapote	*Casimiroa edulis*
Yellow oleander, bestill	*Thevetia peruviana*