

CALIFORNIA PLANT PEST and DISEASE REPORT



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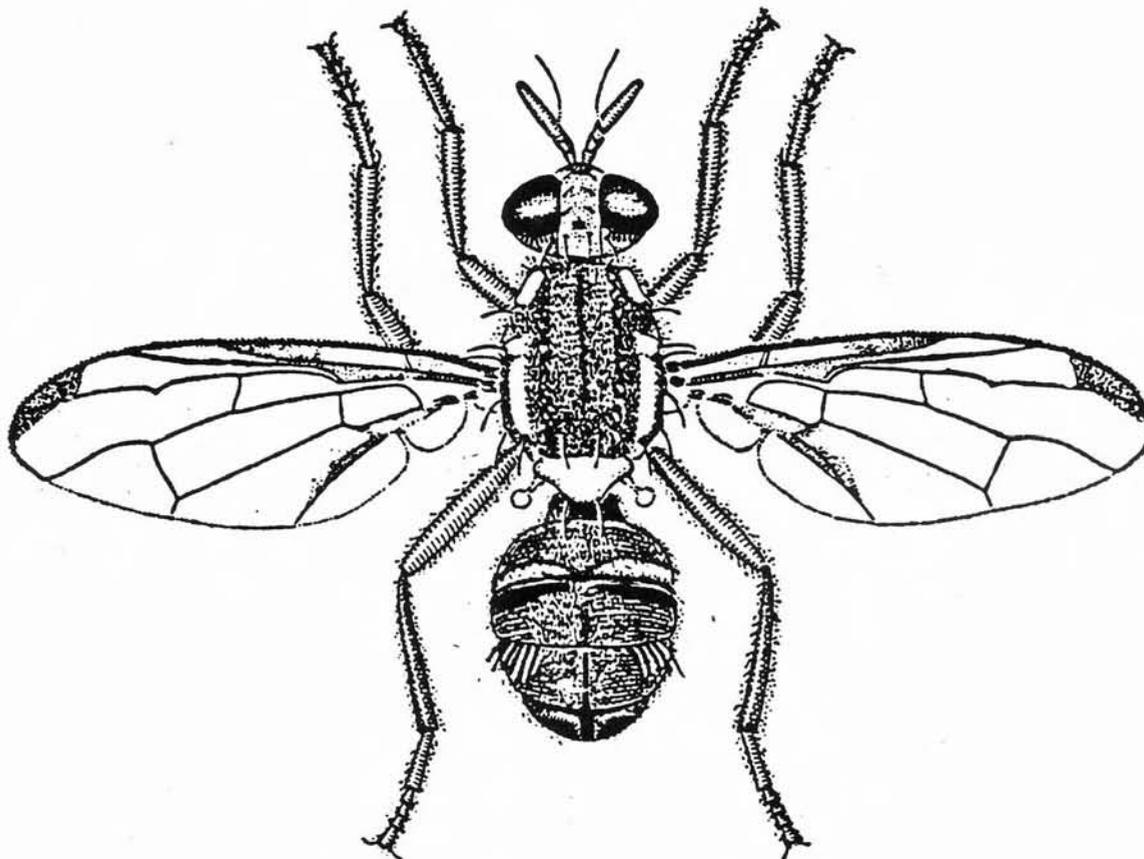
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The PEACH FRUIT FLY, *Dacus zonatus*
(see article on pages 162 to 163)

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California Plant Pest and Disease Report

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ENTOMOLOGY HIGHLIGHTS

NAME CHANGES

The Entomological Society of America (ESA) has made one addition to the list of Common Names of Related Organisms for California Insects. The following common name was adopted by the Society:

carob moth
Ectomyelois ceratoniae (Zoner)
Lepidoptera: Pyralidae

RATING CHANGES

The pest rating for woolly whitefly, *Aleurothrixus floccosus*, has been changed from "A" to "B". This change was recommended by the Woolly Whitefly Subcommittee of the Pest Prevention Committee, which is affiliated with the California Agricultural Commissioners and Sealers Association. This recommendation was accepted by Division Management.

SIGNIFICANT FINDS

MEDITERRANEAN FRUIT FLY, *Ceratitis capitata*, -(A)- The 1990 collections of this exotic pest has increased by four since the last issue of CPPDR.

On September 24, Santa Clara County trapper Burkman found one female Medfly in Los Altos. It was recovered from a Jackson trap placed in an apple tree.

On October 1, CDFA Inspector Joe Moreno detected an unmated female Medfly in a Jackson trap that was placed in a sapote on Parkhaven Way in Riverside.

There were two Medflies found on November 15 in San Bernardino County. County trapper Walker found a single female in a Jackson trap located in a lemon tree in Upland. County trapper Kendall found another single female in a Jackson trap placed in an orange tree in Rancho Cucamonga.

In response to these new Medfly finds, CDFA has increased the trap densities, as needed, to protocol levels.

ORIENTAL FRUIT FLY, *Dacus dorsalis*, -(A)- There were nine Oriental fruit fly finds during October through December 1990.

Orange County Department of Agriculture technician Jeff Croy found a male Oriental fruit fly while inspecting a Jackson/methyl eugenol trap on October 3 in Tustin. The trap was placed in an orange tree along Yorba Street.

On October 10, Los Angeles County Department of Agriculture trapper Rogelio Carranza detected a male Oriental fruit fly in West Hollywood. It was found in a Jackson/methyl eugenol trap placed in a fig tree along North Huntley Drive.

CDFA inspector Desiree Hogervorst detected a male Oriental fruit fly on October 11 in Lakeside, San Diego County. It was found in a Jackson/methyl eugenol trap that was placed in an orange tree on Winter Gardens Drive. CDFA Insect Biosystematist Eric Fisher made the determination.

On October 12, two male Oriental fruit flies were found in West Hollywood in a Jackson/methyl eugenol trap placed in a grapefruit tree on North Croft Avenue. CDFA inspector R.A. Lilis inspected the trap in which the flies were found. On October 13, CDFA initiated Oriental fruit fly male annihilation treatments in a nine-square-mile area around the finds.

On October 24, a male Oriental fruit fly was trapped in Boyle Heights, Los Angeles County. It was found in a Jackson/methyl eugenol trap that was placed in a persimmon tree on Chicago Street. Los Angeles County Department of Agriculture trapper Jesus Lopez is credited with this find.

On October 29, a single male Oriental fruit fly was detected in Bonsall by San Diego County trapper Coyne. It was found in a Jackson trap on a citrus tree.

On November 1, an Oriental fruit fly was found in Costa Mesa, Orange County by agricultural inspector Trung Do.

On November 5, Los Angeles County Department of Agriculture trapper Rogelio Carranza inspected a McPhail trap that contained an unmated female Oriental fruit fly. The trap was placed in a fig tree along Spaulding Avenue in West Hollywood, Los Angeles County.

Carranza detected another unmated female Oriental fruit fly in West Hollywood on November 13. It was found in a McPhail trap that was placed in a grapefruit tree along Sweetzer Avenue.

On December 7, CDFA inspector Justin Feucht detected a male Oriental fruit fly inside of a Jackson/methyl eugenol trap in Irvine. The trap was placed in an apple tree along Loma Street.

In response to these finds, CDFA has increased the McPhail and Jackson/methyl eugenol trap densities to meet the necessary protocol level.

PEACH FRUIT FLY, *Dacus zonatus*, -(A)- The first 1990 California find for this fruit fly menace was located in Hollywood, Los Angeles County on August 31. For more information about past finds, see CPPDR [9(3-4):130].

Since then, 23 peach fruit flies were found during October through December 1990. All of the finds occurred in Fountain Valley, Orange County. The data for these finds are listed on page 163.

Peach Fruit Fly, *Dacus zonatus*, (A)- 1990 Collections

County	City	Date	#M/F	Trap/Stage	Host	Collectors
Orange	Fountain Valley	10/25/90	1/0	Jackson	orange	Zakowicz
Orange	Fountain Valley	10/25/90	3/0	Jackson	-	Zakowicz
Orange	Fountain Valley	10/25/90	1/0	Jackson	avocado	Zakowicz
Orange	Fountain Valley	10/26/90	1/0	Jackson	guava	Zakowicz
Orange	Fountain Valley	10/27/90	2/0	Jackson	apple	Stoffaire
Orange	Fountain Valley	10/30/90	1/0	Jackson	guava	Opgenorth
Orange	Fountain Valley	10/31/90	1/0	Jackson	guava	Opgenorth
Orange	Fountain Valley	11/02/90	1/0	Jackson	guava	Opgenorth
Orange	Fountain Valley	11/03/90	0/1	McPhail	guava	Stoffaire
Orange	Fountain Valley	11/03/90	1/0	Jackson	guava	Stoffaire
Orange	Fountain Valley	11/04/90	1/0	Jackson	guava	Sabak
Orange	Fountain Valley	11/04/90	0/2	Jackson	guava	Sabak
Orange	Fountain Valley	11/04/90	1/0	Jackson	sapote	Sabak
Orange	Fountain Valley	11/04/90	1/0	Jackson	guava	Sabak
Orange	Fountain Valley	11/05/90	0/1	Jackson	guava	Scoffavar
Orange	Fountain Valley	11/06/90	1/0	Jackson	guava	Sabak
Orange	Fountain Valley	11/07/90	0/1	Jackson	loquat	Sabak
Orange	Fountain Valley	11/12/90	0/1	McPhail	guava	Stoffaire
Orange	Fountain Valley	11/12/90	0/1	Jackson	guava	Stoffaire

A TEPHRITID FRUIT FLY, *Dacus scutellatus*, -(A)- On November 30, 1990, a single male *D. scutellatus* was found in a maintenance hangar at the Los Angeles International Airport.

The last find of this exotic fruit fly occurred on April 1, 1987, in which one specimen was trapped in a Jackson/cue-lure trap at a residence on Via Canada in Rancho Palos Verdes. Los Angeles County trapper Robert Inocencio was credited with this 1987 find. For more information about this 1987 find, see CPPDR [6(1-2):3-4].

Little scientific information about this fruit fly is available. It has been found in China, Taiwan, India, Japan, and Okinawa. Apparently, the fly breeds in wild snake gourd, *Trichosanthes cucumeroides*. It is common in citrus groves but it has never been found to feed on the fruit. It is generally considered a minor species where it occurs.

MEXICAN FRUIT FLY, *Anastrepha ludens*, -(A)- There have been eight collections of this fruit fly in Southern California and one collection in Northern California during October through December 1990. The following reports provide information about the finds:

On October 8, San Diego County Department of Agriculture technician James Baldas Rodriguez found an unmated female Mexican fruit fly in a McPhail trap placed in an orange tree along 52nd Street, San Diego.

On October 15, an unmated female Mexican fruit fly was detected in a McPhail trap placed in an orange tree along Berendo Avenue in the Athens area of Los Angeles. CDFa inspector Rhab Boughn is credited with the find.

On October 19, two Mexican fruit flies were found in San Diego County:

County technician James Baldas Rodriguez inspected a McPhail trap which contained a male Mexican fruit fly in the city of San Diego. The trap was placed in an orange tree along Adams Avenue.

A sexually mature male Mexican fruit fly was found in Chula Vista by CDFa inspector Carlos Lopez. It was found in a McPhail trap placed on a lemon tree along Neptune Court.

On October 22, Rodriguez inspected a McPhail trap that contained a sexually mature male Mexican fruit fly. The trap was placed in a lemon tree on Mary Lou Street, San Diego.

A sexually mature male Mexican fruit fly was found in Redwood City, San Mateo County, on October 25. This northern California find is unusual because this exotic pest has been trapped primarily in Southern California. County Department of Agriculture Pest Detection Specialist John Perry found it in a McPhail trap placed in an orange tree along 15th Avenue.

The McPhail trap density in the area was five traps per square mile. In response to the find, the McPhail trap densities will be increased as needed to protocol levels in an 81-square mile area around the find. The intensive trapping area crosses into Santa Clara County. Both the San Mateo and Santa Clara County Departments of Agriculture will be deploying the traps.

A sexually mature male Mexican fruit fly was trapped on October 31. It was found by CDFA inspector Michael Matarazzo in a McPhail trap that had been placed in a tangerine tree along Hill Street in San Ysidro, San Diego County.

On November 6, two male Mexican fruit flies were found in San Diego County near the Mexico/California border:

CDFA trapper Marco Amaro found an unmated female Mexican fruit fly trapped along Willow Road near the Mexican/California border. It was found in a McPhail trap that was placed in a lemon tree.

A male Mexican fruit fly was trapped along Elm Avenue also near the Mexican/California border. It was found in a McPhail trap that was placed in a sapote. CDFA inspector Michael Matarazzo inspected the trap.

In response to these new Mexican fruit fly finds, CDFA is increasing the McPhail trap density, as needed, to meet the protocol.

VARROA MITE, *Varroa jacobsoni*, -(A)- There were 10 finds for this honey bee pest during October through November 1990. Five of these finds occurred in Merced County, one in Stanislaus County, three in San Bernardino County, and one in Riverside County. The following report gives the data for these finds:

On October 3, Agricultural Biologist Clifton Piper detected Varroa mites in an apiary located in Merced County.

On October 16, county trapper Michaelis found Varroa mite in Stevinson, Merced County.

On October 23, county trapper Michaelis found Varroa mite in an apiary located in Delhi, Merced County.

On November 2, Agricultural Biologist Isola found adult Varroa mite in an apiary located in Gustine, Merced County.

On November 20, county trapper Michaelis found adult Varroa mite in an apiary in Modesto, Stanislaus County.

On November 26, Agricultural Biologists David Isola and Larry Lima found adult Varroa mite in an apiary located in Los Banos, Merced County.

On December 3, Agricultural Biologist Allan Smith found three mites in an apiary located on Nevada Street and Beaumont Avenue in Redlands, San Bernardino County.

On December 13, Agricultural Biologist Thomas Vizthum found adult Varroa mite in an apiary located in Riverside.

APPLE MAGGOT, *Rhagoletis pomonella*, -(A)- There were three more finds for this pest during September 1990 that were not listed on the chart for the 1990 apple maggot collections in the last issue of CPPDR [9(3-4):133].

On September 6, Humboldt County Agricultural Inspector Richard Spadoni found four larvae on *Malus* sp. in Hoopa.

On September 11, Spadoni found apple maggot in two Humboldt County towns. Apple maggot was found in Hoopa on *Malus* sp. and also in Willow Creek on apple.

WESTERN CHERRY FRUIT FLY, *Rhagoletis indifferens*, -(A)- Two finds of this fly have been made this year.

On September 18, Placer County trapper Henderson collected this pest in Whitmore. It was found on apple.

On October 2, San Joaquin County trapper Andorf found a single male apple maggot in Lodi. It was in an apple maggot trap placed in a fig tree.

BLACK CHERRY FRUIT FLY, *Rhagoletis fausta*, -(A)- There were four black cherry fruit flies found at the end of September 1990 in Lake Pillsbury/Soda Creek area of Mendocino County.

On September 27, Mendocino County Agricultural Inspector Jim Xerogeanes collected three females and one male. They were captured in an all purpose trap placed on a cherry tree.

NEW COUNTY RECORDS

ASH WHITEFLY, *Siphoninus phillyreae*, -(C)- Populations of this serious pest have been reported in 12 new counties in California during October through December 1990. The new county records include:

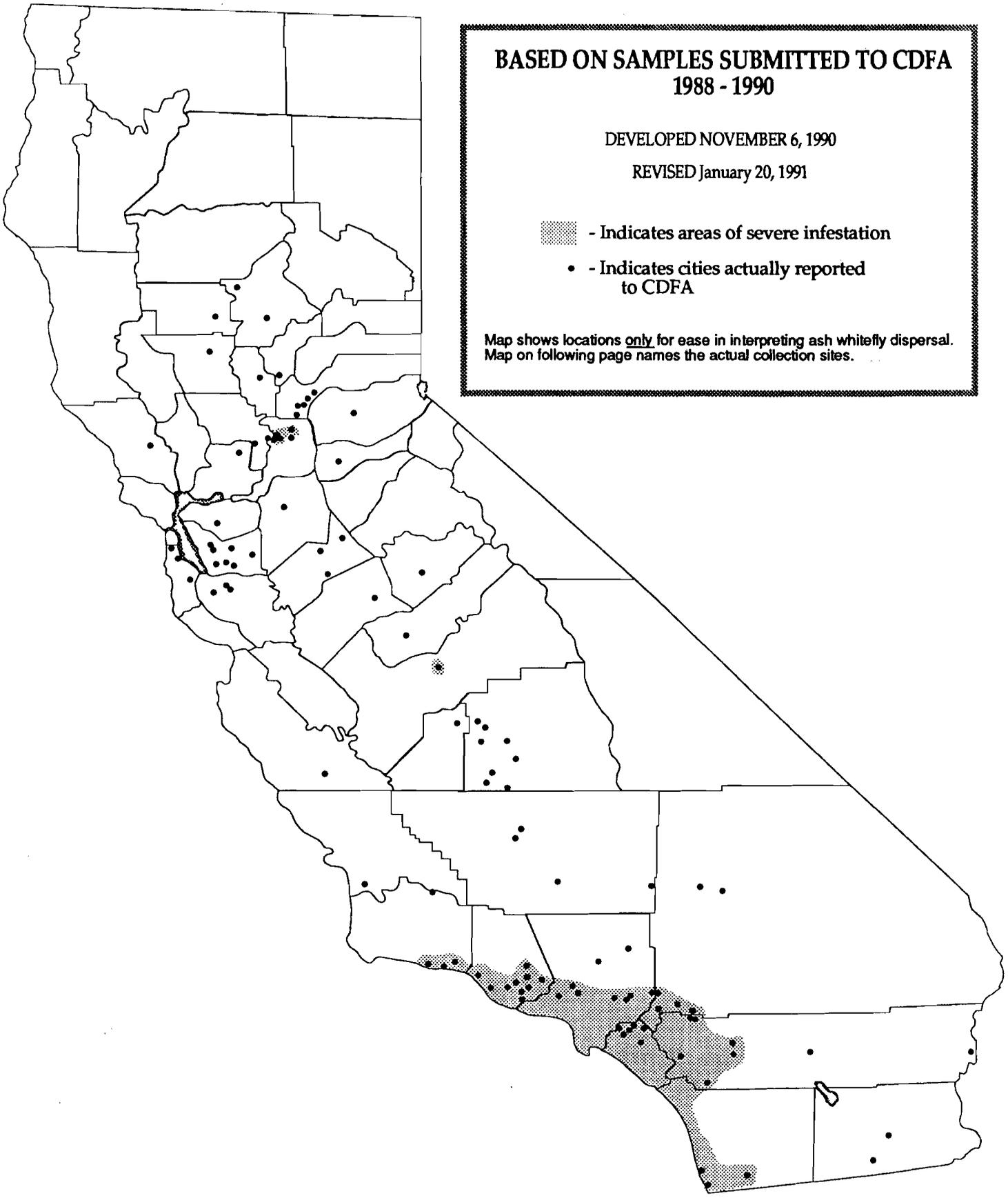
<u>County</u>	<u>City</u>	<u>Date</u>	<u>Host</u>	<u>Collector</u>
Kings	Hanford	10/4/90	Ornamental	P.L. Bookout
Colusa	Maxwell	10/11/90	Pear	S. MacPherson
Placer	Roseville	10/18/90	Ash	B. Villegas
Placer	Auburn	10/23/90	Modesto Ash	J. Wilson
Glenn	Willows	10/30/90	Pomegranate	B. Villegas
Sonoma	Santa Rosa	11/1/90	Raywood Ash	B. Hagen
Sutter	Yuba City	11/5/90	Raywood Ash	D. Doolittle/D. Wilson
Mariposa	Mariposa	11/6/90	Pomo	Fisher
Monterey	Bradley	11/15/90	Ash	B. Oliver
Amador	Sutter Creek	11/19/90	Pear/Apple	-
Yuba	Marysville	11/20/90	Grapefruit	E. Storm
Butte	Oroville	12/6/90	Ash & Bradford Pear	H. Riley/Brown

A distribution map for infested counties in California can be found on page 167. A spot distribution map for ash whitefly can be found on page 168. A map showing actual location sites can be found on page 169.

General Distribution of Ash Whitefly in California



CALIFORNIA LOCATIONS OF ASH WHITEFLY



**BASED ON SAMPLES SUBMITTED TO CDFA
1988 - 1990**

DEVELOPED NOVEMBER 6, 1990
REVISED January 20, 1991

■ - Indicates areas of severe infestation
• - Indicates cities actually reported to CDFA

Map shows locations only for ease in interpreting ash whitefly dispersal. Map on following page names the actual collection sites.

The severe cold snap that hit most of California in mid-December has had a deleterious effect on the overwintering ash whitefly populations, at least in northern California. Large populations had been congregating and laying eggs on citrus. Large numbers of these adults and eggs were frozen along with the citrus leaves. Unfortunately, many adults have managed to survive in protected locations on hosts that were not seriously burned by the cold snap. Biological control specialists hope that the reduced populations will aid in a quick start for the parasites of the whitefly when releases are made this spring.

PINK BOLLWORM, *Pectinophora gossypiella*, -(A)- The season's final total for native pink bollworm moths in San Joaquin Valley is 3,239. This total surpasses the number of moths trapped during the last two years. In 1989 and 1988, there were 166 and 891 trapped moths respectively. County totals for 1988 through 1990 are as follows:

<u>County</u>	<u>1990</u>	<u>1989</u>	<u>1988</u>
Kern	1,588	122	265
Tulare	1,459	10	255
Fresno	108	20	70
Kings	59	10	282
Merced	18	2	10
Madera	7	2	9

SIGNIFICANT FINDS IN OTHER STATES AND COUNTRIES

A TINEID MOTH, *Opogona sacchari*--In August 1990, *Opogona sacchari* (Bojer) was found in Hawaii for the first time. Through the USDA, ARS, Systematic Entomology Laboratory, Dr. D.R. Davis of the Smithsonian Institution made the determinations for this find.

Opogona and related tineids are typically known as detritus feeders and scavengers and are not regarded as very important pests. But the moth can cause extensive damage because the moth first attacks damaged or decaying plant tissues, but often feeds on nearby living tissue.

CHERRY BARK TORTRIX, *Enarmonia formosana* Scopoli--A new lepidopterous pest of deciduous fruit trees has been discovered in Canada. The following by Canadians D.C. Milne, B. Blangez, Y. Singh, and A. Lam reports the find:

The Cherry Bark Tortrix (*Enarmonia formosana*), a xylophagous pest of rosaceous trees, originally from Europe and with a preference for *Prunus* sp., has now been positively confirmed from at least nine different sites in British Columbia's Fraser Valley, indicating a general distribution in that area.

Although positively identified by our (Plant Health Directorate) Diagnostic Laboratory as well as by Biosystematic Research Centre's Tortricid specialist (Agriculture Canada) this spring, observations lead us to believe the pest has been in the area for some years, and due to the nature of its distribution, we are quite convinced that it is present in northern Washington State as well. Our only surprise is the

apparent lack of impact the pest is having on the trees, and we hope to have a more clear understanding of the situation once our assessment is finalized this fall.

Cherry Bark Tortrix was found in Fraser Valley, British Columbia (Canada) at the following residential sites: Richmond, Vancouver, North Delta, Tsawwassen, Burnaby, North Vancouver (two sites), West Vancouver, Surrey (exactly at the border), Chilliwack. The detections were reported between May 1, 1990 and June 19, 1990. All pests detected were in the adult stage.

More information about this pest follows:

DAMAGE: This tortricid is xylophagous, feeding primarily on wood of perfectly healthy fruit trees and, if given the opportunity to develop for several years consecutively, it can be particularly damaging on older trees. Infestations always progress upward on the tree, the larvae consuming any suitable vegetable tissue. On healed-over areas, larvae adjust the lay-out of their tunnels (the sides of which are stained reddish brown and lined with frass) to follow the edge of the wound. Damaged areas rapidly scar over but the larval galleries cause death of affected areas of bark and the formation of a dead layer of underlying wood. Larvae burrow deep into the sapwood, eventually causing death of large areas of bark and branch die-back. Fruit trees typically react by exuding gum, particularly cherry, plum, apricot, almond and peach, less so on apple.

IDENTIFICATION:

EGG: Lenticular, milky white at oviposition, turning bright red in two or three days, a semi-circle of color remaining two to four days later.

LARVA: Eight to 11 millimeters in length, flesh-colored salmon pink with scattered small pale gray spinules.

PUPA: Seven to nine millimeters in length, light brown in color in a dense silken cocoon with compressed particles on the surface.

ADULT: Wings 15 to 18 millimeters across, easily recognized by coloration and a very characteristic pattern of yellow-orange transverse striate lines on the dark brown forewings. At their extremity, the costal margin has five white comma-like spots, beneath which a narrow lead-colored band extends from the middle of the edge and terminates at the apex. The speculum encloses three to four black dashes and is broadly edged in shiny lead-gray with a yellowish orange outer border. The hindwings are dark brown with a light-colored fringe.

BIOLOGY: This species, spread over most of Europe including Siberia, and exclusively wood eating (xylophagous), is dependent upon fruit trees with a marked preference for species of *Prunus*.

- Moths arise from overwintering larvae and appear any time after the end of April or the beginning of May. The flight period lasts a very long time, being spread over three or four months and finishing sometime during August.

- Egg-laying begins around the fourth to sixth day after moth emergence, the number varying from 40 to 60 per female.

- Eggs are laid singly or in groups of two to three on smooth areas of bark.

- Larvae live in sapwood and under the bark, showing a preference mainly for swollen scar tissue. First-

instar larvae tunnel in all directions but only in the outer sapwood, whereas later larvae (instars two to five) use the entire distance between the bark and the cambium, but do not attack the wood.

-There is no diapause. Overwintering is a larval hibernation, initiated when the minimum temperature reaches zero degrees Celsius and lasting about five months, activity resuming in March.

-At maturity, the larva tunnels toward the bark surface. There it spins a silken cocoon in which to pupate, located behind the hole through which it eliminated its last excrement.

-The adult emerges from the pupa in about 15 days.

-This species has only one generation annually.

SURVEY: External signs of larval presence include gum flowing from tunnels and excrement enclosed in silk-lined sacs, the outer walls of which contain frass particles. The larva prefers to live in a cavity with galleries leading in various directions. The presence of one or more larvae is indicated by superficial swellings, especially on older trees but not confined to them. Larvae can be found at graft unions, in crotches, on the trunk and also in wounds. Swollen pruning wounds and enlarged grafting sites are among the most important locations to look for larvae.

Adults can be trapped during detection surveys for Oriental fruit moth from the beginning of May until the end of the summer, using the Zoecon Pherocon 1-C trap or the Consap Biolure trap.

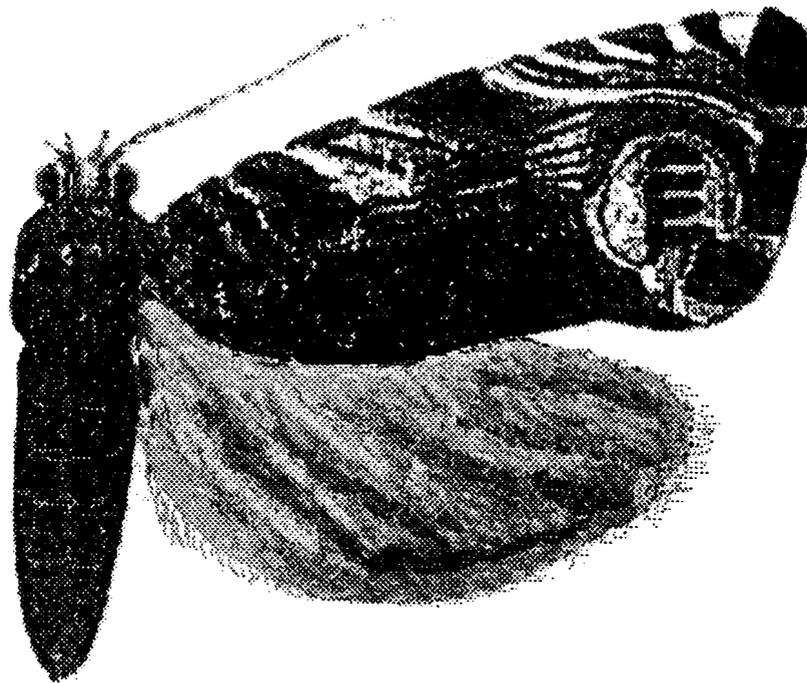


Fig. 1: Cherry Bark Tortrix, *Enarmonia formosana* adult. A recognition character is the "E"-shaped mark on the forewing.

AFRICANIZED HONEY BEE, *Apis mellifera scutellata* hybrids, -(A)- Twelve samples from bee colonies near San Fernando, Tamaulipas, Mexico, were confirmed as Africanized by the Agricultural Research Service Laboratory in Beltsville, Maryland. The swarms were collected in areas about 80 miles southwest of Brownsville, Texas. Another swarm which was trapped near Nuevo Progreso, Mexico, was confirmed as Africanized honey bee at the Beltsville laboratory. This find is approximately two miles south of the Progreso, Texas border crossing. Swarm trap lines along the border adjacent to the finds have been enhanced. There are now 477 swarm traps operated by Plant Pest Quarantine in south Texas.

The bee industry says infiltration by Africanized bees has cut honey production in Central and South America by 60 to 70 percent. Africanized bees could also devastate farmers in the United States who depend on honey bees to pollinate \$9 billion in fruit and vegetable crops.

PLANT PATHOLOGY HIGHLIGHTS

WILD RICE SMUT, *Ustilago esculenta*--On November 5, 1990, an infestation of wild rice smut (*Ustilago esculenta*) was confirmed near Modesto (Stanislaus County), California. The infestation was discovered in a one eighth acre stand of Manchurian wild rice (*Zizania latifolia*) being grown for use as the vegetable "gau sun." The gall formed by the fungus on the basal part of the stem just above the crown is used for food (see opposite figure). Manchurian wild rice is related to several species of *Zizania* that are native to the United States and which are the source of the wild rice sold commercially. Wild rice species are not closely related to the rice plant (*Oryza sativa*). For this reason, the pathogen presents absolutely no danger to the United States rice crop. Reports in the literature that this disease can affect United States *Zizania* species are questionable since there appears to have been some confusion concerning the taxonomy of the wild rice species being tested.

Action has been taken by the State of California to prevent plant material from being moved from the infested site. Steps are now being taken to destroy all of the plants present in the infested field and to conduct delimiting surveys of nearby wild rice fields. The closest wild rice field that has been found is more than seven miles away, making it unlikely that the disease would have been spread beyond the infested site by natural means. An investigation is now underway to determine the source of the infested plants and to determine if infested plants might have been moved to other locations.

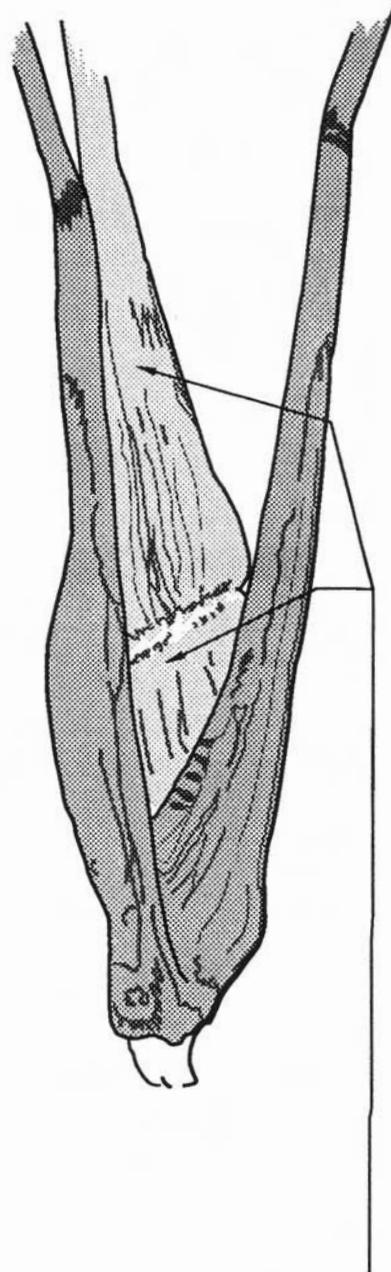


Fig. 2: Symptoms of wild rice smut, *Ustilago esculenta*. Note the characteristic swelling of the central stem just above the crown. The swollen gall is edible. Electronically redrawn from a photograph by Tim Tidwell, CDFA.

SIGNIFICANT FINDS IN OTHER STATES

CHRYSANTHEMUM WHITE RUST, *Puccinia horiana*--An infestation of this chrysanthemum disease has been confirmed on plant material in Portland, Oregon. On October 12, Bob Obermire from the Oregon Department of Agriculture found chrysanthemum white rust at a hobbyist location in Portland.

The first finds of this disease in the Western United States occurred earlier in October, in Clark County, Washington (see [CPPDR 9(3-4):158]). These diseased plants were found growing outdoors at the home of a chrysanthemum hobbyist.

Surveys for this disease have been done in both areas. Apparently, only non-commercial plantings were affected. Commercial plantings have all been negative for the pest.

The Oregon Department of Agriculture has provided the following information on this plant disease:

Hosts: Twelve species of chrysanthemum have been reported as hosts including the Florists chrysanthemum, the nippon daisy and the high daisy. Species that have not developed symptoms when inoculated include the annual and tansy chrysanthemum, the crown, pyrethrum, marguerite, oxy-eye and shasta daisies, the dalmatian pyrethrum, and the corn marigold.

Symptoms: Symptoms on the upper leaf surface first appear as pale, greenish yellow spots; the centers of the spots turn brown and necrotic with age. On the lower surface of the leaf, prominent, pinkish buff pustules develop. They later turn waxy white, hence, the name white rust. Conditions favorable for the development of this disease are high humidity and a film of moisture on the foliage. The spores are easily killed by drying; even by one hour at 90 percent relative humidity or less. The optimum temperature for disease development is between 50-77 degrees Fahrenheit (10-25 degrees

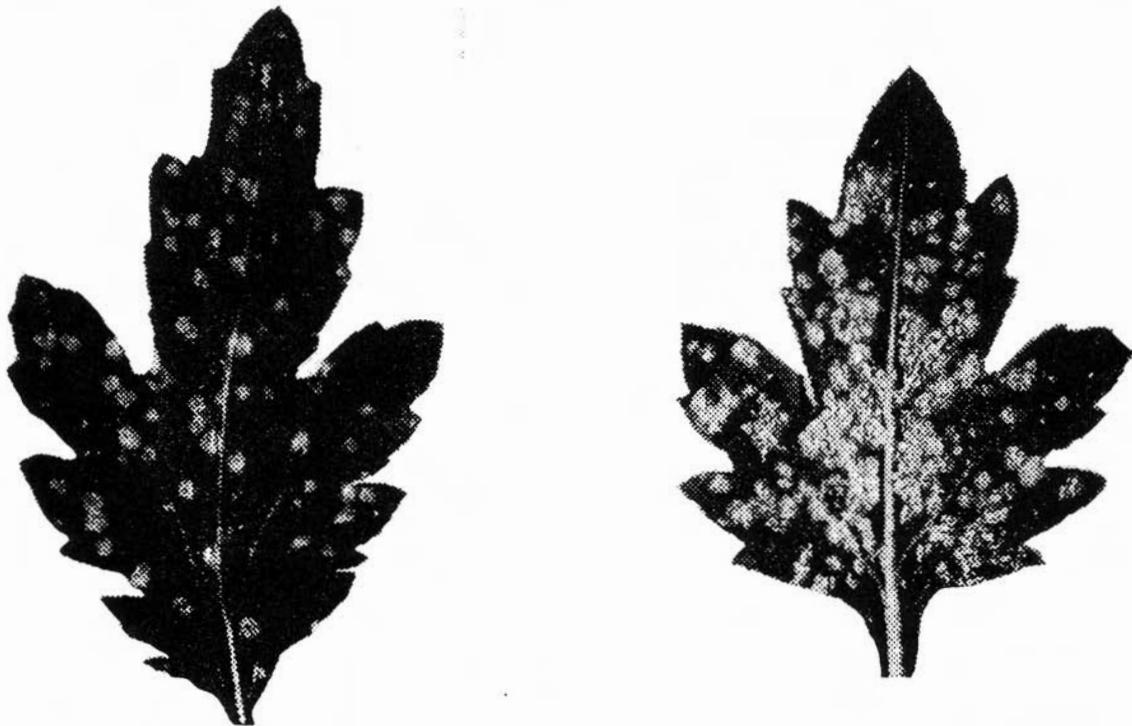


Fig. 3: Chrysanthemum white rust. Left: symptoms on upper leaf surface. Right: symptoms on lower leaf surface. Illustrations electrically redrawn from photographs by Dr. Spence Davis, Extension Pathologist, New Jersey.

Disease Movement: The disease is moved from infected stock to healthy plants primarily by splashing. Free water seems to be necessary for spore germination and under optimum temperatures, five hours are sufficient to establish a new infection. Under very humid conditions, the spores may be dispersed up to one quarter mile by the wind. Infectious stages may also be moved on soil, litter, dead leaves, garden equipment, clothes, and shoes.

Control: The spread of the disease has been checked primarily by exclusion (quarantines). When the disease has entered the United States, sanitation, cultural practices, and fungicides have been employed to eradicate the disease. Since the fungus can live up to eight weeks on litter and dead leaves, the elimination of susceptible tissue for longer periods will break the disease cycle. Hot water treatments of infected rootstocks have also been shown to eliminate the disease (5 minutes at 115 degrees Fahrenheit). Management of water and humidity can result in fewer infections.

The complete eradication of this dangerous plant disease from Oregon is extremely important. The Oregon Department of Agriculture will be cooperating with the USDA- APHIS- PPQ to contain and eradicate the white rust of chrysanthemum from Oregon.

A similar disease to chrysanthemum white rust occurs in California called chrysanthemum rust. A report by T.E. Tidwell and K.L. Kosta on chrysanthemum rust appeared in CPPDR 2[2]:43.

Symptoms for chrysanthemum rust begin as chlorotic flecks on upper and lower leaf surfaces, followed by the formation of dark, powdery pustules (uredia). Plants infected with chrysanthemum rust have chocolate brown pustules on both upper and lower surfaces of leaves but predominantly on the underside; whereas, plants infected with chrysanthemum white rust show whitish pustules on the lower surface of leaves.

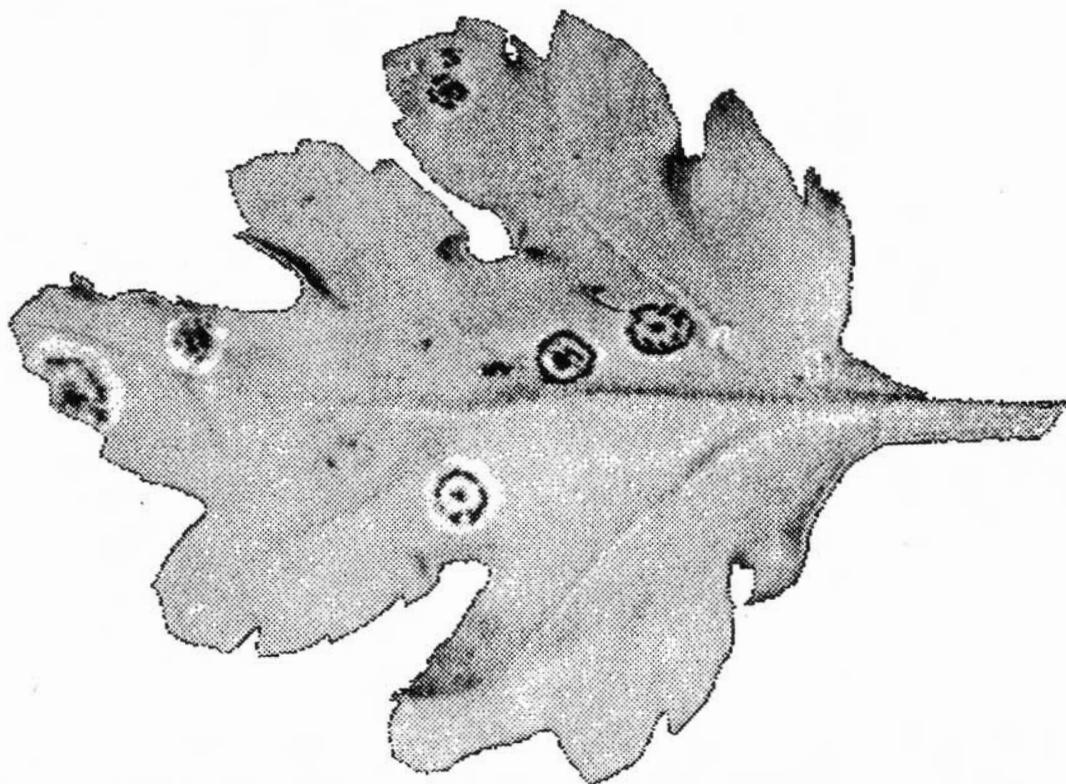


Fig. 4: Chrysanthemum rust symptoms showing characteristic target-shaped pustules on lower leaf surface. Electronically redrawn from a photo by Tim Tidwell, CDFA.

CITRUS CANCKER, *Xanthomonas campestris* pv. *citri*--On October 22, confirmatory tests were completed for what was believed to be a new infestation of the A-strain of citrus canker at the Smoak Pumphouse grove near Lake Placid (Highlands County), Florida (see [CPPDR 9(3-4): 157]). Independent confirmation was provided by laboratories of the State of Florida Division of Plant Industry in Gainesville, Florida, and the USDA Agricultural Research Service in Beltsville, Maryland. Both laboratories identified the pathogen as the A-strain of *Xanthomonas campestris* pv. *citri*, the organism known to cause citrus canker disease. An emergency action order has been issued to prevent any movement of plants or equipment from the entire 400-acre Pumphouse grove. Since the grove is only one and one half years old, no fruit is present.

State employees and APHIS inspectors are continuing to conduct delimiting surveys of other groves in the vicinity of the infested grove. Detection are also being conducted at properties that may have been exposed through association with the infested grove. Fruit harvesting has been suspended in all groves included in the delimiting and detection surveys. Harvesting and movement of fruit will not be allowed to resume at these groves until tree-by-tree surveys and other risk assessment measures are completed. Based on information obtained from surveys that have already been conducted at properties adjacent to the infested grove, there is reason to believe that it will be possible to identify the source of the current outbreak.

BORDER STATIONS

The border stations continue to provide a major line of defense against the introduction of exotic and destructive pests into California. A detailed account of the numbers and kinds of pest interceptions at the borders is not appropriate here since a comprehensive report is produced by the Pest Exclusion Branch of this Department. However, the following excerpts should indicate some of the unusual but highly significant interceptions that were made in the last several months of 1990:

JAPANESE BEETLE, *Popilla japonica* -- The value of "opening empty trucks" entering California has been validated once again. Vidal Plant Quarantine Inspector Erma Carroll opened up an empty truck entering from Arkansas (August 10) and found a male *Popilla japonica* crawling on the trailer floor. The last time live Japanese beetles were found at the border was in a bottle (August, 1984) at Smith River. Live Japanese beetles were also found in three truckloads of New Jersey blueberries (July, 1982) at the Los Angeles Produce Market (before the southern stations reopened).

APPLE MAGGOT, *Rhagoletis pomonella* -- On September 28, Needles Plant Quarantine Inspector John Breznay found live apple maggot larvae in a dozen peaches purchased in Georgia. The peaches were confiscated from an automobile bound for San Francisco.

KHAPRA BEETLE, *Trogoderma granarium* -- On September 31, Blythe Plant Quarantine Inspector Asif Maan found dead *Trogoderma granarium* (fragmented) larvae in an empty truck from Houston (via Phoenix, Arizona) bound for Los Angeles. This insect, native to the Indian subcontinent, is considered to be one of the most serious grain storage pests in the world. Khapra beetle was detected in Tulare County in 1953 and eradicated at that time. There have been no established infestations in the United States since 1966. We are not aware of any previous California border station interceptions of this pest.