CALIFORNIA PLANT PEST and DISEASE REPORT

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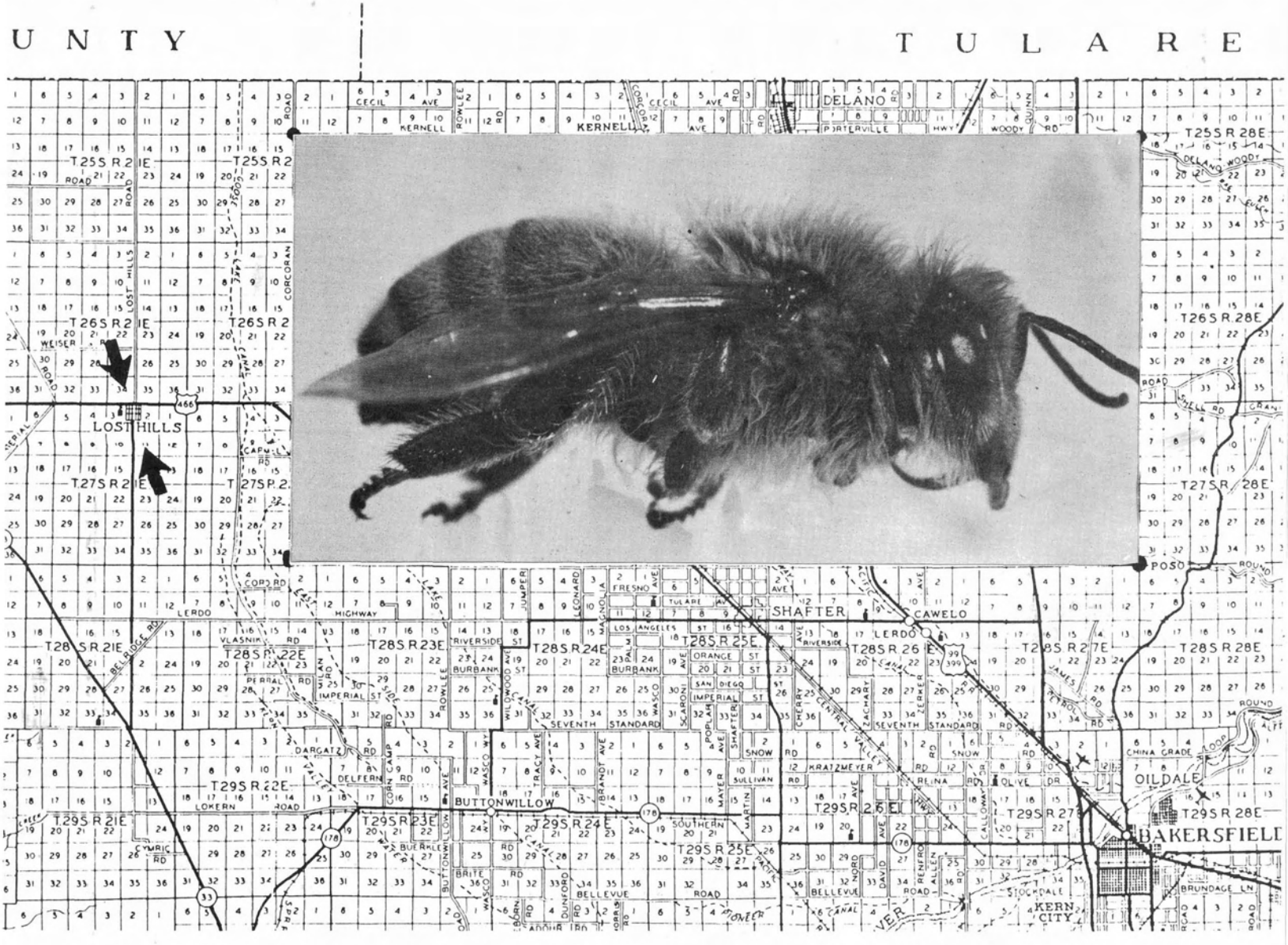

Side view of Africanized bee and location of original find. See article on page 104. (Photo by Jim Heath, CDFA).

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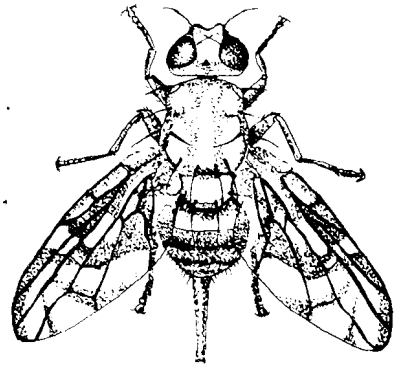
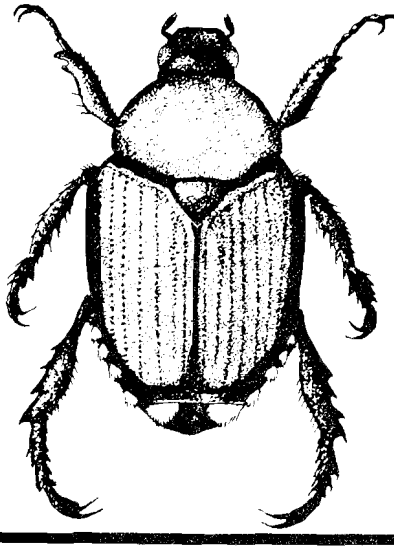


Entomology Highlights



ENTOMOLOGY HIGHLIGHTS

We have been working on making CPPDR as timely as possible concerning new pest finds and the pertinent information dealing with these new finds. We were almost up to date and everything was under control with the March 1985 issue (Volume 4, #2). However, the May 1985 issue ran into budgetary problems and unfortunately, we are again way behind. Part of the problem deals with the high cost of getting the photographs produced for the various articles and even though the quality of reproduction is nowhere near what we want it to be; it is still expensive.

The money which has to go into CPPDR may also be needed by the various laboratory scientists for publishing some of their research work in various scientific journals. Therefore, if CPPDR is to continue in a timely and up to date manner as the laboratory's newsletter to the field personnel, then we may have to find a number of ways of cutting costs.

The following updates are included in an attempt to bring you abreast of new pest finds in the state. We will try to include more information on quarantine and border station interceptions in the next issue.

AFRICANIZED BEE, Apis mellifera scutellata - (Q) - six confirmed colonies of Africanized bees have been found in the state since the initial find in the Lost Hills, Kern County in mid-July. The following report by Len Foote, California Department of Food and Agriculture (CDFA), outlines the current status of the bee as of September 13:

"On July 23, 1985 a sample of bees from Lost Hills, California was confirmed to be Africanized. A machine operator had reported seeing bees swarm from a kit fox den and kill a rabbit. The operator had covered the burrow with dirt and chunks of asphalt. A small cluster of bees remaining at the site was sampled by a Kern County Apiary Biologist.

On July 24, 1985 a special task force assembled at the Kern County Agriculture Commissioner's office. The task force included specialists from CDFA, University of California, USDA, Kern County, and biologists loaned by other counties (Tulare and Fresno). By 9:30 a.m. a crew using a helicopter was mapping the area. Ground survey crews assembled at Lost Hills. By week's end a 400 square mile area had been mapped locating 131 apiaries containing 10,142 managed bee hives (colonies). Each apiary was placed under hold order and each colony given a kick-test for aggressive behavior. No aggressive behavior was found.

Based on the machine operator's testimony and examination of 24 nest combs found in a cavity between two large timbers below the kit fox den, the first find was determined to be a good-sized colony of Africanized bees which had occupied the nest site for more than a year and at the time of discovery had built at least 3 queen cells and stopped other brood rearing in preparation to abscond. The colony probably absconded in early June.

A 462 square mile area was placed under State and Federal Quarantine. One serious violation occurred in which a beekeeper moved supers (boxes) of honey comb containing bees from the quarantine area. The load was intercepted at Riverside and the bees killed. Criminal charges are being pursued against the violator.

Testing of managed apiaries within the Quarantine area is in progress. Apiaries which test free of Africanized bees and parasitic mites may be certified for removal of honey supers not containing drone brood or bees, if the apiary is not within 2 miles of a site where Africanized bees have been found.

A 500 bee composite sample is taken from each apiary and submitted in alcohol to the CDFA Sacramento lab for mite tests. The sample is shaken and the alcohol examined for dislodged Varroa mites. One hundred (100) bees are then dissected and the breathing tubes examined for tracheal mites.

A 50 bee sample is taken from each colony to test for Africanization. Each sample is immediately frozen in dry ice to preserve body weight. The Africanization test which formerly

took up to 30 hours per sample has been modified into a 4-step screening process. Steps 1 and 2 are done in a field lab at Bakersfield, where 92% of the samples are screened out as European bees by measurement tests which take 15 and 20 minutes each. Samples passed on to step-3 at University of California, Berkeley (UCB) require up to 2 hours per test and those going to USDA-ARS Bee Breeding Laboratory at Baton Rouge, Louisiana for step-4 and final determination require 4 hours per sample.

Additional nests of Africanized bees have been found. The second find, August 8, 1985, was a swarm which had recently displaced a European bee colony in a managed hive two miles north of the original find. This swarm consisted of a queen, 3 drones and 3,500+ worker bees. This may have been the swarm which absconded from the nest below the kit fox den. The survey area was extended two miles northward (42 square miles). Aerial and ground surveys revealed five additional apiaries in the northward extension.

The third find, August 14, 1985, was a well-established Africanized bee colony which had been in a hollow tree stump seven miles southwest of the original site for more than a year. The southwest survey area was extended 172 square miles to accomodate this find. Three apiaries were found in the southwest extension.

Apiaries in the extended survey areas are under hold order until everything within 2 miles of them has been tested free of Africanized bees and parasitic mites.

The fourth find, August 21, 1985, is considered to be a "carry-out". Early this spring a Bakersfield beekeeper captured a swarm in the Lost Hills area. The swarm was found occupying previously built combs in an abandoned water tower enclosure. The swarm had brood in early stages of development but none had yet hatched. The beekeeper hived the swarm and placed it with his 25 other colonies at a location near California State College at Bakersfield. The colony was a good producer but was very aggressive at times and kept raising queen cells in an effort to swarm. The beekeeper learned how to manage the colony so as to avoid stings and weekly cut out queen cells to prevent swarming. Surplus brood from this colony was used to make increase but no queens were reared until late July. By preventing swarming he was able to increase the population of this colony until it occupied 5 hive bodies. His apiary of 35 colonies was taken on May 1 to Kelso Valley (midway between Lake Isabella and Red Rock Canyon on the eastern side of the Sierra's).

During the six weeks this apiary was on the wild buckwheat nectar flow this colony swarmed, (about June 1). The apiary was returned to the southwest Bakersfield area about mid-July where it was increased by raising queens and dividing colonies. Hearing of the Africanized bee descriptions the beekeeper suspected this colony might be Africanized. He contacted the county apiary biologist on August 11, 1985. Priority testing

revealed the colony to be Africanized. All apiaries within two miles of the present apiary site, past apiary sites and extracting plant have been placed under hold order for testing. A feral swarm survey is underway in Kelso Valley. Beekeepers who normally move apiaries into that area now for all flowers have been warned to keep managed apiaries out.

The fifth find, August 29, 1985, was a well-established Africanized bee colony occupying a standard 3-story (recently supered) hive in a migratory apiary of 184 colonies just 1.3 miles east of the original Lost Hills find. The apiary had been moved to its discovery site on July 23, 1985. Its low testing priority despite its closeness to the original find was due in part to its being a recent movein.

The sixth find, September 6, was an Africanized bee swarm which in early July had moved into unoccupied combs in a dead-out hive among 101 colonies in a migratory apiary located 4 miles east of the first find. The swarm had a young queen, 8,300 workers, but no drones. The cluster occupied 8 comb sides, had produced just enough honey to meet colony needs, and had begun 3 queen cells in preparation to swarm. There were 6 comb sides well-filled with healthy brood in all stages.

Feral (wild) bee nests reported within a 50 mile radius of the original Lost Hills site are being killed and sampled. The public is being asked to assist in locating feral nests. Trained crews have inspected all residences and possible nest sites within the quarantine area and are searching extended survey areas for feral nests.

Trap hives have been deployed at the rate of 16 per immediate square mile in the rest of the quarantine area and extended survey areas. These are being checked weekly for swarms. One swarm was captured and found to be European.

By September 9 the project had sampled 15,657 colonies in the quarantine area (462 square miles), extended survey areas (400 square miles) and 2 mile radius exposure zones (4) outside quarantine area. Initial step 1 and 2 testing of managed colonies in quarantine area is expected to be completed by early October. Testing of colonies in expanded survey areas, feral nests in 50 mile radius call-in area, and retesting of colonies in 2 mile radius exposure zones is expected to extend step 1 and 2 testing through mid-November."

The following information summarizes some of the known facts about Africanized bee.

HISTORY

The Africanized honey bees are descendents of 26 colonies of honey bees headed by queens from Africa. In 1956, they were brought to Brazil by a geneticist who wished to interbred them with European bees to produce a new type particularly suited to

the South American tropics. The Africanized honey bees swarmed from experimental colonies near Sao Paulo, Brazil and interbred naturally in the wild with the European-type honey bees of the region. The resulting hybrids have since spread widely in tropical and sub-tropical South America.

SWARMING

The Africanized honey bee colony consists of a queen, workers, and drones. The queen is the reproductive center of the colony. Swarming only occurs through the initiative of the queen - no swarm exists unless a queen is present.

Africanized honey bees swarm excessively. Swarming is a form of colony proliferation. The queen bee leaves with about half the bees in the colony to find a new home. The bees remaining in the hive choose a new queen. Thus, by swarming, the original colony divides itself in two. Africanized bees swarm much more often than domestic bees and for longer distances.

REPRODUCTION

Bees cannot reproduce or form new colonies without a queen.

STINGING

The sting of an Africanized bee is no more venomous than that of our domestic bees and there is no evidence that these bees cause more human fatalities in South America or Africa than any other kind of bee in North America or Europe. The reason for concern is that the Africanized bee is more prone to sting than the average honey bee because they are more aggressive. They will chase and sting any animals or people within approximately 300 feet (91 m) of an apiary. Even a slight disturbance can set off a chain reaction within seconds and affects an entire apiary. They can take half an hour to quiet down, while European honey bees, on an average, will become peaceful again in a few minutes.

Like all honey bees, they lose their stingers when they sting, then die. There are people who are highly allergic to bee venom; however, most people can absorb several initial stings with only itchy, uncomfortable swellings resulting.

MELON FLY, Dacus cucurbitae - (A) - two flies have been trapped this year. One in Pasadena on June 21 by N. Quintanilla and one in San Diego on September 11 by Delores Brandon.

ORIENTAL FRUITFLY, Dacus dorsalis - (A) - as of September 13, 38 Oriental fruit flies have been found in California this year. There has been one each from Ventura, Santa Clara, San Diego, San Bernardino and Orange counties. Thirty-three have been collected in Los Angeles County, mostly from the Long Beach area. See the following report by John Pozzi: Thirteen male Oriental fruit flies (OFF) and larvae were detected on September 13, 1985, in Long Beach, Los Angeles County. While inspecting host material

near the recent Long Beach Oriental fruit fly finds, CDFA Economic Entomologist Dick Penrose found 11 OFF larvae in an apple tree. The discovery was made at a Cantel Street residence. CDFA Biosystematist Karen Corwin determined that ten of the larvae were third instar and one was a second instar.

In addition, 13 Oriental fruit flies were trapped within one-quarter mile of the larvae find. Three flies were found in Jackson traps that had been placed in guava and persimmon trees along Los Santos Drive, and Fanwood and Palo Verde Avenues. The remaining ten male Oriental fruit flies were discovered on five Long Beach properties at which fruit flies had been trapped earlier. Nine of the fruit flies were found in Jackson/OFF traps and one fly was detected in a McPhail trap. Los Angeles County trapper Vince Gerlach was responsible for finding the flies.

OFF/Jackson and McPhail trap density in the area was 25 traps per square mile.

CDFA Insect Biosystematist Karen Corwin determined that all of the male Oriental fruit flies from the Jackson trap were sexually mature and the one fly found in the McPhail was sexually immature.

MEXICAN FRUIT FLY, Anastrepha ludens - (A) - larvae of this serious fruit pest were found alive in mango fruit at a grocery store in Yuba City, Sutter County on May 30. The fruit was brought into the Ag. office and given to Dave Welson and Allen Melton of Sutter County.

JAPANESE BEETLE, Popillia japonica - (A) - only one adult beetle was trapped this year in the Sacramento eradication area. The collection was made by Teresa Miller on June 18, 1985 in Orangevale. Five specimens have been trapped in and around international airports. Four were trapped at Los Angeles International and one at San Francisco International. As of September 5, 27 adults have been found on airline flights to California.

GYPSY MOTH, Lymantria dispar - (A) - as of August 12, 28 gypsy moths have been trapped this year. The following indicates the breakdown by counties: Alameda 2, Contra Costa 2, El Dorado 1, Los Angeles 8, Mariposa 1, Orange 1, San Diego 5, Santa Barbara1, Santa Clara 6 and Ventura 1.

WHITE SNAIL, Theba pisana - (A) - the following excerpts from reports by John Pozzi and Don Henry ouline the finds of the mollusk pest:

White snail, Theba pisana, was found on August 5, 1985 in San Diego. According to the San Diego County Deputy Agricultural Commissioner, George Opel, the snails were found by gardeners in Martin Luther King, Jr. Park. A local chemical company was contacted by the gardeners for advice on control measures. The

company's owner brought a collection of the snails to the San Diego County Agricultural Commissioner's office and Deputy Agricultural Commissioner Gerry Hill made a tentative identification. Specimens were sent to CDFA, Division of Plant Industry, where it was identified by Biosystematist Dr. Alan Hardy.

A delimiting survey is in progress by San Diego County and Department personnel. Initial reports indicated that the snails were confined to an embankment area within the park and were found in grass, ground cover, and eucalyptus trees. The park was established about 20 months ago and is approximately four acres in size.

Since the discovery of white snail in the Encanto area of San Diego, delimitation efforts have revealed four other infestations. The Encanto infestation covers about one (1) square mile. The Santee infestation covers about five (5) square miles and is 10 miles to the north. The Lakeside infestation covers about 1/2 square mile and is about three (3) miles to the east. The Mission Hills infestation covers about 1/4 square mile and is about five miles to the west of Encanto. The Kearny Mesa Park infestation to date, amounts to one dry snail shell and is about five (5) miles north of Mission Hills. Delimitation has just begun on the Kearny Mesa Park infestation.

White snail and H. maritima are federal action pests. Federal, state, and county personnel are cooperatively conducting the delimitation survey and carrying out quarantine activities.

The areas infested are for the most part hilly residential with a few canyons and vacant lots that are covered with native grasses, weeds, shrubs and a few trees. The snails are aestivating and, as is their habit, have crawled up several feet on weeds, tree trunks, fences, houses, etc., and remain there in clusters of a few to several dozen.

Personnel doing the delimitation survey have taken advantage of the snails' aestivation habit and are conducting a county wide survey. These clusters of snails are readily visible from slow moving vehicles. The crews are stopping regularly and spot checking properties on a door-to-door basis. In addition, crews are concentrating on surveying more likely infested areas - parks, construction areas (some other infestations have been near construction sites), new housing and adjacent areas, and vacant lots where vegetation is dry and snails would be in aestivation. White snails have been found on both sides of the San Diego River in the Santee area. The river bottom is now being surveyed both up and down stream. To date, no white snails have been found in the river bottom.

By the end of next week, we expect to have a gross survey of San Diego County completed. With a relatively high degree of confidence, we feel we will have detected any large infestations, and will have covered all high hazard areas.

The survey is continuing, and through new releases, the San Diego County Agricultural Commissioner is asking the public to report suspicious snails.

Dr. David S. Woodruff, Associate Professor of Biology, University of Califoria, San Diego, has expressed the opinion that white snail has been in San Diego County for some years, possibly decades.

Three pesticides are currently registered for snail control: metaldehyde, Mesurol, and Zectran. Based on snail biology and the literature describing the eradication efforts in the early 1920's, I would estimate that the program would cover several years, with crews working all year (treatment during wet months and survey in dry months).

Dr. Woodruff, reports that "there is no obvious molluscicide for Theba control. Metaldehyde is ineffective, the carbamates are too toxic for use in some situations...."

Damage information prepared in 1978 by department personnel report that the white snail is phytophagous and will feed on foliage of many garden plants and weeds. It does feed on other organic matter, however, and has been a particular problem of citrus trees.

A large portion of California is climatically suited for the white garden snail to flourish. Its high reproductive potential (demonstrated in past California infestations) and phytophagous feeding habit are factors of prime concern to California agriculture. In Europe it is recognized as a pest of citrus, feeding on foliage, bark, twigs, fruit and blossoms. It has also been reported as causing damage to olive and almond trees.

Dr. Woodruff reports that "In most of its range in those countries (Australia, England, and France) Theba is not an economically significant pest. There is no doubt, however, that an uncontrolled population can have a serious impact on orchards and gardens."

NEW STATE RECORDS

MARITIME SNAIL, Helicilla maritima - (Q) - this snail has been found in San Diego County associated with several of the white snail locations. Identification was by Dick Munkittrick, USDA Port Entomologist.

A WHITEFLY, Paraleyrodes sp. undescribed - (Q) - San Diego County Agricultural Technician Belinda Moss has found a whitefly new to California for the second time within six months. This time she found Paraleyrodes sp., an apparently undescribed whitefly which is probably native to Mexico. A taxonomic study of the pupal cases indicated originally that the new find was the crustywaxed whitefly, Paraleyrodes naranjae. However, when the adult males became available for study at a later time, it was found that they did not agree morphologically with males of naranjae or any other known species of Paraleyrodes.

Belinda made the discovery on July 12, 1985, on an orange tree in the Hillcrest area of San Diego. In addition, suspect specimens have been detected several miles away in Logan Heights, also on orange. At this time at least four sites are known in the greater San Diego area. CDFA Insect Biosystematist Ray Gill made the determination and supplied the following information:

Paraleyrodes is the first whitefly to occur in California belonging in the subfamily Aleurodicinae, which also contains the pest species Aleurodicus dispersus or spiraling whitefly. Aleurodicine whiteflies are unique in that their pupal cases have large compound wax pores. Long rods of white wax are produced from the pores and often protrude upward from the dorsal surface and will be found scattered all over the surrounding leaf surfaces. No other California whiteflies are known to have this characteristic.

San Diego County Deputy Commissioner George Opel has observed that the adults have lightly spotted wings, are rather sluggish, and do not fly readily even when disturbed. The adult male has unusually large, slightly swollen, readily visible antennae. Female antennae are also long but not as thick and are angled in the outer 1/4 of their length.

Presently, the new San Diego species is known also from Uruapan, Michoacan Mexico, where it was collected in 1982 on avocado by Mike Rose of the University of California, from the Brownsville - Weslaco areas of Texas and from Guatemala.

Known hosts are Citrus, Chamaedorea, Bauhinia mexicana, Psidium guajava, Persea americana and Stenolobium stans.

HAWAIIAN THRIPS, Thrips hawawiiensis - (Q) - the following report by Tokuwo Kono, CDFA, summarizes the important data pertaining to this new state record:

While on a field trip in California, Research Entomologist Steve Nakahara, USDA-ARS in Beltsville, Maryland, collected a flower thrips, which he has identified as Thrips hawaiiensis (Morgan). According to Nakahara:

> "Two adult females of Thrips hawaiiensis were collected in two localities in San Diego County, California on June 18 by me. One specimen was found on dandelion flower (Taraxacum officinale) in a park on the north shore of Mission Bay in San Diego, and another specimen was collected by beating elderberry (Sambucus sp.) growing along a road off county road S6, about 1/2 mile east from junction of S6 with interstate 5. These two collections constitute the first records for California. The two specimens have 8-segmented antennae and resemble the 8-segmented form commonly found in Hawaii.
>
> This introduced thrips was first detected in the conterminous United States in 1969 in Florida. Since then, it has been found in Georgia, South Carolina, District of Columbia and Texas."

According to Zimmerman (1948), this species is a widespread flower feeder. It occurs in large colonies on many families of plants from seashore to mountain tops. It exhibits a preference for Leguminosae and Convolvulaceae.

It is considered a minor pest of garden beans and has been reported to damage orchids. Some host plants of economic importance on Zimmerman's list are: alfalfa, asparagus, aster, avocado, bean, bell pepper, bush bean, Dendrobium, Easter lily, gladiolus, Hubbard squash, Hydrangea, orchids, pole bean, radish, and Rosa.

The females are about 1.30 mm long. The body is bicolored in that the head and thorax are light yellowish-brown to orange and the abdomen is dark brown. The forewing are grayish-brown with a lighter band close to the base.

Bhatti (1980) gave the following distribution: India, Sri Lanka, Pakistan, Bangladesh, Indonesia, Philippines, Thailand, Laos, Malaysia, Tahiti, New Guinea, Norfolk Island, Fiji, Hawaiian Islands, Riouw Archipelago, China (including Taiwan), Japan, Nigeria, Angola, Mozambique, Uganda, Sierra Leone.

It is surprising that this thrips was not collected in California before. It probably does not like California. It is being introduced daily on flower leis from Hawaii. Shake a flower lei from Hawaii over a piece of white paper or white cloth for a souvenir thrips from Hawaii.

References

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Zimmerman, E.C. 1948. Insects of Hawaii. Apterygota to Thysanoptera. University of Hawaii Press. Honolulu, Hawaii 2:1-475. (415).

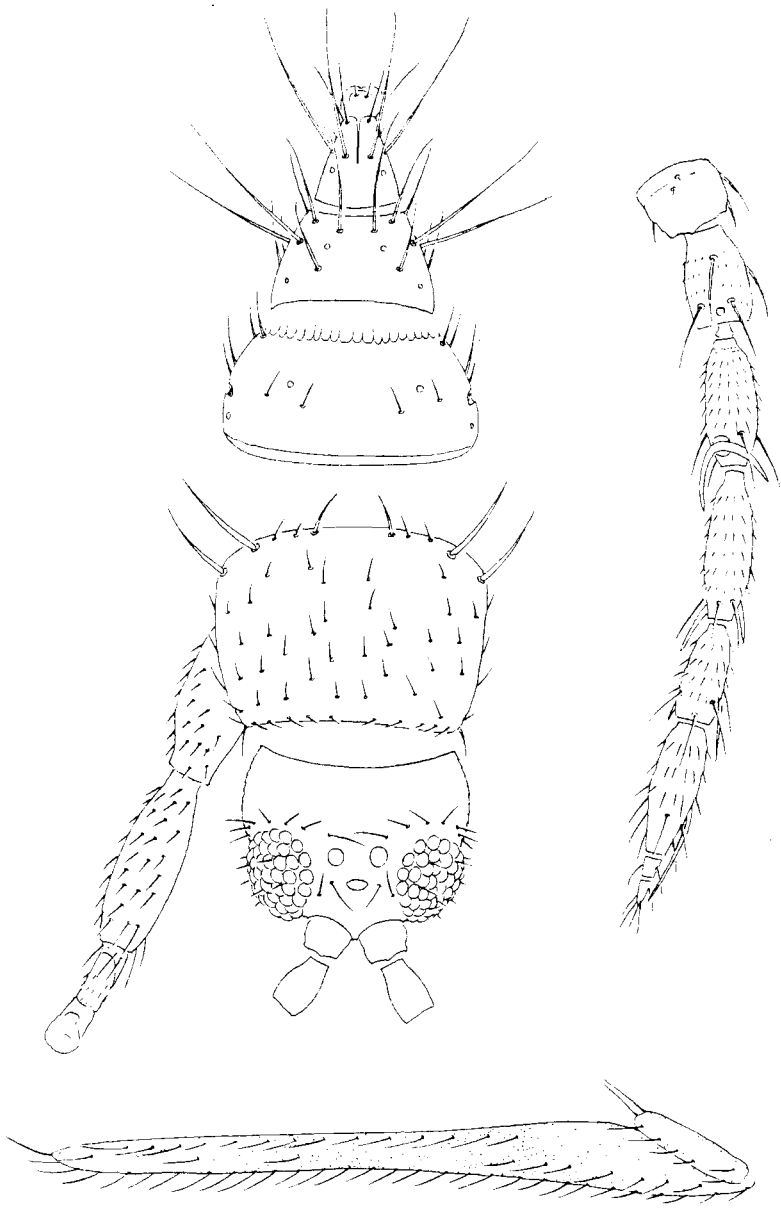

Figure 1. Parts of the body of Thrips hawaiiensis female.

MOLINUS PLANT HOPPER, Delphacodes molinus - (C) - This plant hopper is a grass infesting species which is probably native to Arizona and the Sonoran subregion of Mexico. Specimens were collected from Bermuda and St. Augustine grasses at El Centro, Imperial County by county entomologist Robert Flock on June 4.

NEW COUNTY RECORDS

ASPARAGUS APHID, Brachycolus asparagi - (A) - found for the first time in Kings County at Kingsbury on July 29 by G. Montrass in commercial asparagus. Found for the first time in Madera County at Madera on September 9 by D. Bradburn. It is previously known from Riverside, Kern and Fresno counties.

SOUTHERN CHINCH BUG, Blissus insularis - (C) - recorded from Calaveras County at Jenny Lind on August 14, by Doug Norfolk. A 1/2 acre block of St. Augustine grass was infested.

BONELL'S PLANTHOPPER, Caliscelis bonnellii - (C) - this introduced species has been found for the first time in Mendocino County at Covelo on August 27 by Jim Xerogeanes. The host was grass.

ASH/LILAC BORER, Podosesia syringae - (B) - the detection survey for clearwing moth pests utilizing sex attractant baited sticky traps continues to provide new and useful data {See the last issue of CPPDR: March 1985, 4(2):52}. Two new county records for ash/lilac borer were discovered in this manner.

Recently, the ash/lilac borer (Podosesia syringae - Sesiidae) was identified from two specimens forwarded to the lab from Stockton by Kirby Brown, entomologist for San Joaquin County. These male moths were collected in June in traps baited with a sex attractant, which is being used in a broad ranging survey for clearwing moth borers. The San Joaquin County confirmation is a NEW COUNTY RECORD for this B-rated pest; a collection was also made from these traps in an olive tree in Oakdale, Stanislaus County. This NEW RECORD was collected by M. Mecedo in July.

OTHER FINDS OF INTEREST

PEPPER TREE PSYLLID, Calophya schini - (Q) - this pit making pest of California pepper tree is a native of Peru. It was first recorded in California in July, 1984 (CPPDR 3(5):119-121. M. Hixson of Ventura reports that it is causing heavy distortion and defoliation of California pepper tree leaves and shoots in Camarillo during June.

IMPORTED BAGWORM, Apterona crenulella - (B) - see the following report by Tom Eichlin, CDFA:

Large numbers of a small snail-like pest were recently reported from Sierra County on wind-rowed alfalfa. These little helical, dirt covered shells are in fact the larval cases of a highly unusual imported bagworm, Apterona crenulella form "helix" (Psychidae), a B-rated pest commonly referred to as the garden bagworm. This is a European species, which was first discovered in the United States in Nevada City, Nevada County, July 18, 1940. It has since spread to most counties in the northern half of California and into areas of Idaho and Nevada. Since then it has been re-introduced from Europe into the Albany, New York region.

One of the more unusual aspects of the California form of this species is that it is thought to be exclusively parthenogenetic, because no males have ever been seen or reared in this population. In Europe, equal numbers of males and females are produced in the population, but parthenogenesis is also known to occur.

The larvae actively feed at night from the open end of their cases in a period from about mid-April through the first part of July. Pupation occurs in the case, with the somewhat larviform adult females appearing by early July until the first of August. After producing approximately 25 eggs deposited inside the bag, the adult female drops to the ground and dies. The young larvae hatching from these eggs then overwinter within the pupal skin of the parent inside the case which has been attached to the substrate.

The garden bagworm feeds on a wide variety of host plants, many of which are garden varieties and ornamental plantings. The damage is in the form of splotches of skeletonized areas on the leaves.

REVIEW OF INDEX OF "MONTHLY BULLETIN"

by Tom Eichlin, CDFA

For all those individuals and institutions who have been storing a complete set of The Bulletin of the California Department of Agriculture but have never been able to use the information contained in them for lack of knowing what's in there and where it is located, the answer to this problem has just arrived. The late Mrs. Magda R. Papp, former CDFA Agricultural Biological Technician has authored a special publication, just now available, called INDEX TO THE BULLETIN OF THE CALIFORNIA DEPARTMENT OF AGRICULTURE. Its 204 pages are hard-bound in a handsome brown cover with gold lettering and was produced through Entomography Publications by Sierra Graphics & Typography - Sierra Pacific Press, Sacramento.

Mrs. Papp's preface to the INDEX gives a summation of the history of the Bulletin from its beginning in December 1911 to its termination in March 1967. This is interesting reading. For example, she points out that the co-founders of that publication were A.J. Cook and his student E.O. Essig, the latter servings as the first editor and contributing many articles. From the 56 total volumes, consisting of 3,265 articles, Mrs. Papp, in the first section of the INDEX, organized all of the authors alphabetically, with each author's titles listed together chronologically. This is followed by the Index to Common Names and the Index to Scientific Names.

The INDEX will be a valuable reference tool, making it possible to locate topics of interest in The Bulletin series, data which was here-to-fore essentially unattainable. A limited number of copies are available and will be forwarded upon request on a first-come, first-served basis. To obtain a copy of the INDEX, contact T.N. Seeno, Chairman, Entomology Library, Room 340, Department of Food and Agriculture, 1220 N Street, Sacramento, CA 95814.

PLANT PATHOLOGY

PEACOCK SPOT OF OLIVES

T.E. Tidwell

"Peacock spot" disease of olives is also known as "bird's eye spot" and as "Cycloconium leaf spot", referring to the name of the causal fungus, Cycloconium oleaginum Cast. Peacock spot has been known in California since the turn of the century as a foliar disease of olives which usually causes relatively little economic damage in most years. However, occasional outbreaks of the disease are reported to have substantially reduced production of some trees due to the partial defoliation it causes. Serious outbreaks between the years 1941 to 1949 are recorded as having reduced productivity by as much as 20% in some orchards. Also noteworthy was the fact that these infrequent, but serious, outbreaks of peacock spot did not occur only in localized areas, but rather, all throughout California's olive growing areas. Peacock spot is fairly well known throughout the world wherever olives are grown. The disease has been reported in Europe, the Mediterranean area, parts of Africa and South America, and of course, in California on the North American continent. Olive cultivars differ widely in susceptibility, but unfortunately, the most important commercial variety in California, Mission, also happens to be the most severely affected.

The disease symptoms begin as small, inconspicuous lesions on the upper leaf surface. Eventually, these lesions develop into dark green to black circular spots 2-10mm in diameter (Fig. 1). Faint yellow halos may surround spots. As the lesions enlarge, infected leaves turn yellow and fall. As a result of unseasonal defoliation, newly exposed twigs die. Early observers noted that the dark spots viewed against the yellow background of the infected leaf resembled the spots in a peacock's tail feathers, hence the origin of the name "peacock spot." Although the lesions will most frequently be found on leaves, they can also develop on petioles, fruit, and fruit stems as well.

Research has shown that in California infection and disease development takes place during the cool, rainy season (November through May) although it should be noted that leaf symptoms may not be apparent until as late as three months after the initial infection. The fungus becomes relatively inactive during California's hot, dry summers, and survives this period of the year as mycelium in infected leaves on the tree. Optimum conditions for growth and spore germination of the fungus are a temperature of ca. 21 C (ca. 69-70 F) and plenty of free moisture, particularly in the form of rain or fog. Spores of the fungusare primarily disseminated from diseased leaves to healthy leaves via splashing raindrops. This means of spread also accounts for the lower portions of tree canopies being more heavily infected than the upper protions--conidia are "washed" downward, coupled with the fact that the leaves in the lower

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canopy remain wet longer than higher leaves where air circulation is better.

Prevention of the disease can be accomplished with appropriate fungicides. In addition, pruning to admit sunlight as well as to increase air circulation may also help reduce the amount of disease in individual trees.

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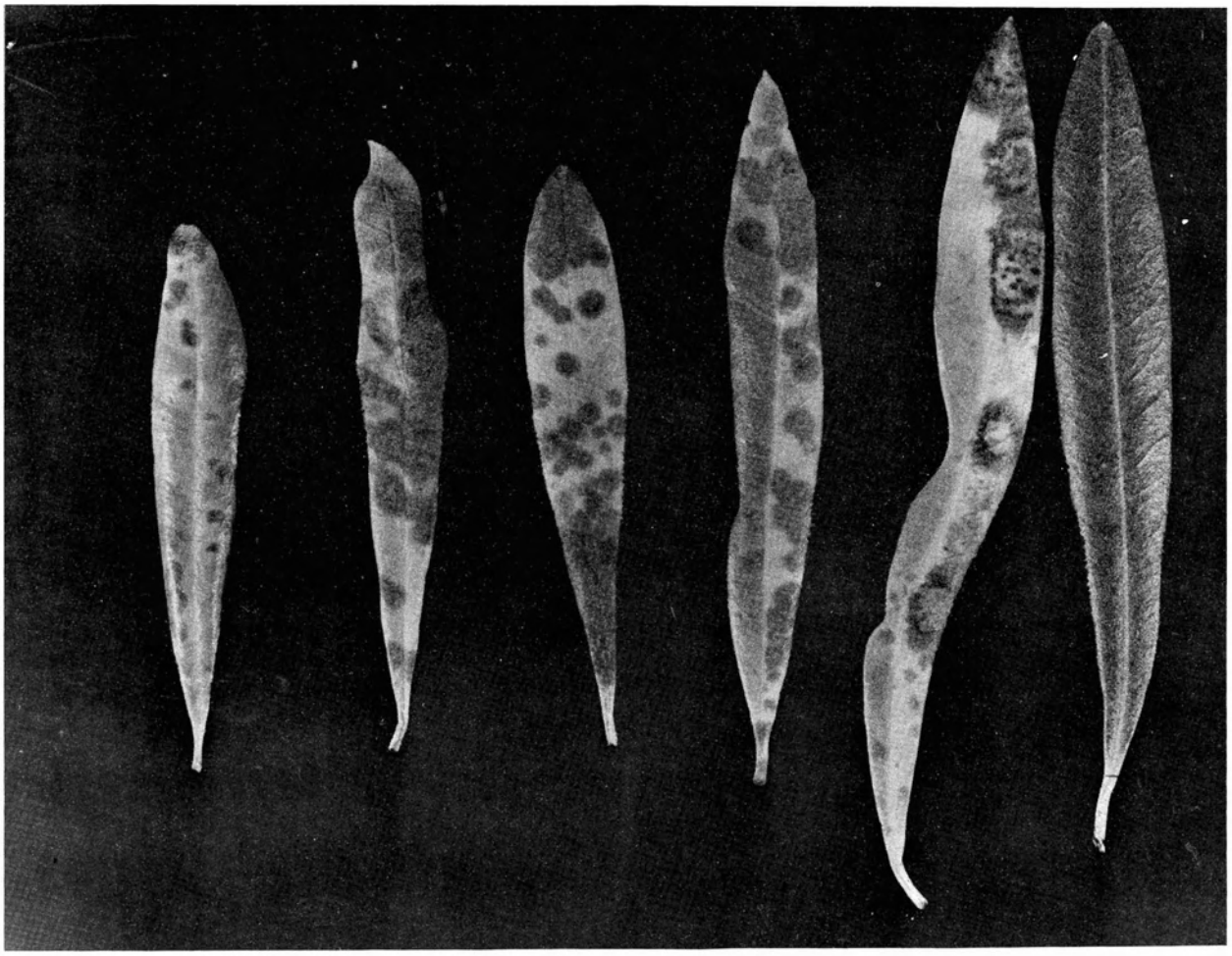

Fig. 1. Olive leaves showing "Peacock spot" lesions caused by the fungus Cycloconium oleaginum. Healthy leaf at right.