Topics in Subtropics Newsletter

University of California Cooperative Extension

Fresno, Kern, Madera, Riverside, San Bernardino, San Diego, San Luis Obispo, Santa Barbara,Tulare,&Ventura Counties

News from the Subtropical Tree Crop Farm Advisors in California

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TOPICS IN THIS ISSUE – Peggy Mauk, Editor

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Black Fig Fly, *Silba adipata* McAlpine, Diptera: Lonchaeidae
California Pest Rating Proposal Current Rating: Q Proposed Rating: A
Comment Period:7/13/2021–8/27/2021

Initiating Event:
On June 10, 2021, a resident in Pasadena (Los Angeles County) submitted a fig with pupae to county agricultural personnel. The pupae were confirmed as *Silba adipata* with molecular techniques. On June 21, 2021, a resident in Goleta (Santa Barbara County) submitted figs with larvae to county agricultural personnel. These were also confirmed as *S. adipata* with molecular techniques. On June 24, 2021, a larva from a fig at the Goleta residence was collected by state (CDFA) personnel and this was confirmed as *S. adipata* with molecular techniques. On June 29, 2021, an adult male was confirmed as *S. adipata* via morphology of the genitalia. Further finds of *S. adipata* were made in Orange and Ventura counties. *Silba adipata* was not previously known to be established in the New World and it's pest status has not been rated. Therefore, a pest rating proposal is needed.

History & Status:
Background: Adult *Silba adipata* are black shining flies 3.5-4.5 mm in length. Adults feed on exudates of figs and fig tree sap and possibly in flowers of other plants. Edible fig (*Ficus c*arica) is the only known larval host, and both figs and caprifigs are attacked. Female flies oviposit groups of eggs under the scales of the ostiole of the fruit, and unripe fruits are reported to be preferred for oviposition. Oviposition is reported to primarily occur on figs that are in a shaded position. Adult activity is reported to be greatest early in the morning and late in the afternoon, when temperatures are lower. Larvae feed inside the fruit, and this often results in premature fruit drop. Larvae can complete development in dropped fruit, and they emerge from emergence holes approximately 1 mm in diameter to pupate in the soil (Abbes et al., 2021; Katsoyannos, 1983; M. Hauser, pers. comm.). There are reportedly 4-6 generations per year (Katsoyannos and Guerin, 1984). Adults are active in Turkey from May to November (Tutmuş, 2013).
Infestations by *S. adipata* caused fruit drop in Slovenia, but impact varied by location and fig variety (Rote et al., 2017). In Tunisia, it caused "massive" fruit drop and infestation rates (% of fruits infested) exceeded 80% in some cases. All varieties of figs there were reported to be susceptible (Abbes et al., 2021).

For McPail traps, Katsoyannos and Guerin (1984) found that the attractants Hexanol and ammonium sulfate used together gives three-fold increase over either alone. Tutmuş (2013) reported attraction of these lures to be increased greatly by the addition of fig "milk" (presumably sap). Regarding control, Abbes et al. (2021) suggested bait sprays, mass trapping, netting the fruits, and burying dropped fruit to limit development of larvae as potential control techniques. The pesticide Delegate^{TM}250 WG is labeled for control of *S. adipata* on figs in South Africa (Corteva). Additionally, Spinosid, Entrust or Success are labeled for figs.

Worldwide Distribution: *Silba adipata* is reported to be native to the Mediterranean region and the Middle East. Its distribution includes Africa: Egypt, South Africa (introduced), Tunisia; Asia: Israel, Syria, Turkey; Europe: Italy, Malta, Slovenia (introduced); North America: United States (California) (Abbes et al., 2021; D'Antonio and Fimiani, 1988; Giliomee, 2011; MacGowan and

Freidberg, 2008; Mifsud et al., 2012; Rot et al., 2017; Tutmuş, 2013). It was found in Morelos, Mexico in March 2020, but the status of this eradication is not known (United States Department of Agriculture).

Official Control: *Silba adipata* is presumably considered reportable by the USDA. It does not appear to be a listed quarantine pest in other countries.

California Distribution: *Silba adipata* was found infesting figs in Goleta (Santa Barbara County), Los Angeles (Los Angeles County), Fullerton (Orange County), and Ventura (Ventura County) in June and July 2021 (California Department of Food and Agriculture).

California Interceptions: *Silba a*dipata has not been intercepted in California. The risk *Silba adipata* poses to California is evaluated below.

Consequences of Introduction:

1) Climate/Host Interaction: *Silba adipata* is occurs widely in Mediterranean regions and the climate of much of California is likely suitable. The only known host, fig, is grown widely in the state. Therefore, it receives a High (3) in this category.
–High (3) likely to establish a widespread distribution in California.

2) Known Pest Host Range: *Silba adipata* is only known to feed on one host, fig. Therefore, it receives a Low (1) in this category.
–Low (1) has a very limited host range.

3) Pest Reproductive and Dispersal Potential: *Silba adipata* could be moved on infested fruit, and it can fly. It reportedly can have 4-6 generations per year. Therefore, it receives a High (3) in this category.
–High (3) has both high reproduction and dispersal potential.

4) Economic Impact. *Silba adipata* causes major fruit drop which would have a heavy impact on California fig yield. Production costs could increase due to control measures, and fruit bagging could be implemented. Therefore, it receives a High (3) in this category.

Economic Impact: A, B, D

- **A. The pest could lower crop yield.**
- **B. The pest could lower crop value (includes increasing crop production costs).**
- C. The pest could trigger the loss of markets (includes quarantines). **D.The pest could negatively change normal cultural practices**.
- D. The pest can vector, or is vectored, by another pestiferous organism.
- E. The organism is injurious or poisonous to agriculturally important animals.
- 1. G.The organism can interfere with the delivery or supply of water for agricultural uses.

Economic Impact Score: High
–High (3) causes 3 or more of these impacts.

5) Environmental Impact. Infestations of *Silba adipata* could affect figs in both commercial production as well as residential settings, and treatments could be triggered in both. Therefore, *S. adipata* receives a High (3) in this category.

Environmental Impact: D, E

A. The pest could have a significant environmental impact such as lowering biodiversity, disrupting natural communities, or changing ecosystem processes.
B. The pest could directly affect threatened or endangered species.
C. The pest could impact threatened or endangered species by disrupting critical habitats.
D. The pest could trigger additional official or private treatment programs.
E. The pest significantly impacts cultural practices, home/urban gardening or ornamental plantings.

Environmental Impact Score: High (3)
–High (3) causes two or more of the above to occur.

Consequences of Introduction to California for *Silba adipata*: High (13) Add up the total score and include it here.

–High = 13-15 points

6) Post Entry Distribution and Survey Information: *Silba adipata* is established in coastal southern California. It receives a Low (-1) in this category.
–Low (-1) Pest has a localized distribution in California or is established in one suitable climate/host area (region).

Final Score:
7) The final score is the consequences of introduction score minus the post entry distribution and survey information score: Medium (12)

Uncertainty: This fly may be more widely established in California. Although it is possible that the adults would be attracted to some of the fruit fly detection traps used in the state, they may have been overlooked because they are not target fruit flies. There may be natural enemies or conditions (natural or artificial) in California that could limit the impact of this pest here.

Conclusion and Rating Justification: *Silba adipata* is a monophagous pest of figs, which are an important crop in California. This fly is known to cause large-scale fruit drop and it could have a major economic impact in the state. It is established in coastal southern California, but the state is currently investigating what course of action to take regarding this pest. For these reasons, an "A" rating is justified.

References:
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United States Department of Agriculture. APHIS Amends Import Requirements for Fresh Fig (Ficus carica) Fruit from Mexico. Accessed June 29, 2021: https://www.aphis.usda.gov/import_export/plants/plant_imports/federal_order/downloads/2 020/DA-2020-19.pdf

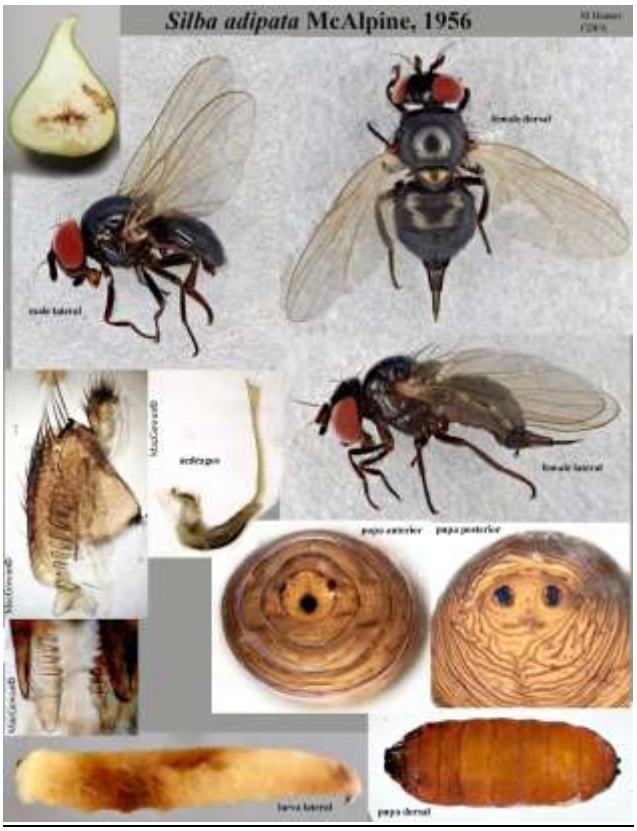
Responsible Party: Kyle Beucke, 2800 Gateway Oaks Drive, Suite #200, Sacramento, CA, 95833, 916-698-3034, permits[@]cdfa.ca.gov *CommentPeriod:7/13/2021 – 8/27/2021*NOTE: You must be registered and logged in to post a comment. If you have registered and have not received the registration confirmation, please contact us at permits[@]cdfa.ca.gov.

CommentFormat: ❖Comments should refer to the appropriate California Pest Rating Proposal Form subsection(s) being commented on, as shown below. Example Comment: Consequences of Introduction: 1. Climate/Host Interaction: [Your comment that relates to "Climate/Host Interaction" here.] ❖Posted comments will not be able to be viewed immediately. ❖Comments may not be posted if they: Contain inappropriate language which is not germane to the pest rating proposal; Contains defamatory, false, inaccurate, abusive, obscene, pornographic, sexually oriented, threatening, racially offensive, discriminatory or illegal material; Violates agency regulations prohibiting sexual harassment or other forms of discrimination; Violates agency regulations prohibiting workplace violence, including threats. ❖Comments may be edited prior to posting to ensure they are entirely germane. ❖Posted comments shall be those

which have been approved in content and posted to the website to be viewed, not just submitted.

Proposed Pest Rating: A

Black Fig Fly Damage



Identifying Black Fig Fly

Branch canker and dieback diseases associated with citrus in California

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In California, the most prominent canker and dieback diseases are caused by selected species of fungi. Additionally, some production areas have bacterial cankers that can also be a problem, however, this article will focus on cankers caused by fungi. Most of these fungal pathogens can colonize both young and mature trees. Some diseases are more common than others. Fortunately, most of these diseases are considered minor issues that do not cause significant economic losses on an annual basis. However, sometimes the environmental conditions can favor these types of pathogens that can impact crop production and ultimately cost growers time and money. For the grower, the cost comes with having to hire pruning crews to manually cut out the dead wood and apply treatments, biological or chemical, to pruning wounds. Since most of the fungal pathogens survive and reproduce on the deadwood and prunings, the best practice for longer term control is to remove the deadwood and destroy prunings. There are only a very limited number of fungicides registered and since the fungicides do not move in wood, not many are available to treat and established infections. Three common shoot dieback and canker diseases are discussed below.

Colletotrichum Shoot Dieback. There are two species of *Colletotrichum*, *C. gloeosporioides* and *C. karstii*, that are associated with this disease in California. Both are widely distributed and both species can be found within the same citrus grove. Anecdotal evidence suggests that wounding may be needed. It is also possible that insect injury or injuries form blowing sand may contribute to twig and leaf injuries, but this has not been seriously tested in California. Most likely infections occur on young shoots during rain events in the San Joaquin Valley (SJV) production areas in the late fall, winter, and early spring each year. Once infection occurs, the pathogens grow in the wood and colonize the stem or branch. This causes dieback of the shoot and usually results in branch canker with some gumming at the margin of living and dead tissue as the host responds to the infection and attempts to wall it off (Fig. 1). Older infections can lead to major dieback (Fig. 2) and occasionally the dieback can extend into branches that are 2-3 inches in diameter, but this is not that common (Fig. 3).

Fig. 1

Fig. 2

Fig. 3

Botryosphaeria Gummosis (formerly Dothiorella canker). This disease complex is caused by many different species within a fungal family called the Botryosphaeriaceae. In the central valley or District I, *Spencermartinsia viticola, Neofusicoccum mediterraneum, Botryoshaeria iberica,* and *B. stevensii* have been found; whereas in the coastal counties of District II, *N. parva, N. lutea, B. australis, S. viticola,* and an unidentified *Botryosphaeria* species have been found. The pathogen can be visible on deadwood as black pycnidia (fruiting body with asexual spores) that ooze out tendrils containing conidia and/or ascostroma (fruiting body with sexual ascospores). Because of the large complex of different species causing the canker, there is no one symptom used for identification. Still, gumming or gummosis (sap oozing out of the canker) is generally more common in the summer and early fall and rarely seen in winter and spring. In general, these pathogens can cause dieback, cankers, and gummosis. Unlike Colletotrichum dieback, trunks and/or large branches can be affected by the pathogen that can seriously affect large section of the tree or even result in tree death. When cankers are found, the dead outer bark is usually located over a sunken canker. The bark is usually tightly adhered and not cracked but will eventually crack as the canker ages and the pathogen moves up and down from the initial infection site. When peeling the bark back, you can often see yellowish-brown discoloration of the wood. Older cankers show symptoms of a grayish color on the exterior of the bark. In favorable conditions, rapid decline and death of the tree can occur and younger trees are especially susceptible. The two images below show large cankers on large limbs that are also exhibiting gummosis and dieback of the tips.

Fig. 4

Fig. 5

Spores of these pathogen enter the host plant through fresh wounds such as pruning wounds, split branches from wind damage, frost damage, mechanical and grafting wounds. Also, wet weather, summer rain, high relative humidity, and furrow or sprinkler irrigation has been shown to be helpful in the infection process, especially in dispersing the spores. Thus, timing of pruning activities to dry periods of the year and removal of pruned materials from the orchard are essential practices in the management of Botryosphaeria gummosis.

Sooty canker (old name Hendersonula). This disease is caused by the fungus *Neoscytalidium dimidiatum.* The disease is more prevalent in warmer growing areas because this pathogen usually infects plants when the temperatures are above 90° F. Therefore, it is more of an issue in the Desert growing region but can be found in the SJV. The southern side of the tree where sunburn injuries occur is usually where the infection takes place. Infections can also occur on topped grafted trees in the field, presumably due to the increased likelihood for sunburn injuries. Wounds created when grafting may also be colonized by the pathogen. Grapefruit and lemons seem to be the most susceptible but other varieties can also become infected. Like Botryosphaeria gummosis infections, the fungus can colonize large scaffolding branches as well

as the trunk where the pathogen girdles the entire limb or trunk, limiting movement of water or nutrients. Once the tree branch or trunk is girdled the tree declines and resulting ultimately dies. Sooty canker is characterized by cankers that appear to be wet or moist (Fig. 6). Brownish discoloration of the wood can be seen inside of a canker (Fig. 7). Eventually a black mass can be found under the bark (Fig 8) or in advanced stages on top of the bark (Fig. 6). Note: this disease is not covered in the UC IPM guide. However, similar to other canker-causing and wood-rotting fungi, the only solution is to prune diseased tissues and remove from the field so additional spread cannot take place at a later time.

Fig. 6

Fig. 7

Fig. 8

Control options for these pathogens can be found at the UC IPM website: https://www2.ipm.ucanr.edu/agriculture/citrus/?src=redirect2refresh and in the Citrus production manual: https://anrcatalog.ucanr.edu/Details.aspx?itemNo=3539

Caloptilia, No Longer a New Pest

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This article was first posted in July 2020 when it wasn't clear if this leaf roller/leaf miner was going to be a significant pest. In June 2021, a few PCAs from Ventura County area are saying that they are having to spray for it. So, the pest has returned and it is probably going to hang around for a while. It does not seem to feed on fruit. It causes damage to leaves but it doesn't seem to cause damage on mature trees. On a newly planted tree, it can defoliate it, so it should not be ignored. Read the history below. https://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=48887

A new pest for avocado? Old pest? How much damage will it do? Don't know yet.

Tracy Ellis, the San Diego County Ag Commissioner Entomologist has partially identified what appeared to be two pests and a parasitoid, as only one pest and a beneficial that is doing its job parasitizing the pest.

The insect determination has come back for both larvae (one a leaf miner and one a leaf roller) as the same insect! It has been determined to be C-rated gracillariid miner *Caloptilia* sp. (Lepidoptera: Gracillariidae) at this time. An image of the adult moth is not yet available.

Apparently, the larval stage transitions from a leaf miner to a leaf roller, in what's called hyper-metamorphosis. Starting as a miner and abandoning the mine to roll the leaf. CDFA scientist Marc Epstein is taking a closer look at this insect. Marc does not know if it is a local insect that

adapted to avocados or if it is an import, as many in this family have not been studied or sequenced.

The leaf roller/folder has appeared in San Diego and Santa Barbara Counties. It's not clear whether it will be a pest of the fruit at this time.

The results for the parasite came back as Hymenoptera. That too needs greater study.

It is not clear what damage this pest may do but be vigilant with new plantings. It may not be a major pest but generally, new pests take time for beneficials to manage them. We are hopeful that this will not be a significant pest. It may only be an aberration for a few years.

Stay tuned and be watchful.

Figure 1. Caloptia larval stages, left and right in photo. Both stages can be found together in the same habitat.

A. B.

Figure 2. The damage from the leaf miner along the mid-rib (A) and leaf edge (B).

Figure 3. Leaf miner larval stage.

A. B.

Figure 4. Symptoms of leaf roller damage (A) and larvae under leaf roll near forceps (B).

Figure 5. Larval leafroller with the parasite on it.

Figure 6. Adult parasitoid.

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