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# Plum Bud Gall Mite: An Emerging Pest in the Greater Bay Area

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## Introduction

Plum bud gall mite was first identified and confirmed in Santa Clara County in February 2019. However, there might have been earlier sightings of this pest, including a possible observation in north Marin County in early 2014 (Steven Swain, Farm Advisor, Environmental Horticulture, UC Cooperative Extension Marin and Sonoma Counties). Since 2019, the pest has been confirmed in Contra Costa, Alameda, Marin, San Mateo, Santa Cruz, and Sonoma counties, and more recently in Western Oregon. Currently, plum bud gall mite is widespread in the greater Bay Area.

The majority of the information currently available about this pest is through reports from Europe, Eastern Mediterranean, and Western Asia. In Western Asia, plum bud gall mite is also referred to as Almond Bud Gall Mite because of its impact on almonds. In Europe and the Middle East, where plum bud gall mite is primarily found, it has been reported on almond, apricot, peach, plum trees, and cotoneasters.

So far in California, plum bud gall mite has been found in plum and pluot trees; further information about the susceptibility of apricots to this pest is still needed. To date, other stone fruit trees, especially almonds, that are located nearby plum bud gall mite infected orchards have not been impacted by these mites. Also, the impact of this pest has thus far been seen mostly in residential areas and very few commercial orchards have been impacted.

## Identification

The scientific name of plum bud gall mite is *Acalitus phloeocoptes*; it belongs to the eriophyid mite family. The mites are tiny – typically 0.15 mm in length or less – and are difficult to see without magnification (Fig. 1). They have wormlike bodies and are whitish in color. Because these mites are microscopic, they are usually not noticeable until their feeding has produced galls (Fig. 2).

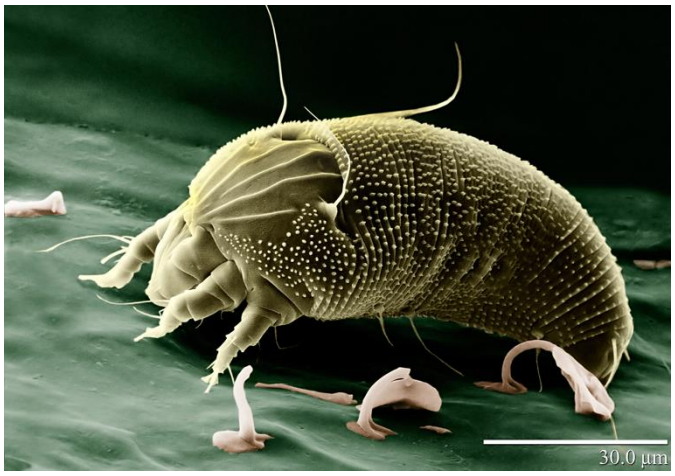


Figure 1: Eriophyid mite appearance under magnification. Photo: Eric Erbe; digital colorization by Chris Pooley (USDA, ARS, EMU).

A close look at the galls under a microscope shows that the infested galls are made up of different chambers and these chambers can be filled with

Fig. 2. Infected bud galls in a Golden Nectar plum tree. Photo: Aparna Gazula.

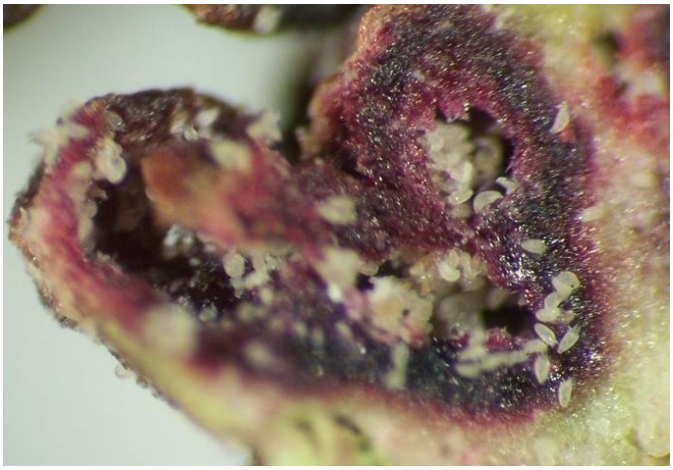

Figure 3: Plum bud gall mites with a wormlike body and whitish color, as seen under microscope. Photo: https://ujkarositok.weebly.com

large populations of the clear-bodied, wormlike mites (Fig. 3).

## Life Cycle

Adult females overwinter in galls and emerge in the spring, when galls crack open. Mites then migrate toward new buds and begin to feed. The mites' migration occurs at night. The presence of feeding

Fig. 4. Bud galls formed due to infestation by plum bud gall mites, as seen under a microscope. Photo: Susan Casner-Kay.

mites leads to the formation of new galls around infested buds (Fig. 4). These galls enclose the recently-arrived mites and will expand to accommodate all of their descendants. Inside the gall, female mites lay one egg each day for 20-25 days. During the summer a new generation is produced about every three weeks, so that by the fall, when reproduction stops, a gall may contain between 4000 to 5000 mites.

Plum bud gall mites are primarily dispersed by wind, but can also be transmitted to new host trees by insects and birds, and by moving infected budwood.

## Damage

Mites are piercing and sucking feeders. Their feeding activity causes cells to grow and envelop the mites, leading to the formation of galls, which range in diameter from 1.3 to 1.8 mm, around buds on almond, apricot, plum, and peach trees (Fig. 4). Mites may also lead to the deformation of fruit spurs (Fig. 5). Reports have found that tree susceptibility to the pest and the severity of infestation is highly variety dependent.

Reports from outside the US describe plum bud gall mite infestations that have led to weakened trees,

Fig. 5. Flavor Queen Pluot tree with infested bud galls. Photo: Aparna Gazula.

decreased yield (seen in almonds in the Middle East), or, in some cases, the death of the tree. In other instances, trees have recovered from the mite attack, and some cultivars are known to be resistant to the mites. Information about plum bud gall mite behavior, impact, and management for North America remains limited.

## Results of 2020 Host Range Study

In 2020, host range studies were conducted by Karen Suslow (Dominican University, San Rafael, CA). These studies were conducted in nursery stock of five commonly grown almond varieties – Monterey, Padre, Nonpareil, Carmel, Butte, and two commonly grown plum varieties – Santa Rosa and Mariposa. All five of the almond varieties were grafted on Krymsk rootstock. One hundred and twenty-five plum bud gall mite infested twigs with emerging mites were collected from plum trees in San Rafael, CA. Emergence and presence of plum bud gall mite in the galls was confirmed by California Department of Food and Agriculture (CDFA). The plum bud gall mite infested twigs were attached to the healthy almond and plum tree branches. Seven to eight infested twigs were attached to each plum tree and two infested twigs were attached to each almond tree. The galls on the infested twigs were placed in direct contact with healthy almond and plum tree branches

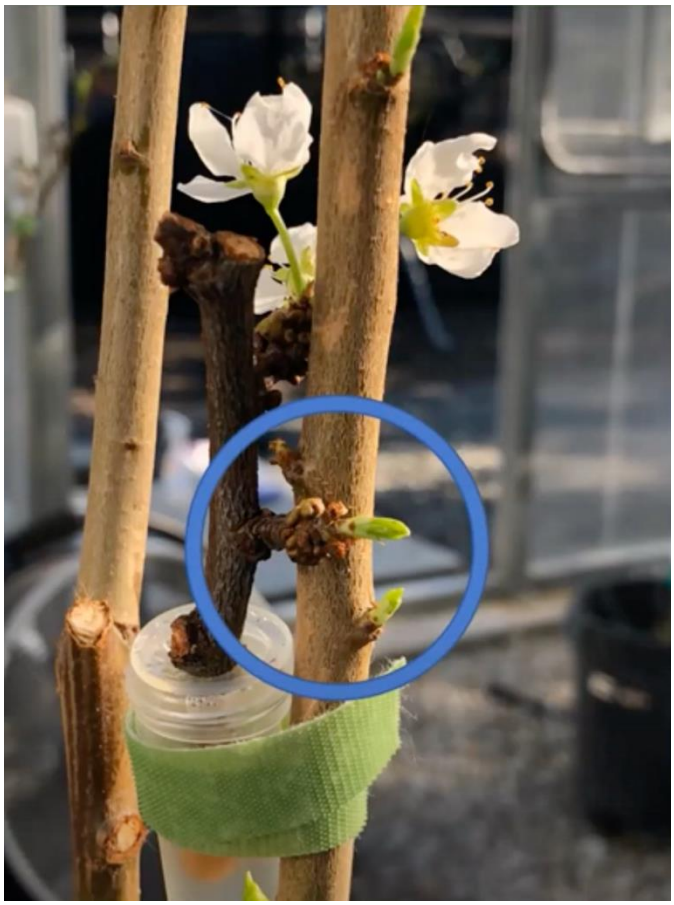

Fig. 6. Plum bud gall mite infested galls place in direct contact with healthy plum branch to ensure transfer of emerging mites onto the healthy tree branches. Photo: Karen Suslow.

to ensure transfer of emerging plum bud gall mites onto the healthy tree branches (Fig. 6.).

The host range study found that 1) No galls were formed on any of the five almond varieties tested; 2) No galls were formed on the Santa Rosa plum trees; 3) Only Mariposa plum trees formed galls; 4) Old galls formed during prior years of plum bud gall mite infestations do not harbor mites; 5) Plum bud gall mites' emergence from the infested galls was observed over a three month period, February-April 2020; 6) On the infested Mariposa plum trees, galls took approximately 5 months to form; 7) Steaming killed plum bud gall mites inside galls; and most importantly, 8) Almonds did not serve as a host for plum bud gall mites.

## California Pest Rating Profile

California Department of Food and Agriculture has a pest rating system of A, Q, B, C, D. In 2019 plum bud gall mite was given the rating 'A'. The rating for the pest has since been downgraded to 'B'. The main reasons for this revised rating are as follows: 1) High likelihood to establish a widespread distribution in California; 2) Low or has a very limited host range; 3) High both reproduction and dispersal potential; 4) Low economic impact; 5) Medium environmental impact; 6) Pest has a localized distribution in California.

## What to Do

If you suspect that a tree at your home or in your commercial orchard is affected by the plum bud gall mite, you should avoid moving budwood off your property to keep from spreading the pest. Otherwise, no other steps are required at this time to manage plum bud gall.

Each County Agricultural Commissioner makes their own determination about how to manage plum bud gall mite. If you have questions about the requirements in your county, please contact your County Agriculture Department (Table 1).

**Table 1: Phone numbers for County Agriculture Departments in seven counties where plum bud gall mite has been identified.**

| County | Phone Number |
|---|---|
| Alameda County | (510) 670-5232 |
| Contra Costa County | (925) 608-6600 |
| Marin County | (415) 473-6700 |
| Santa Clara County | (408) 918-4600 |
| San Mateo County | (650) 367-0130 |
| Santa Cruz County | (831) 763-8080 |
| Sonoma County | (707) 565-2371 |

Because this is a new pest, options for managing it are still being developed. According to the UC IPM program, low populations of Eriophyid mites can be suppressed by using biological control techniques such as predaceous mites (UC IPM Western Predatory Mite). Organic treatment options include biological control and applications of sulfur sprays. Pesticide treatment options for conventional production systems include wettable sulfur or sulfur dust, and fenbutatin oxide (Vendex) 50 WP. For further information on managing these mites, please consult "UC IPM: UC Management Guidelines for Eriophyid Mites on Plum." Also, mites generally tend to emerge from infected bud galls in the spring season during bud break. Pesticide applications targeting the pest during bud break tend to be very effective.

## References


California Pest Rating Proposal *Acalitus phloeocoptes* (Nalepa): Plum bud gall mite. CDFA.https://blogs.cdfa.ca.gov/Section3162/wp-content/uploads/2020/10/Acalitus-phloeocoptes-CA-Prunus.pdf

Castagnoli, M., and Oldfield, G.N. 1996. Other Fruit Trees and Nut Trees. Chapter in: Eriphyoid Mites - Their Biology, Natural Enemies and Control, 543 - 559.

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California Department of Food and Agriculture Pest Ratings. Plant Pest Regulations and Permits. UC Agriculture and Natural Resources. https://ucanr.edu/sites/plantpest/Regualtory_Information/Pest_Ratings/

Talhouk, A.S. 1977. Contribution to the knowledge of almond pests in East Mediterranean countries. Z. ang. Ent. 83, 248-257.

Vacante, V. 2016. The handbook of mites and economic plants. CAB International, 314-317.

**Table 1: CDFA Pest rating definitions. ***

| Rating | California Department of Food and Agriculture Pest Rating Definitions |
|---|---|
| A | An organism of known economic importance subject to state (or commissioner when acting as a state agent) enforced action involving: eradication, quarantine regulation, containment, rejection, or other holding action. |
| Q | An organism or disorder requiring a temporary "A" action pending determination of a permanent rating. The organism is suspected to be of economic importance but its status is uncertain because of incomplete identification or inadequate information. In the case of an established infestation, at the discretion of the Director, the Department may conduct surveys and may convene the Division Pest Study Team to determine a permanent rating. |
| B | An organism of known economic importance subject to: eradication, containment, control or other holding action at the discretion of the individual county agricultural commissioner.<br>or<br>An organism of known economic importance subject to state endorsed holding action and eradication only when found in a nursery. |
| C | An organism subject to no state enforced action outside of nurseries except to retard spread. At the discretion of the county agricultural commissioner.<br>or<br>An organism subject to no state enforced action except to provide for pest cleanliness in nurseries. |
| D | No Action. (Parasites, predators and organisms or little of no economic importance.) |

* This table has been copied from UC Agricultural and Natural Resources' Plant Pest Regulations and Permits website.

https://ucanr.edu/sites/plantpest/Regualtory_Information/Pest_Ratings/