Maintaining the UC IPM Pest Management Guidelines for Almond

Introduction

The Pest Management Guidelines (PMGs) are the University of California's official guidelines for managing agricultural pests in California.

The Pest Management Guidelines are the UC's primary extension publication for growers.

The Pest Management Guidelines are a well-established tool to extend the most current pest management science.

The Pest Management Guidelines

- Series receives about 2 million web accesses a year
- The Almond Guidelines receives an average of 7,564 hits per month, with a total of 90,763 hits in the last year.

www.ipm.ucdavis.edu/PMG/selectnewpest.almonds.html

What's New

- Year-round IPM program Pesticide Application Checklist updated
- Dormant spur instructions improved and new first-year twig sampling
- New Alternaria disease severity model
- Navel orangeworm monitoring and treatment timing updated to protect natural enemies
- Relative toxicities of insecticides and miticides table updated
- General properties of fungicides, most effective treatment timing, and resistance management tables updated
- New insecticides, fungicides, and herbicides

Update Process

Every year PMG Coordinator Romy Basler contacts the authors for updates.

1. Romy edited and incorporated these updates.
2. The authors reviewed the changes and approved or made additional changes/clarifications. Steps 1 and 2 were repeated until the authors approve the updated pest sections.
3. The UC ANR Office of Pesticide Information and Coordination reviewed new and revised pesticide information for accuracy and compliance with regulations.
4. Romy worked with the production team to publish in PDF and online.

Kassim Al-Khatib
Director and CE Specialist

Tunyalee Martin
Content Development Supervisor

Romy Basler
PMG Coordinator

The Crop Team manages the overall direction of the Pest Management Guidelines and, with the authors, provides scientific content. Authors:

James Adaskaveg*, Walt Bentley*, Joe Connell*, Roger Duncan*, Doug Gubler, David Haviland, Brent Holtz, Marshall Johnson*, Mike McKenry*, Carolyn Pickel, Jim Stapleton, Anil Strestha*, Robert VanSteenwyk, Frank Zalom*

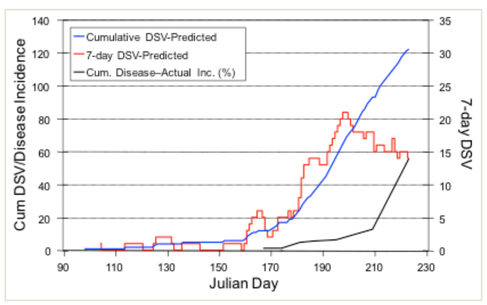
***2008–2012 Crop Team member and author**

New Alternaria leaf spot disease severity value (DSV) model added to help determine when to apply fungicides.

MANAGEMENT

The disease occurs first and is most severe on exposed leaves. Trees trained to an open and spreading canopy usually have more severe Alternaria leaf spot. Trees planted with rows in an east-west direction also have more severe disease than do orchard with rows planted north-south. Varieties that are most susceptible include Carmel, Sonora, Monterey, Winters, and Butte. Monitor for signs of the disease in April through June. If monitoring indicates the presence of Alternaria, begin late-spring treatments about mid-April. In orchards with a history of the disease, treat in mid- to late April and 2 to 3 weeks later.

A disease severity value or DSV model has been developed on tomato and modified for almond for forecasting Alternaria leaf spot. Index values are assigned for specific ranges of average temperatures during leaf wetness periods during a day. Apply fungicide if accumulated index values over a 7-day period reach a value of 10 or higher.



Mean temperatures (C) during wetness	Leaf wetness duration (hours)				
15-17	0-6	7-15	16-20	21	---
17.1-20	0-3	4-8	9-15	16-22	23+
20.1-25	0-2	3-5	6-12	13-20	21+
25.1-29	0-3	4-8	9-15	16-20	23+
DVS	0	1	2	3	4

Updated navel orangeworm spring spray information reduces pesticide harm to natural enemies.

Monitoring and Treatment Decisions Degre

In orchards where a thorough sanitation program and early harvest are carried o
there is a source of moths from infested trees outside the orchard. If cultural con
application may be necessary. A harvest sample will help to evaluate the effectiv

Treatment is generally required in orchards that have more than two mummies (
remaining per tree after bud swell. Usually only one treatment is necessary to ke
are removed before the start of the third flight. Depending on the product used, a
Dormant sprays do not control navel orangeworm. If you also need to control pea
bloom spray was not applied, you may be able to apply one spray in spring (May)
that egg hatch for peach twig borer, leafrollers, and navel orangeworm will occur
during hullsplit, because they can cause mite numbers to increase and will have a
enemies. In general, pyrethroids are more appropriate for protecting late almond

Spring sprays

Apply a spring spray for navel orangeworm just after the first eggs of the spring brood hatch using reduced-risk products, the insect growth regulator methoxyfenozide, diamide chlorantraniliprole or flubedimide, or spinosyns such as spinosad and spinetoram. Spinetoram and spinosad are toxic to bees, so only apply when bees are not foraging. Apply at night to avoid bee activity and because spinetoram works best when moths are active, which occurs at night. Under moderate pest pressure Bt could be used as well.

The time of brood hatch will vary according to year and location, so use degree-day accumulations to predict egg hatch (lower threshold of 55°F; upper threshold of 94°F). For assistance in calculating degree-days, see *"degree-days"*.

The biofix for the start of degree-day accumulation is the beginning of a consistent increase in egg laying on egg traps. When at least 50% of the egg traps in a given location show increases in the number of eggs on two consecutive monitoring dates, the biofix point is the first of those two dates. (Be sure to remove eggs from the trap after it is examined.) Egg hatch is expected when 100 DD have accumulated.

Dormant spur monitoring instructions were improved for invertebrate pests and new first-year twig sampling instructions were added for disease monitoring. Videos show the invertebrate pests (Part I) and how to sample (Part II).

How to Manage Pests
UC Pest Management Guidelines

| All almond pests | All crops | About guidelines |

Almond

Dormant Spur or First-Year Twig Sampling and Treatment Guidelines

(Reviewed 3/09, updated 11/12)

In this Guideline

- How to sample
- Treatment thresholds
- Important links
- Publication
- Glossary

Dormant spur or twig sampling is used to determine the need for a dormant treatment to control San Jose scale, European red mite, brown mite, European fruit lecanium, and almond scab, caused by *Fusicladium carpophilum (Venturia carpophila)*. Spurs or twigs are the short green shoots producing the flower buds, and represent twig growth that developed in the previous summer and fall. They have not yet developed bark. Dormant spur samples are taken once a year between mid-November and the end of January.

Dormant spur sampling for prune pests.
This technique can also be used to monitor for these pests in plum and almond. (View with transcript)

HOW TO SAMPLE

View photos for identification

- Randomly select 35 to 50 trees from each orchard or plot to be sampled.
- Selecting major scaffolds randomly, clip 2 to 3 spurs or twigs from the inside of each tree's canopy for a total of 100.
- Clip the spur off at the base, making sure to include some old spur wood along with the last year's growth to detect parasite activities on scales.
- Using a hand lens or binocular microscope, examine 20 of the spurs for scales, mite eggs, and scab lesions and record observations in a sampling form. It is not necessary to count the number of individual insects or mite eggs present, just identify the pest or disease and record whether it is present or not.
- Note how many scales are parasitized. A parasitized scale can be distinguished from a live scale by a small hole in the top of the scale covering. Parasitized European fruit lecanium scales turn black. If a large number of scales have been parasitized, minimize the use of insecticides during the growing season and only use those that are not harmful to parasites so that naturally occurring populations will not be destroyed.

TREATMENT THRESHOLDS

1. **Randomly select a first set of 20 spurs out of the 100 spurs collected (20/100):**
   - If no scab lesions are found, no more spurs need to be examined. For scales and mite

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