Field Notes
San Joaquin County
August 2016
University of California
Agriculture and Natural Resources | Cooperative Extension

# Fusarium Wilt of Tomatoes

In general, disease pressure has been fairly low from powdery mildew, Fusarium crown rot, tomato spotted wilt virus (TSWV), and Curly Top virus (BCTV). However, we are seeing high pressure from Fusarium wilt race 3 caused by *Fusarium oxysporum* f. sp. *lycopersici*. Symptoms include bright yellow flagging of branches, dark vascular discoloration (when stem cut open) and dieback of vines. In some cases, a dark brown lesion at the crown can be seen. This season Fusarium wilt has appeared in many new locations in the county where we have not seen the disease previously. It also appeared quite early in the season this year, affecting young tomatoes. This might be attributable to the early heat waves we had. I am including some information in Figure 1 which describes factors that affect the severity of Fusarium and Verticillium wilt (summarized from information found in the scientific literature). I don't want to overstate the impact of these factors; these are just things that can tilt the balance slightly in favor of the pathogen or against it. These factors cannot be adjusted to successfully control these diseases. That said, it is interesting to see what conditions favor these diseases under experimental conditions.

| Fusarium Wilt | |
|---|---|
| Favored by: | Suppressed by: |
| Ammoniacal nitrogen | Nitrate nitrogen |
| Acid soils | Alkaline soils |
| 80-90 F | 60-70 F |
| Sandy soils | Microbially rich soils |
| **Verticillium Wilt** | |
| Favored by: | Suppressed by: |
| Nitrate nitrogen | Ammoniacal nitrogen |
| Alkaline soils | Acid soils |
| 65-80 F | Microbially rich soils |

Figure 1. Factors which can impact the severity of disease caused by Fusarium and Verticillium wilt (information summarized from reports in the scientific literature).

Based on testing of samples I've sent to the Plant Pathology lab at UC Davis, we have two different strains of the race 3 pathogen. One strain they have identified appears to be homegrown, in the sense that it appears to have mutated from strains we already had here and overcame the host plant resistance (varieties resistant to races 1 and 2 then became susceptible). The second strain is a Florida-derived strain. Variety susceptibility is the same as the California strain, but symptoms do vary between strains. The Florida strain has a tendency to cause a crown rot and foliar symptoms which can easily be confused with the pathogen causing Fusarium crown and root rot. I have seen fields which had both strains present and causing disease several times. Because of this overlap of symptoms with the other Fusarium disease of tomato, it can be important to get a laboratory diagnosis which includes genetic testing to determine the type and strain of *Fusarium oxysporum* that are causing the disease. This is particularly important if you might be interested in planting tolerant or resistant varieties, as the resistance/tolerance to one Fusarium does not confer resistance to the other. In other words, you need to know your enemy to make the best use of host resistance. As a side note, Fusarium crown and root rot seems to have become less important in recent years, after causing significant problems when it was first found in California. We don't know why the pressure from Fusarium crown and root rot has subsided, but we are thankful!

Host resistance to race 3 will be the best option for managing this disease. Based on my observations of growers' attempts to control Fusarium wilt with drip fumigation (and field trial evidence from Gene Miyao), fumigation with Vapam or K-Pam is not highly effective, at least with the application methods we are using (banded applications via buried drip systems). A group of five UC farm advisors have been conducting variety trials in processing tomatoes to look at race 3-resistant or tolerant varieties that are available now. I don't yet have yield data from my variety trial, but below is a table showing the percentage of plants affected by Fusarium wilt at 12 weeks after transplanting in a central Delta field. As you can see, the race 3-resistant varieties are holding up very well to the wilt, and the tolerant varieties are doing fairly well also (Table 1). If you have any questions or if you need help with disease or strain diagnosis, please don't hesitate to contact me.

Brenna Aegerter, Farm Advisor

## Table of Contents:

Table 1. Preliminary results of a processing tomato variety trial conducted in a field with Fusarium wilt race 3.

| Variety | Resistances* | Category** | Disease incidence*** |
|---|---|---|---|
| H 8504 | VFFNP | susceptible | 29% |
| DRI 319 | VFFNPsw | tolerant | 12% |
| HM 3887 | VFFNsw | tolerant | 11% |
| N 6429 | VFFFNswLv | resistant | 0.6% |
| BQ 142 | VFFFNPsw | resistant | 0.3% |
| H 1310 | VFFFNPsw | resistant | 0.3% |
| H 1539 | VFFFNsw | resistant | 0.3% |
| BQ 141 | VFFFNPsw | resistant | 0 |
| BP 16 | VFFFNPsw | resistant | 0 |
| BP 2 | VFFFNPsw | resistant | 0 |
| SVS 8232 | VFFFNPsw | resistant | 0 |
| SVS 2493 | VFFFNPsw | resistant | 0 |
| BQ 406 | VFFFNPsw | resistant | 0 |
| HM 58801 | VFFFNsw | resistant | 0 |
| N 6428 | VFFFNsw | resistant | 0 |

*V= Verticillium wilt, FF= Fusarium wilt race 2, FFF= Fusarium wilt race 3, N= root knot nematode, P= Bacterial Speck, sw= Spotted wilt virus, LV= powdery mildew.
** Category of variety with respect to Fusarium wilt race 3.
*** Disease incidence based on visual evaluation at 12 weeks after planting.

## Cherry Production Self-assessment Workshop: Announcement for growers, PCAs, and Packing Sheds

The California Cherry Board has organized a workshop for members in the cherry industry to present the results of the self-assessments done by growers in 2015. It is a great opportunity to see how the summarized assessment confirm a commitment to good stewardship by California cherry growers. The workshop will be on August 16 from 10:30 am to noon at the Robert J. Cabral Agriculture Center, 2101 East Earhart Ave, Stockton, followed by lunch. An hour of DPR Continuing Education Units has been applied for. At the workshop attendees will be given printed copies of the workbook and time to complete part of the self-assessment. If you have a laptop or tablet with WiFi, bring it to the workshop and you can do the self-assessment on-line. The self-assessment workbook is a tool a cherry grower can use to document the practices and processes they are using in their orchards and learn about others that may improve their farming operations. The workbook was put together by a committee of growers, packer/shippers, and University of California Farm Advisors under the guidance of the California Cherry Board. The project is funded by a California Department of Food and Agriculture Specialty Crop Block Grant to the California Cherry Board.

Please RSVP to:
Nick Matteis, California Cherry Board at (916) 441-1064, nmatteis@agamsi.com; or
Cliff Ohmart, SureHarvest at (530) 601-0740 cohmart@sureharvest.com

## Are You Pushing Out a Chandler Orchard in the Next Year? Call Kat!

Are you planning on pushing out an old Chandler or Tulare orchard this fall or next spring? We could use your help filling in one of the final pieces of the walnut nitrogen budget puzzle. We need to know how much biomass and nitrogen is in the woody tissue of grown walnut trees. As you're all aware, nitrogen use is coming under increasing scrutiny. We need precise, replicated measurements to justify how much nitrogen to budget for tree growth every year. If you might be willing to allow us to remove a few trees before you pull the rest of an orchard you are removing, please call Kat Pope, Orchard Systems Advisor, at (530) 377-9528 or send an email to kspope@ucanr.edu.

# Almond Scab

Scab disease has been prevalent this year on almond, especially on the Carmel variety, most likely in response to the higher levels of rainfall received in the San Joaquin Valley this spring. Unfortunately, disease symptoms often catch us by surprise in July and August because we associate scab as a disease that we typically try to control in the spring after petal fall.

Almond scab is caused by a plant pathogenic fungus, *Cladosporium (Fusicladium) carpophilum,* that causes greasy black spots on fruit, leaves, and green shoots. The first visible evidence of a scab infection on leaves occurs in late spring as small, indistinct, yellowish spots. These enlarge to about 1/5 inch in diameter and become greasy gray when the fungus begins to produce spores (Fig. 1). Later in the season, the lesions become brown and necrotic.

The shoot lesions (Fig. 2) serve as the overwintering sites for the fungus and the source of new spores and infections the following spring. Lesions on twigs start as indistinct, water-soaked spots that gradually turn brown in the center and have lighter-colored margins. In spring, when the fungus resumes growth, it produces spores at the margin of the lesions, causing the margin to develop a distinct dark color. Lesions are superficial and do not girdle the shoots. Twig lesions are present throughout the year and can be used to confirm the presence of the disease in an orchard. Twig lesions should not be confused with the natural patchy darkening of maturing wood.

Small circular spots can also develop on hulls (Fig. 3), more common on the upper side of the hull. Eventually, they can coalesce into large, irregular dark blotches. The kernel is not affected. No apparent damage is done to the fruit, but leaves may fall prematurely and trees will have reduced photosynthesis. If early defoliation is severe, fruit drop can also occur. Scab infections left uncontrolled for several years will weaken trees and reduce yield.

All almond cultivars are susceptible, but the Carmel, Peerless, Monterey, and Ne Plus Ultra varieties are especially susceptible. One of the more complicated aspects for managing this disease is that it is slow to develop, and then symptoms appear to develop rapidly later in the season just before harvest. When symptoms are observed, most growers and PCAs want to make a fungicide treatment; however, it is very difficult to manage the disease once symptoms are observed.

Fungicides can be used to control almond scab, usually just after the small leaves begin to emerge in the spring, typically corresponding to 2-5 weeks after petal fall. If spring conditions are very wet, a third fungicide may be necessary (8-9 weeks after petal fall). Many growers have observed that their fungicide treatments for almond scab don't seem to be as effective. Almond scab was effectively controlled with the strobilurin (QoI-quinone outside inhibitor) fungicides (Abound, Gem, Prestine) when they were first released, but resistance has developed rapidly to these single-site mode of action fungicides, and we now recommend not using Fungicide Resistance Action Committee (FRAC) Group 11 fungicides (strobilurins) repeatedly or exclusively unless in pre-mixtures or tank mixtures with other fungicide chemistries. Repeated use of single-site mode of action fungicides may lead to increased resistance within the fungal population.

We have developed a three-spray strategy for scab control that includes a delayed dormant application of copper and oil or chlorothalonil and oil, a two-week after petal fall spray that includes multisite mode of action compounds such as chlorothalonil, and a 5-week after petal fall spray that includes other multisite mode of action compounds such as Captan, Ziram, or pre-mixtures of other fungicide combinations. Many growers have very good fungicide spray programs to control brown rot and shot hole at pink-bud, full bloom, and petal fall, but then they often neglect to apply a disease prevention program when their trees are leafing out and susceptible to almond scab and rust (2-5 weeks after petal fall), especially if we are having a wet spring like we had in 2016.

Figure 2. Scab symptoms on almond shoot

Figure 1. Scab symptoms on almond leaf

Figure 3. Scab symptoms on almond hull

*(Continued from page 3)*

More information on fungicide rotation for scab control can be found on-line under the "Fungicide efficacy and timing for deciduous tree fruit and nut crops and grapevines" at the UC IPM website at http://www.ipm.ucdavis.edu. This is the 'Bible' of bloom and foliar disease management. Group numbers have been assigned to each fungicide based on its mode of action by the FRAC (http://www.frac.info/). Fungicides with a different group number are suitable to alternate in a resistance management program. Resistance to fungicides can develop over time with repeated use; thus, we need to rotate the fungicides and chemistries we use.

I performed a trial last year to examine new chemistries and alternative fungicide rotations for their efficacy to control almond scab. Sequential treatments of Fontelis (penthiopyrad), Bumper (propiconazole), Tebuconazole, Abound (azoxystrobin), Gem (trifloxystrobin), an experimental fungicide, Merivon (fluxapyroxad + pyraclostrobin), Bravo Weather Stick (chlorothalonil), Quadris Top (difenoconazole + azoxystrobin), Inspire EC (difenoconazole), Quash (metaconazole), Rovral (iprodione) + oil, Luna Sensation (fluropyram + trifloxystrobin), Luna Experience (fluropyram + tebuconazole), Indar (fenbuconazole), Serenade Optimum (*Bacillus subtilis*), Microthiol Disperse (micronized wetable sulfur), and Regalia (extract of *Reynoutria sachalinensis*) in tank-mixtures and in various combinations and timings for the control of almond scab. Most treatment combinations effectively controlled scab except for the experimental fungicide and Regalia and Serenade. Microthiol Disperse, which if often allowed as an organic treatment, was very effective at reducing scab when applied at the 20 pound per acre rate.

Brent Holtz, Almond Farm Advisor and County Director

**Scab Incidence**
**Carmel Variety**

| Treatment | Rates per acre | Incidence[a] | |
|---|---|---|---|
| 1 Fontelis 1.67 SC[1,2,3] | 20 fl oz | 2.75 | a |
| 10 Quadris Top[1] 14 fl oz + DA, Bravo[2] 4 pt, Inspire EC[3] | 7 fl oz + DA | 2.75 | a |
| 11 Fontelis 1.67 SC[1] 16 fl oz, Inspire EC[2,3] | 7 fl oz + DA | 3.50 | a |
| 14 Indar | 6 fl oz + DA 0.25%[1] | 4.00 | a |
| 14 Indar | 6 fl oz + | 4.00 | a |
| 14 Abound | 15 fl oz+ DA 0.25%[2,3] | 4.00 | a |
| 17 Pristine[1], | 14.5 oz + DA | 4.25 | a |
| 17 Luna Experience[2,3] | 8 fl oz + DA | 4.25 | a |
| 9 Merivon SC[1,2,3] | 5.5 fl oz + DA 0.25% | 4.50 | a |
| 3 Fontelis + Tebucon 45DF[1,2,3] | 20 fl oz + 8 oz | 4.75 | a |
| 18 Microthiol Disperse[1,2,3] | 20 lbs | 5.75 | a |
| 15 Luna Sensation SC[1,2,3] | 5 fl oz+ DA 0.25% | 6.00 | a |
| 2 Fontelis + Bumper | 3.6EC[1,2,3] 20 fl oz + 8 fl oz | 7.25 | a |
| 13 Rovral + oil[1] | 16 fl oz+1%v/v | 10.25 | a |
| 13 Luna Sensation SC+ DA[2,3] | 7 fl oz + 0.25% | 10.25 | a |
| 5 Fontelis + Gem 4.05SC[1,2,3] | 20 fl oz + 2.9 fl oz | 11.00 | a |
| 12 Quash | 3.5 oz + Dyne-Amic 0.25%[1,2,3] | 12.00 | a |
| 4 Fontelis + Abound 2.0 8F[1,2,3] | 20 fl oz + 12 fl oz | 12.00 | a |
| 8 Experimental + DA[1,2,3] | 57.8 fl oz + 0.25% | 13.00 | a |
| 16 Serenade Optimum | 16.0 oz + DA 0.25%[1] | 14.25 | a |
| 16 Luna Experience[2,3] | 6 fl oz + DA | 14.25 | a |
| 7 Experimental + DA[1,2,3] | 43.4 fl oz + 0.25% | 16.50 | a |
| 6 Experimental + DA[1,2,3] | 28.9 fl oz + 0.25% | 36.25 | b |
| 19 Regalia[1,2,3] | 1.0% v/v dilution | 37.75 | b |
| 20 Untreated Control | | 51.00 | b |
| 21 Untreated Control | | 80.25 | c |

[a]Incidence = number of nuts that have scab lesions on 100 nuts randomly sampled per tree. 100 nuts per Carmel tree/replication were randomly sampled on July 15th and taken back to the laboratory to determine incidence and severity. Data was analyzed by ANOVA with means separated by Fisher's Protected LSD ($\alpha = 0.05$) test. Means followed by the same letter are not significantly different. Most treatments significantly reduced the incidence of almond scab when compared to our two untreated controls.

The following trial applications are outlined above:
[1]First trial application was performed at 100% full bloom (100 % FB) on February 18th.
[2]Second trial application was performed 1 week after petal fall (1WPF) on March 5th.
[3]Third trial application was performed 5 weeks after petal fall (5WPF) on April 2nd.

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**2016 Alfalfa and Forage Field Day**

*Wednesday, September 14, 2016*
Kearney Agricultural Research and Extension Center
9240 S. Riverbend Ave., Parlier, CA 93648

7:30 AM **Registration**

8:00 TRAM LEAVES FOR FIELD TOUR

- Alfalfa Varieties for Pest and Disease Management – *Dan Putnam, CE Specialist and Agronomist, UC Davis*
- Forage and Grain Sorghum Evaluations – *Jeffery Dahlberg, Director at Kearney Agriculture Research & Extension Center*
- Irrigation Management Research – *Robert Hutmacher, CE Specialist and Director at West Side Research & Extension Center*

9:15 TRAM RETURNS

9:20 New Alfalfa Herbicide Registrations – *Kurt Hembree, Weed Management Farm Advisor, UCCE Fresno*

9:40 Alfalfa Weevil Management – *Larry Godfrey, CE Specialist in Entomology, UC Davis*

10:00 Managing Aphids, Worms, and Leafhoppers in Alfalfa – *Vonny Barlow, Entomology, IPM, and Crop Production Farm Advisor, UCCE Riverside*

10:20 Using the IPM Decision Support Tool – *Peter Goodell, IPM Cooperative Extension Advisor, Kearney Agricultural Research & Extension Center*

10:40 **Break –** *Sponsored by BASF*

11:00 Irrigation Systems and Salinity Management in Alfalfa – *Khaled Bali, CE Irrigation Water Management Specialist, Kearney Agricultural Research & Extension Center*

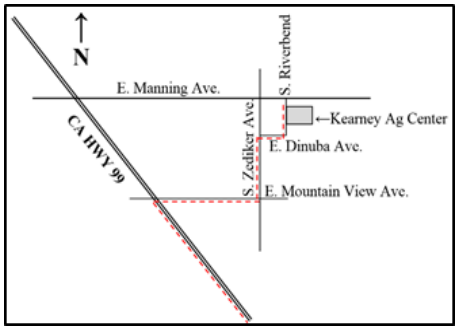
11:20 Challenges of Sub-Surface Drip Irrigation in Alfalfa – *Dan Putnam, UC Davis*

11:40 BMP's for Dairy Manure Fertilization of Forage Crops – *Nicholas Clark, Agronomic Cropping Systems and Nutrient Management Farm Advisor, Kings*

12:00 PM Harvest Strategies for Yield and Quality Goals of Small Grain Silage – *TBA*

12:20 New Alfalfa Check-Off Program: Updates and Industry Input – *Facilitated by Dan Putnam, UC Davis*

12:30 **Lunch** – *Sponsored by Bayer*




Continuing Education Requested: DPR 1.75 of *Other;* CCA 3.5 hours
For More Information, Contact:
Nicholas Clark
(559) 852-2788
neclark@ucanr.edu

# Almond Short Course

**November 8-10, 2016**

Plan to join us for this integrated orchard management short course featuring UC faculty, Cooperative Extension specialists and farm advisors, and USDA researchers who will provide an in-depth, comprehensive study of all phases of almond culture and production.

The program is based on the latest information and research and will cover the fundamental principles that form the basis for practical decisions and include Q&A for each session, quality time with instructors and networking opportunities.

Who should attend: New and experienced growers as well as other industry members interested in commercial almond production.

Register to learn about:

- Orchard planning, design and development
- Almond variety and rootstock selection
- Evaluation and modification of soils
- Tree training and pruning
- Tree and root physiology
- Bud Development, pollination and fertilization of flowers
- Bee management
- Irrigation scheduling
- Proper use and maintenance of irrigation systems
- Salinity management
- Mineral nutrition and fertilization
- Soil amendments
- Management of weeds, vertebrate pests, insects and diseases
- Organic production
- Economics of almond farming and marketing

**Early registration available July 1 through September 1**

**Registration includes:**

- **Three Full Days of Instruction with over 35 Presentations**
- **Binders with presentations**
- **Three lunches and two receptions**

**Modesto Centre Plaza**
**1000 L Street**
**Modesto, California**

**For more information visit**
**http://ucanr.edu/almondshortcourse**

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# Taking Nut Samples at Harvest for Insect Damage Assessment

It's harvest time! Since we will begin harvesting almonds and walnuts soon, I'd like to remind you about how to take harvest samples and assess the damage inflicted by individual insect pests. Harvest sampling provides the actual damage on the current crop at harvest, which is higher than the reported damage by your processor because of losing some damaged nuts during the handling process (sweeping to processing). More importantly, the damage assessment will guide next year's pest management plan. Insect populations in orchards build over time; therefore, knowing the history of damage helps to manage the potential risks for next year's crop.

**Harvest sampling in almonds.**
Taking a minimum of 500 sample nuts anytime between shaking and sweeping is recommended. Infestation can vary across different sides of the tree, between edges and interior portions of the orchard, etc. We suggest collecting representative samples by taking these factors into account. Take paper bags and collect samples from different places (4-8 points) within the orchard. Keep the bags in the freezer until you have time to evaluate them. Crack open the nuts and look for damage signs associated with particular insect species described in the following paragraphs. Major insects for damage evaluation are navel orangeworm (NOW), peach twig borer (PTB), oriental fruit moth (OFM), ants, and leaffooted bugs (LFB).

**Worm damage (NOW, PTB, OFM).** Indications of NOW damage include deep feeding tunnels in the kernel (nutmeat) and presence of a significant amount of white frass and webbings (Fig. 1a). (All figures appear on page 8.) Since NOW and PTB often infest the same nut, NOW feeding damage often masks the PTB damage. Feeding damage by PTB and OFM on kernels looks similar (i.e. the presence of shallow tunnels and surface grooves on the kernels, no webbings) (Figs. 1b and 1c). In contrast to PTB, OFM larvae are present in multiple numbers and often leave small amounts of reddish frass on the hulls.

**Ant damage.** The extent of ant damage during harvest depends on how long the nuts were on the ground after shaking. The longer the duration, the more damage we can expect from ants. Furthermore, higher damage is expected in orchards with drip or sprinkler irrigation compared to flood irrigation. Cover crops in orchards often result in elevated ant problems compared to clean orchards. Nuts with tight seal shells or with narrower hull splits (<0.03 inch wide) have less ant damage; although, tightness of shells varies with variety, year, and other cultural practices. Ants can completely hollow out the nutmeats and leave a thin outer skin (i.e. pellicle). Other signs of ant damage are peeling skin, absence of webbings, and frass (Fig. 2a).

**Leaffooted bug damage.** Although leaffooted bug feeding causes aborted and shriveled nuts, leading to nut drop in May-June, their feeding after shell hardening can leave black stains on kernels (Fig. 2b). Varieties with soft shells such as Fritz, Sonora, Aldrich, Livingston, Monterey, and Peerless are more susceptible to bug damage for a longer period during the season.

**Harvest sampling in walnuts.**
Take a minimum of 1000 nuts after the harvest, crack them, and record the damage caused by NOW, codling moth (CM), ants, husk fly and sunburn. The damage signs associated with individual insect pests and sunburn are described in the following paragraphs.

**Worm damage (NOW, CM).** Damage from NOW can be identified by the presence of large amounts of white frass and webbings, giving the kernel a "messy appearance" (Fig. 3a). Larvae, present in a group, deeply bore into the kernel. Heavy infestation may give the nutshell an oily appearance. Damage from CM is indicated by a lot cleaner kernel. Frass is evident, but only at the entry point on the husk; very little webbing is present (Fig. 3b). A single larva infests the nut.

**Ant damage.** Similar to almond, nut damage by ants increases the longer the nuts stay on the ground. Ants enter into the nut from the soft tissues (i.e. stem end) and/or through a codling moth injury. Ant damage on nuts is identified by the presence of deep chewing channels with clean kernels (i.e. no frass, no webbings, no boring) (Fig. 4a).

**Husk fly damage**. Walnut husk fly larvae (technically maggots) feed in groups by boring into the husk. Early season damage results in shriveled and darkened kernels, with the increased potential for mold growth. Late season infestation causes little kernel damage (Fig. 4b); although, it may stain the shell, which makes the husk removal process difficult.

**Sunburn damage.** Sunburn damage on nuts can be confused with husk fly damage. In cases of sunburn, nutmeat is shriveled and darkened on one side of the nut. There is no evidence of frass, webbings, or larval presence (Fig. 4c). Husks can be removed from the shell during processing, which is not the case for nuts damaged by husk fly.

Jhalendra Rijal, IPM Advisor


Fig 1. Almond kernels (nutmeat) damaged by: a) navel orangeworm, b) peach twig borer, c) Oriental fruit moth


Fig. 2. Almond kernels damaged by: a) ants, b) leaffooted bugs

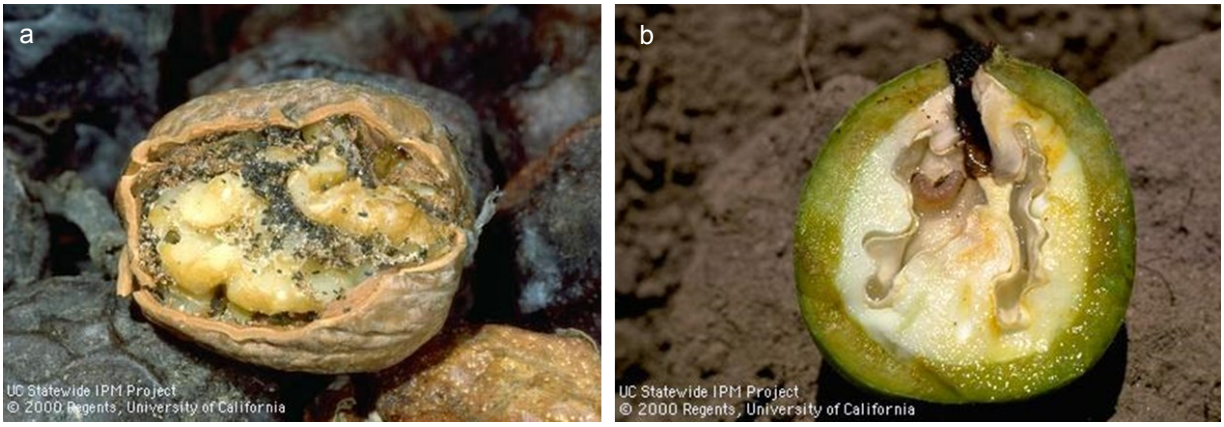


Fig. 3. Walnut damaged by: a) navel orangeworm, b) codling moth


Fig. 4. Walnut damaged by: a) ants; b) walnut husk fly; c) sunburn

# Announcements / Calendar of Events

**Cherry Production Self-Assessment Workshop**
August 16, 2016
10:30am-12:00pm
Robert J. Cabral Agricultural Center, 2101 E. Earhart Ave., Stockton, CA

**Dry Bean Field Day**
August 25, 2016
10:00am-12:00pm
UC Davis Agronomy Field Headquarters, Hutchison Drive, UC Davis

**Rice Experiment Station Annual Field Day**
August 31, 2016
7:30am-12pm (lunch included)
Rice Experiment Station, 955 Butte City Hwy, Biggs, CA 95917
For more information, visit http://www.crrf.org/.

**Alfalfa and Forage Field Day**
September 14, 2016
7:30-12:30pm (lunch included)
Kearney Agricultural Research and Extension Center, 9240 S. Riverbend Ave., Parlier, CA
For more information, see flyer on page 5.

**Almond Short Course**
November 8-10, 2016
Modesto Centre Plaza, 1000 L Street, Modesto, CA
For more information, please visit: http://ucanr.edu/almondshortcourse or see flyer on page 6.

**UC Soil and Water Short Course**
November 17, 2016
7:30am to 4:30pm
Buehler Alumni Center, UC Davis
For more information, please visit: http://vric.ucdavis.edu/events/soil_water_info_2016.htm.

**California Alfalfa and Forage Symposium**
November 29-December 1, 2016
Peppermill Hotel, Reno, NV
For more information, please visit: calhay.org/symposium.

# Winegrape Crop Digest

Harvest arrives early again; although, it's a little behind 2015 when harvest started around July 22nd. A couple of hot spells and an early start to budbreak helped set the early harvest.

There were three days of 100$^0$F or higher maximums in June, and there were eight days in July. That puts the season just slightly ahead of halfway to the long term average number of seventeen 100$^0$F days for a season.

The 2016 season did start out with budbreak about two weeks ahead of average, but the moderate growing conditions slowed Growing Degree Day (GDD) accumulation down, and the two hot spells may have speeded up some vineyards and delayed others. Right now, GDD seasonal totals are about 100 degrees above "average", which is within about 5% error for average. In 2015, some color in Zinfandel occurred as early as June 23rd. Although there were a few scattered reports of Zinfandel (most likely Primitivo) showing color in late June this year, I didn't see or hear of significant color until July 4th, which is about average for Lodi Zinfandel over the long term.

As of August 1st, harvest is going with Pinot grigio, Sauvignon blanc and some "light crop" Chardonnay. Last year, we got under way on about July 24th with Pinot grigio, some Sauvignon blanc and Muscat selections, and some Pinot noir for sparkling wine. As in 2015, warm days and cooler-than-average nights with little morning dew compared to usual, brings us to the task at hand -- harvest.

There have been fewer windy days this year, but conditions have still been good for powdery mildew (PM). Although problems were scattered, it has been a severe problem at some sites. The PM model has been a great tool, and there are a surprising number of good materials for control. If you have a problem, be sure to start early next season with a late dormant spray, weekly applications of sulfur or shortened intervals of the systemics, and rotate modes of action. Talk over your strategy with your PCA before spring, and if desired, give me a call.

With the first hot spell in June and dry soil conditions, spider mites have flared somewhat in the last month. The problems have been scattered and came on late, maybe because of the good vine growth from good rainfall, but problems did arise, if scattered inconsistently.

The positive aspect of weather this year is that the winter and spring rains mitigated the dry soil conditions that developed over the 2012 and 2013 seasons. This year's total rainfall was 17.8 total inches in the north county. A wet December and January, followed by a bone dry February, rounded out by a wet March seemed to reduce weed problems, but encouraged vines to grow very well (almost too well!). What these conditions also seemed to provide was a good season for gopher digging and reproduction. I would personally term this the Year of the Gopher, as opposed to the Year of the Squirrel in 2015.

If gopher mounds are observed, it is best to control them immediately.Vine Mealy Bug is still spreading through the county, so be aware of any new infestations, often indicated by sooty (black) mold or exces-

*(Continued on page 10)*

sive honeydew in clusters, spurs, or cordons. A high degree of ant activity in and around vines can also indicate problem spots. Good places to focus a first look are where birds tend to perch or roost. The Light Brown Apple Moth continues to expand its territory in the south county around Manteca since it was found in 2009. The good news is it is of reduced concern in regards to movement of harvested fruit and all the associated paperwork. It is similar to the Omnivorous Leaf Roller in appearance, number of host crops, damage, and control. Double check with your winery on all pest exclusion and movement concerns to be prepared.

The Brown Marmorated Stink Bug has been caught in Stockton and two locations on the west side of Lodi, but it seems isolated in all locations in San Joaquin County. Be on the watch for odd looking stink bugs that may congregate around homes and shops. Another new pest is the Virginia Creeper Leaf Hopper, which is similar in many respects to current leafhoppers, but natural beneficials and predators may be lagging as they adapt. It is a pest to discuss with your PCA before it arrives.

Even with the excellent vine growth, the overall crop looks to be about average across varieties. Cluster counts are good -- in many cases as good as last year-- but cluster size and set varies by variety and location.

The demand seems stable to slightly improved for many varieties such as Cabernet Sauvignon, Petite Sirah, Muscat varieties, and Piot grigio, among others. Other varieties such as Pinot noir, Sauvignon blanc, and even Chardonnay still seem to be in good demand. The mini-boom in planting new vineyards and the replanting of old ones seems to be slowing and gave way to many new orchards of walnuts and almonds. Local growers, and agriculture overall, are still in a relatively good position compared to other sectors of the state and national economy. Recent good news has been recognition of Lodi as Wine Region of the Year! Lodi and San Joaquin County are in a good position to continue the tradition of affordable wines of excellent quality. Have a good harvest!

Paul Verdegaal, Viticulture Advisor

## Armyworms in Delta Rice

I was recently contacted by a PCA who was observing armyworm feeding in Delta rice fields. Over the last two years, both locally and in the Sacramento Valley, armyworms have been striking rice fields earlier in the season and in greater numbers. This has been described by farm advisors in the UC Rice Blog (http://ucanr.edu/blogs/riceblog/index.cfm). Armyworms are generally a summer pest of rice, spending spring and early summer months on other plants, but over the last two years, armyworm feeding has been detected in June. Armyworms generally only have one generation in rice later in the season, but last year, earlier infestations caused concern that there might be two generations. This was not eventually observed, but PCAs should keep this in mind again this year as they scout throughout the summer. I have set up armyworm traps in three Delta locations to monitor populations over the season.

Armyworm defoliation is most deleterious during stem elongation and grain formation and is observed as angular cut-outs from the leaves (Figure 1). UC IPM guidelines state that yield may be affected if defoliation is greater than 25% of the plant at two to three weeks before heading, and they provide the following monitoring instructions.


Figure 1. Angular feeding of armyworms in rice.

*To sample, choose a part of the field where you have observed injury. Select a plant at random and pull it up or move all the surrounding foliage away and check for defoliation. Check the plant from the top of the leaves to the base of the plant and the water surface for armyworms. Determine if 25% or more of the foliage has been removed by armyworms; also note if you find armyworms on neighboring weeds or rice plants. Record your observations on a monitoring form. Repeat this procedure every 5 to 10 feet across a transect until 10 plants have been examined. Move to a different part of the field where feeding is evident and examine 10 more plants in the same manner. Repeat this procedure at several areas of the field until you are confident that you have an estimate of the average field condition.* (UC IPM guidelines, http://ipm.ucanr.edu/PMG/r682300411.html)

It is important to monitor throughout the season in order to detect damage severity, and thus, know when to treat. UC IPM guidelines recommend treatment when, in the vegetative stage, at least half of the plants sampled have at least 25% defoliation and armyworms are present. Later in the season, damage may also occur on the panicle rachis (Figure 2).


Figure 2. Armyworm feeding damage on rice panicle.

*(Continued on page 11)*

When the panicle has formed, UC IPM guidelines recommend treatment if 10 percent of the sampled panicles are damaged and armyworms are present. Armyworms are generally more apparent at night or in the cooler morning hours; thus, monitoring should occur when worms are active and apparent. Early season management of armyworms includes weed management around the perimeter of fields. Registered chemicals are limited but include certain pyrethroids, which have not always proven efficacious, and carbaryl, which cannot be used within two weeks of a propanil application. The carbaryl label also includes precautionary language regarding bees, so it would not be recommended when rice is neighbored by insect-pollinated crops, like melons.

This year, the California Department of Pesticide Regulation has issued a crisis exemption under the US EPA Section 18 to allow for the use of Intrepid 2F (methoxyfenozide) on armyworms in certain rice growing counties, including San Joaquin County. The emergency exemption is valid until September 30, 2016. Please contact the county Agricultural Commissioner's office for more details.

Michelle Leinfelder-Miles, Delta Farm Advisor

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☐ ***Along the Grapevine*** - (Wine Grapes) - Paul Verdegaal

☐ ***Delta Crops/Field Crops*** - Michelle Leinfelder-Miles

☐ ***Down the Vegetable Row*** - Brenna Aegerter

☐ ***Field Notes*** - Quarterly publication (all commodities)

☐ ***Pomologist*** - (Tree fruits, Walnuts)

**Check the commodities in which you are interested: (Meeting notices/other information)**

| | | |
|---|---|---|
| ☐ Grapes | ☐ Apples | ☐ Tree Fruits |
| ☐ Alfalfa | ☐ Beans | ☐ Corn |
| ☐ Small Grains | ☐ Rice | ☐ Sorghum |
| ☐ Cherries | ☐ Olives | ☐ Almonds |
| ☐ Walnuts | ☐ Asparagus | ☐ Melons |
| ☐ Tomatoes | ☐ Peppers | |

If you do not see your crop listed above please indicate here:

_____

**Check your occupation below:**

| | | |
|---|---|---|
| ☐ Ag chemicals (San Joaquin Co.)-AL | ☐ Ag chemicals (outside county) - AO | ☐ Consultant/Advisor - CA |
| ☐ Grower - GR | ☐ Lender - LN | ☐ Irrigation - IR |
| ☐ Nursery/Seed Co. - NS | ☐ Pest Control Advisor - PA | ☐ Landscape - LS |
| ☐ Shipper/Packer - SP | ☐ Winery - W | ☐ Parks - PK |
| ☐ Government - GV | ☐ Media - M | ☐ Master Gardener - MG |

**Please complete the following optional questions. Your individual responses are confidential.**

Gender: ☐ Male –M ☐ Female – F

Ethnicity: ☐ White –W ☐ Asian/Pacific Islander -A ☐ Native American/Native Alaskan – I
☐ Latino – L ☐ African American - B

Disability: ☐ Yes –Y ☐ No –N

University of California Agriculture and Natural Resources
Cooperative Extension
San Joaquin County
2101 E. Earhart Ave., Suite 200
Stockton, CA 95206-3949

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# Notes from the Field

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The University of California working in cooperation with San Joaquin County and the USDA.