Field Notes
San Joaquin County
August 2017

University of California
Agriculture and Natural Resources

PRACTICAL • CONNECTED • TRUSTED

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 (Fig. 1). These enlarge to about 1/5 inch in diameter and become a greasy gray when the fungus begins to produce spores. 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 and 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 2017.

More information on fungicide rotation for scab control can be found online under "Fungicide efficacy and timing for deciduous tree fruit and nut crops and grapevines" at the UC IPM website (http://www.ipm.ucdavis.edu).

(Continued on page 2)

Table of Contents:

(Continued from page 1)

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.

Brent Holtz, Almond Farm Advisor and County Director

Figure 1. Scab symptoms on almond leaf.

Figure 3. Scab symptoms on almond hulls.

Figure 2. Scab symptoms on almond shoot.

Monitoring Forage Particle Length—How and Why?

Summer forage harvest is upon us, and so is a flurry of silage choppers, trucks and packing tractors. Putting feed up quickly is imperative to the ensiling process, making monitoring during harvest equally important. A dairy can harvest and ensile a year's worth of forage in as little as a few days. If the desired chop length is not met, or kernel processing is not adequate, there could be issues with how the forage performs in the ration.

Chop length of forages can be measured as it's delivered to the silage structure. In a recent corn silage management survey, 80% of dairies reported monitoring chop length during harvest, with 97% of those dairies doing so visually. Another less popular but more precise method of evaluating chop length on farm is the Penn State Particle Separator (PSPS) analysis.

What is a PSPS?

In Figure 1, there are four numbered piles which correspond to the PSPS trays shown in Figure 2. The top 3 trays have openings for material to pass through (Table 1), becoming gradually smaller with a solid bottom tray to catch the "fine" material. For reference, recommended ranges for corn silage and haylage are also included in Table 1.

(Continued on page 3)

(Continued from page 2)

Table 1. Forage separator characteristics (2002 model) and recommendations for corn silage and haylage. From Penn State Extension: http://extension.psu.edu/animals/dairy/nutrition/forages/forage-quality-physical/separator

	Pore Size (in)	Particle Size (in)	Corn Silage	Haylage
Tray 1	0.75	>0.75	3% to 8%	10% to 20%
Tray 2	0.31	0.31 to 0.75	45% to 65%	45% to 75%
Tray 3	0.05	0.07 to 0.31	30% to 40%	20% to 30%
Tray 4	solid bottom	<0.07	<5%	<5%

Figure 1. PSPS tray forage fractions.

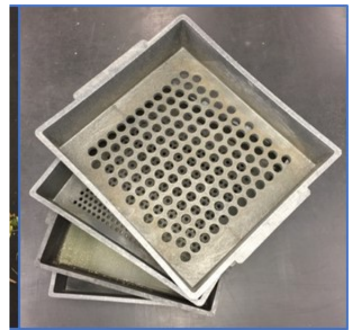


Figure 2. PSPS showing trays.

How do I use a PSPS box?

A sample of harvested forage is placed in the top tray of the PSPS (with the other trays stacked underneath) and "shaken" and rotated according to the instructions. Then, material in each of the trays is weighed and calculated as a percentage of the total weight. The entire process can be completed on farm in about 5 minutes. For more information, visit: http://extension.psu.edu/animals/dairy/nutrition/forages/forage-quality-physical/separator

PSPS results from harvested sorghum

Last summer, 16 fields of sorghum chopped for silage were sampled. There isn't a lot of information available on desired sorghum chop length, but the results were still interesting. Table 2 includes the average, median, minimum and maximum percentages of the 16 chopped sorghum samples at harvest. Compared to corn silage (Table 1), these sorghum samples were chopped much coarser than typical corn silage, as evidenced by the large percentage of material found in tray 1. Tray 3 contained less material than typical corn silages, which may be due, in part, to the lack of starch (sorghum grain) as compared to corn silage. Individual results from the PSPS analysis (including pictures) can be found here: http://ucanr.edu/casorghum16.

Take home thought

Desired chop length can vary depending on several factors, including end user (heifers vs. lactating cows) and presence/absence of other forages in the ration that can provide long particles. When particles are too long, sorting may become an issue; too short and rumen issues may occur. Talk with your nutritionist to determine the desired chop length of your summer forages, and monitor chop length throughout harvest to ensure your end product meets your dairy's needs.

Jennifer Heguy, Dairy Advisor - Merced, Stanislaus & San Joaquin counties

Table 2. PSPS results of chopped sorghum (n=16) taken at harvest

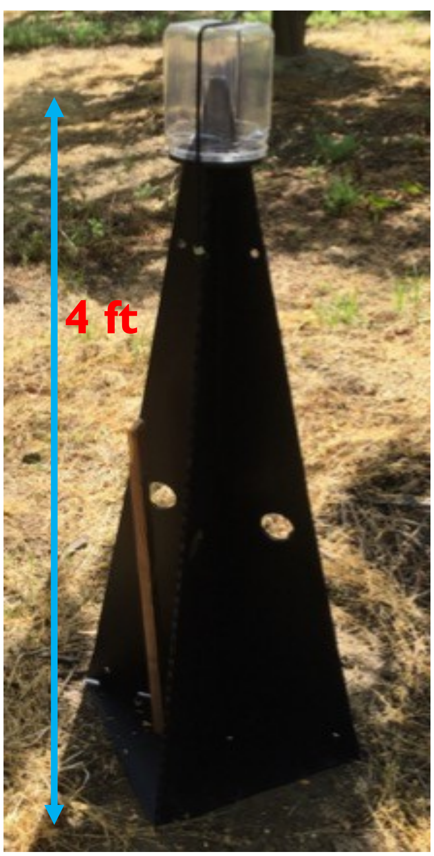
	Average	Median	Minimum	Maximum
Tray 1	28%	27%	3%	59%
Tray 2	51%	52%	17%	70%
Tray 3	20%	21%	7%	29%
Tray 4	2%	2%	0.3%	4%

Update on Brown Marmorated Stink Bug (BMSB) Monitoring 2017

Brown marmorated stink bug (BMSB) is a new invasive insect pest of several crops, including tree fruits, ornamentals, vegetables and field crops. BMSB has inflicted serious crop loss mainly in peaches and apples in the Mid-Atlantic region in the year 2010. Since then, it has become a major pest that needs an aggressive spray program to keep the population under control throughout the crop growing season. Learn more about BMSB at www.stopBMSB.org. In California, the significant BMSB population was detected in the Sacramento midtown/ downtown area beginning Fall 2013, and since then, it has been a severe nuisance in the winter, affecting backyard trees and community gardens of the Sacramento metropolitan area. To date, there are 9 counties (Butte, Sutter, Yolo, Sacramento, San Joaquin, Santa Clara, Los Angeles, Siskiyou, and Stanislaus) with BMSB populations reported in residential areas. The reproducing population of BMSB was detected for the first time in Modesto in Summer 2015 near Highway 99. Since then, residents of Modesto, Ceres, Empire, and Turlock have reported sightings of BMSB in their houses and nearby parks. BMSB has not, however, been reported in agricultural areas of California until recently. Several BMSB adults were trapped in a commercial peach orchard in the Modesto area in 2016, and to our knowledge, it was the first report of BMSB in any crops in California (see the most recent CAPCA article https://docs.wixstatic.com/ugd/6179bc_e0bdc0415ab7407481c4e5a746dc0fa4.pdf)

Due to the potential threat to multiple crops in the northern San Joaquin Valley, we are currently conducting a BMSB detection survey using two types of traps (pyramid and sticky panel) in commercial orchards. Both types of traps were baited with the best-available BMSB lure (BMSB aggregation pheromone + methyldecatrionate). The pyramid trap (Fig. 1) has been the standard BMSB trap, but this trap is expensive and cumbersome for field use. This year, along with other researchers on the East Coast, we are testing the new 'sticky panel trap' (Fig. 2). Eight traps (four of each trap type) separated by at least 50 ft have been placed at six sites (almonds, walnuts, peaches) along the edges of the orchards. Traps were placed around mid-March, except for the Almond 2 site where traps were placed after we discovered BMSB activity in mid-June. All monitoring sites are in the area where BMSB was detected in 2016 monitoring. Traps have been checked and serviced as needed, and lures have been changed at 4-week intervals. BMSB were captured from all sites as shown in Fig. 3. In all sites, the majority of the captures were from the beginning of the season (March-May), likely overwintering adults. In some of these orchards, particularly walnuts, growers reported finding BMSB in and near their houses next to the walnut blocks during the winter (Jan-Feb), and we put traps on those blocks. We have not noticed any BMSB live stage or feeding activity on walnut trees or fruits. Despite the spread to agricultural areas, BMSB populations still seem to be low. Nevertheless, we need to be vigilant and pay close attention to the orchards, deploy traps, and monitor the activity. We will provide the full update of this ongoing study around the end of the year.

Jhalendra Rijal, IPM Advisor, San Joaquin, Stanislaus, and Merced counties



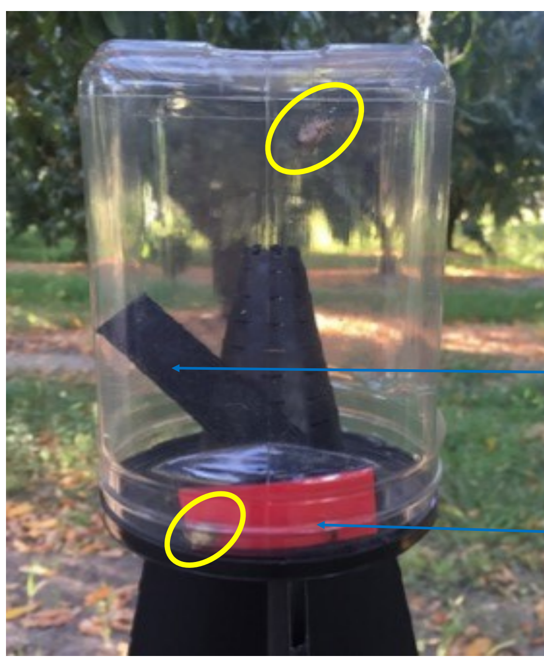


Figure 1. Black pyramid trap used in BMSB monitoring. Photos by J. Rijal.

Figure 2. Clear "sticky panel" trap used in BMSB monitoring.
Photos by J. Rijal.

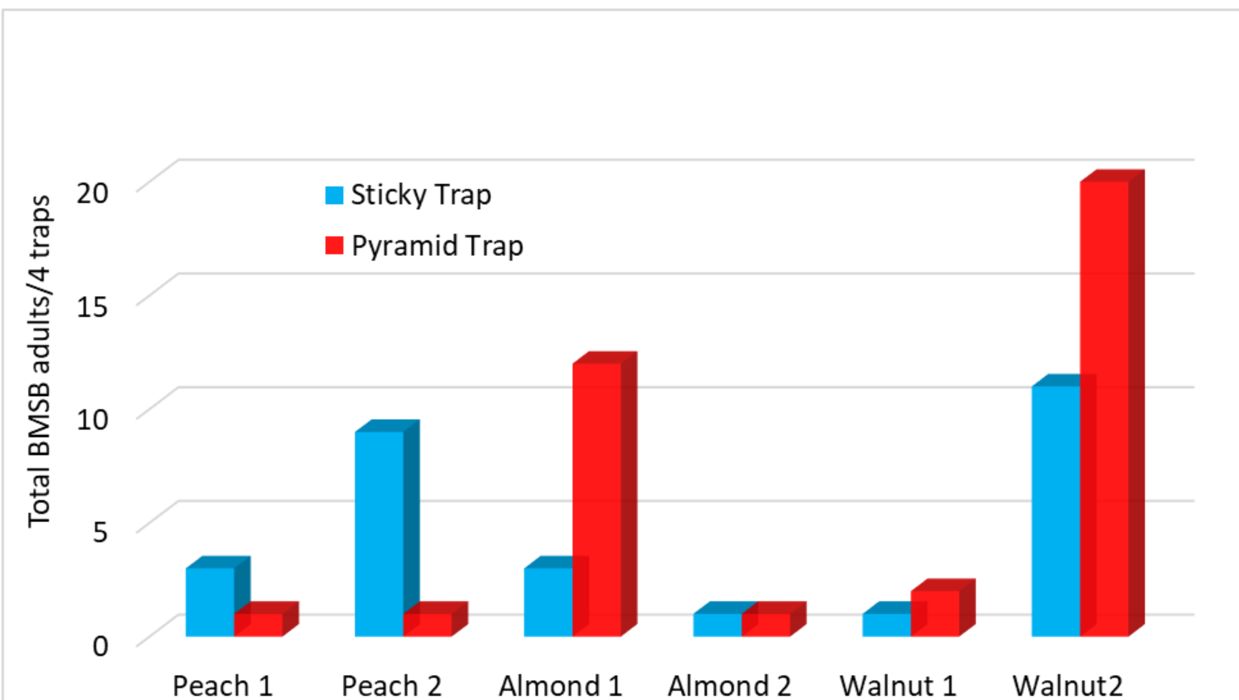


Figure 3. Total BMSB adult captures from four traps from monitoring sites in Stanislaus County (14 March-28 June, 2017). Almond-2 has only 2-weeks of data (mid-to-late June).

Field Crops Update

1. Grain Corn Variety Trial Bloom Update. The 2017 UCCE grain corn variety trial was planted on May 9th, almost two weeks later than the trial was planted in 2016, due to the wet winter and spring. The trial is located in the Sacramento County Delta. There are fifteen varieties that are replicated three times and they include 14 varieties submitted by seed companies and one variety submitted by the grower (Table 1). This year, the trial includes both conventional and RR glyphosate tolerant varieties. Stand counts were made approximately two weeks after planting, and bloom was assessed over the week of July 10th. While bloom occurred later this year, the number of days to bloom was less than in 2016. Across all varieties, the average number of days to bloom was 65, compared to 70 in 2016. Over the remainder of the season, we will also evaluate disease pressure (fusarium ear rot, head smut, and common smut), lodging, ear height, grain moisture, and yield. Results from previous years are available from my website (http://ucanr.edu/sites/deltacrops/Corn/).

2. Sorghum Seeding Rate Trial. We are continuing this trial that we began last year to evaluate optimum seeding rates for grain sorghum. UC research on sorghum (http://sorghum.ucanr.edu/) has increased over the last few years, primarily in the southern San Joaquin Valley, to evaluate grain and silage sorghum for its adaptability to drought and low-input conditions. This seeding rate trial complements those efforts to provide management information for California growers. The 2017 trial was planted on May 25th, approximately 5 days later than the previous year's trial, in the Sacramento County Delta. The trial consists of five replicated blocks of five treatments: 5, 6, 9, 12, and 15 pounds per acre. These treatments correspond to approximate plant populations of 68,000, 81,600, 122,400, 163,200, and 204,000 plants per acre, respectively. (This takes into account the 85 percent germination of the variety.) We have taken stand and weed counts and are currently monitoring bloom. Last year, bloom occurred 71 days after planting. At the end of the season, we will measure grain moisture and yield in an effort to better understand optimum seeding rate.

3. Rice Armyworm Monitoring. UC Cooperative Extension has augmented efforts to monitor armyworm populations in rice fields since 2015 when we observed large populations earlier in the year (June) than previously observed. Here in San Joaquin County, we began monitoring Delta rice fields in mid-June. We reached the highest trap count (36 moths/day) in late June, but trap counts for late July have been much lower (<10 moths/day). We are cooperating with rice farm advisors in the Sacramento Valley to get a more comprehensive assessment of the populations. Trap counts in the Sacramento Valley have followed a similar pattern as what we have seen in San Joaquin County, and weekly updates are posted to the UC Rice Blog (http://ucanr.edu/blogs/riceblog/). Armyworm larvae will grow to full size and pupate in about 3 to 4 weeks. That said, it is important to continue monitoring fields in case the adult generation seen in late June reproduced to form a new generation of worms that could be present when panicles have emerged. UC IPM has these guidelines (http://ipm.ucanr.edu/PMG/r682300411.html) for monitoring and treatment. The E.P.A. has granted an emergency approval of Intrepid 2F (methoxyfenozide) in rice growing counties. Please contact the County Agricultural Commissioner's office for more information.

Michelle Leinfelder-Miles, Delta Farm Advisor

Table 1. Field corn varieties planted in the 2017 UCCE field corn variety trial.

Brand Initials	Variety Number	Brand Name	Submitted by
CP	5290DGVT2P	Croplan	Stanislaus Farm Supply
CP	5678VT2P	Croplan	Stanislaus Farm Supply
DKC	62-06 (Conv)	DeKalb	Monsanto
DKC	63-07RIB	DeKalb	Monsanto
ES	7514VT2P	Eureka Seeds	AgReliant Genetics
ES	7622VT3P	Eureka Seeds	AgReliant Genetics
G	6708VT2PRO	Golden Acres	AgReliant Genetics
G	8828VT2PRO	Golden Acres	AgReliant Genetics
INT	9678VT3P	Integra	Wilbur Ellis
INT	6533VT2P	Integra	Wilbur Ellis
LG	5643VT2RIB	LG Seeds	AgReliant Genetics
LG	5701VT2PRO	LG Seeds	AgReliant Genetics
MY	2D848	Mycogen	Dow
MY	2Y767	Mycogen	Dow
P	1197 (Conv)	Pioneer	Grower

Announcements / Calendar of Events

August Calendar:

Weed Science School 2017
August 22-24, 2017
Bowley Plant Science Teaching Center, UC Davis
Please see: http://wric.ucdavis.edu/events/weed_science_school_2017.htm for more information and to register.

Rice Experiment Station Annual Field Day
August 30, 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 20, 2016
8:00am-12:30pm (lunch included)
Kearney Agricultural Research and Extension Center, 9240 S. Riverbend Ave., Parlier, CA

California Small Farm Conference
Sunday, October 29 and Monday, October 30, 2017
Cabral Agricultural Center, 2101 E. Earhart Ave., Stockton, CA 95206-3949
For more information, contact Tacy at: tacy@californiafarmconference.com.

California Alfalfa and Forage Symposium
November 28-30, 2017
Grand Sierra Resort, Reno, NV
For more information, please visit: calhay.org/symposium

UC
CE

University of California
Agriculture and Natural Resources

Cooperative Extension
San Joaquin County

2101 E. Earhart Ave., Suite 200
Stockton, CA 95206-3949

Notes from the Field

August 2017