Sacramento Valley Walnut News

Issue 27 Winter, 2016/2017

University of California
Agriculture and Natural Resources | Cooperative Extension

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Submitted by:

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Sutter, Yuba and Colusa Counties

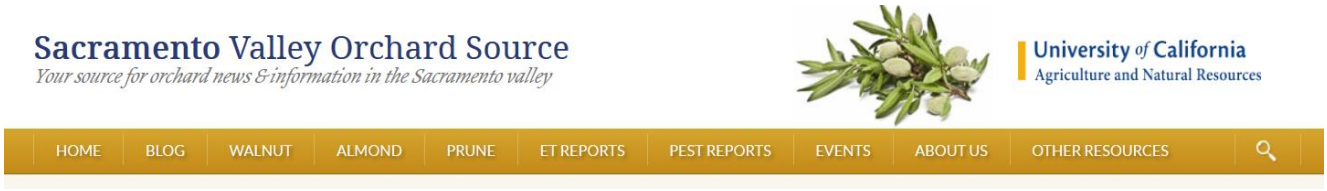
2017 UC Cooperative Extension Walnut Meetings	
January 19th 7:30 am-1:00 pm	**Butte & Glenn County Almond & Walnut Day in conjunction with North Valley Nut Conference** Silver Dollar Fairgrounds, Chico *Topics include: Insect & disease management, nutrient deficiencies, hands-on breakout sessions on NOW, irrigation and spray coverage*
January 20th 8am-noon Pre-register for lunch to follow	**Tehama Walnut Day** Red Bluff *Pre-register for lunch $15, call 527-3101* *Topics include: Nutrient deficiencies, insect/mite updates, irrigation, rootstocks, CWB research, laws & regs*
February 21st 12:30pm-4:30pm	**Sutter-Yuba-Colusa Walnut Day** Veteran's Hall, Yuba City *Topics include: Insect/mite & disease updates, walnut tree growth characteristics, rootstocks, laws & regs, CWB activities*
February 28th Morning	**Walnut (9th leaf) Pruning systems compared in No Pruning long term study & Bot pruning wound study Field Meeting** Nickels Soil Lab, Arbuckle *Rain date: March 2nd*
February 28th Afternoon	**Walnut (2nd leaf & 4th leaf) No Pruning / Variation of No Pruning / Pruning Grower Comparison Field Meeting** Wheatland *Rain date: March 2nd*
March 1st 8:00am-noon	**Sacramento-Solano-Yolo Walnut Day** Norton Hall, Woodland *Topics include: orchard replanting and nematodes, mites, scale and Bot*

New this Year!
Monthly IPM Breakfast Meetings at various locations throughout the Sacramento Valley

Meetings will be held the second Tuesday of each month from February through November and will cover a wide range of timely pest management topics. Meeting locations will be rotated throughout the Sacramento Valley.

- Colusa: February and July
- Yuba-Sutter: March and August
- Tehama: April and September
- Glenn: May and October
- Butte: June and November

Meeting locations and more information will be available at sacvalleyorchards.com or by contacting UC IPM Advisor Emily Symmes at (530) 538-7201 or ejsymmes@ucanr.edu



Remember to visit us at the Sac Valley Orchard Source for up-to-date news, articles, and events!

Featuring:

- Event calendar with all orchard related CE meetings throughout the Sacramento Valley
- Newsletter articles with extra photos & resources
- Timely posts responding to current events such as frost events or pest outbreaks
- Weekly irrigation and pest reports during the growing season

Visit & bookmark us soon at www.sacvalleyorchards.com!
Or subscribe to weekly emails at:
www.sacvalleyorchards.com/subscribe

Counting Winter Chill

Katherine Pope, UCCE Farm Advisor Sacramento, Solano and Yolo Counties
Janine Hasey, UCCE Farm Advisor Sutter, Yuba and Colusa Counties
Joseph Connell, UCCE Farm Advisor Emeritus, Butte County

The last few years have been highly variable, both in terms of winter chill accumulation and spring bloom and leaf-out behavior. The winter of 2015-2016 had moderate-to-high chill accumulation in the Sacramento Valley and leaf-out in the spring was tight and early. The winter of 2014-2015, on the other hand, had low chill accumulation and leaf out was late and straggled. We documented this in Chandler, but also saw it in other mid-to-late leafing, mid-to-high chill varieties. What's driving this behavior? What can we expect this year? And how can one track and interpret chill accumulation?

What drives the timing of leaf-out?
Deciduous fruit species lose their leaves and enter dormancy each fall. This dormancy has external and internal requirements for growth to begin again in the spring. The first is favorable external conditions facing the plant, primarily adequate moisture and favorable temperatures for growth. Even if temperatures and moisture conditions are favorable, there is a period during the winter when trees will not grow. During this period, growth is inhibited by internal factors when the plant is said to be in "rest".

Rest is broken by exposure to cold temperatures. All deciduous fruit plants require a certain amount of chilling during the winter rest period to enable their buds to sprout evenly and for good flowering and fruit set to occur in spring. The winter chilling requirement to break this rest period varies with plant species and even with particular varieties within the same species. Early leafing walnut varieties require less chilling than later leafing varieties (Table 1). Insufficient winter chilling prolongs rest and results in delayed and uneven bloom and leafing the following spring. Bud drop and reduced set may also occur and consequent production and quality of fruits and nuts may be poor.

What can we expect this year in terms of winter chill?
We don't have tools yet for predicting whether winters will be low, medium or high chill before they start. We do know that historically, low chill winters occur every 10-15 years. We had a low chill winter in 2014-2015, so it seems less likely that this would also be a low chill winter. But our climate has been doing some unusual and record-breaking things in the last few years, so past behavior is not a guarantee of future behavior. We also know that in the past, December and January have been our most critical months for chill accumulation. So if you're going to keep an eye on chill accumulation, those are the months to pay attention.

How to track and interpret chill accumulation?
There's growing evidence that the newer Chill Portions Model, also sometimes called the Dynamic Model, may be the more accurate model to use for tree crops in California and in other Mediterranean climates. How does the Chill Portions model work, and what makes it different from other chill models? The math behind Chill Portions is more complex than Chill Hours, which just counts each hour between 32-45° F as one chill hour (or even more simply, each hour under 45° F). But, while Chill Portions has some complex equations, it's based on some fairly simple components. There are three basic things that make Chill Portions different from Chill Hours:

1) Chill Hours counts any hour between 32°-45° F as the same. Chill Portions gives different chill values to different temperatures. No more wondering about the value of 'warm' chill hours. Temperatures between 43°-47° F have the most chill value. The chill value on either side of that range are lower, dropping to no value at 32° F and 54° F.
2) Chill Hours only count up to 45° F. Chill Portions count up to 54° F. This makes Chill Portions better able to approximate effective chilling for the trees we grow, most of which evolved in fairly mild climates.
3) Chill Hours does not subtract for warm hours. With the Chill Portions model, warm hours that closely follow cold periods can subtract from the running total of chill accumulation.

In recent years, chill hours and chill portions have counted winters differently. In the winter of 2013-2014, the chill portions model showed low chill accumulation, whereas we had average to high chill hours accumulation. Both models counted low chill for the winter of 2014-2015. In Davis, leaf-out was eight days later than average in 2014 and 11 days later than average in 2015, indicating that walnut buds responded to both winters as low chill.

Because Chill Portions is much newer than the Chill Hours model, researchers don't have exact estimates for the chilling requirements of all California's important tree crops and cultivars. While researchers work on that, it may be valuable to watch chill accumulation with both models to see if, as occurred in 2013-14, one indicates normal winter conditions while the other indicates leafing and bloom is likely to be more sporadic.

Chill accumulation for both models using CIMIS weather station data, along with additional information on the models, how to calculate accumulation with your own weather data, and estimates of chilling requirements for some crops in Chill Portions is available at http://fruitsandnuts.ucdavis.edu/Weather_Services/chilling_accumulation_models. Because there is not a CIMIS station close to Yuba City, Janine Hasey calculates chill based on a temperature recorder at the UCCE office in Yuba City. We will be posting regular updates of that chill accumulation on the new Sac Valley Orchard Source blog at http://www.sacvalleyorchards.com/blog/. To receive those updates via email, subscribe to the blog at http://www.sacvalleyorchards.com/subscribe/ and select walnut updates in addition to any other categories of interest.

Table 1. Range of chilling requirements for some walnut cultivars.

Cultivar	Chill Hours Requirement[1]	Chill Portions Requirement
Payne	627	38
Serr	827	Not Available
Hartley	984	54
Chandler	1015	45-50
Howard	1015	Not Available

[1]From Gale McGranahan et. al., Walnut Improvement Program 2006, Walnut Research Reports 2006, p.10. Chilling hours required to break bud after 15 days at 71.6° F.

NOW Update

Emily J. Symmes, Sacramento Valley Area IPM Advisor
University of California Cooperative Extension and Statewide IPM Program

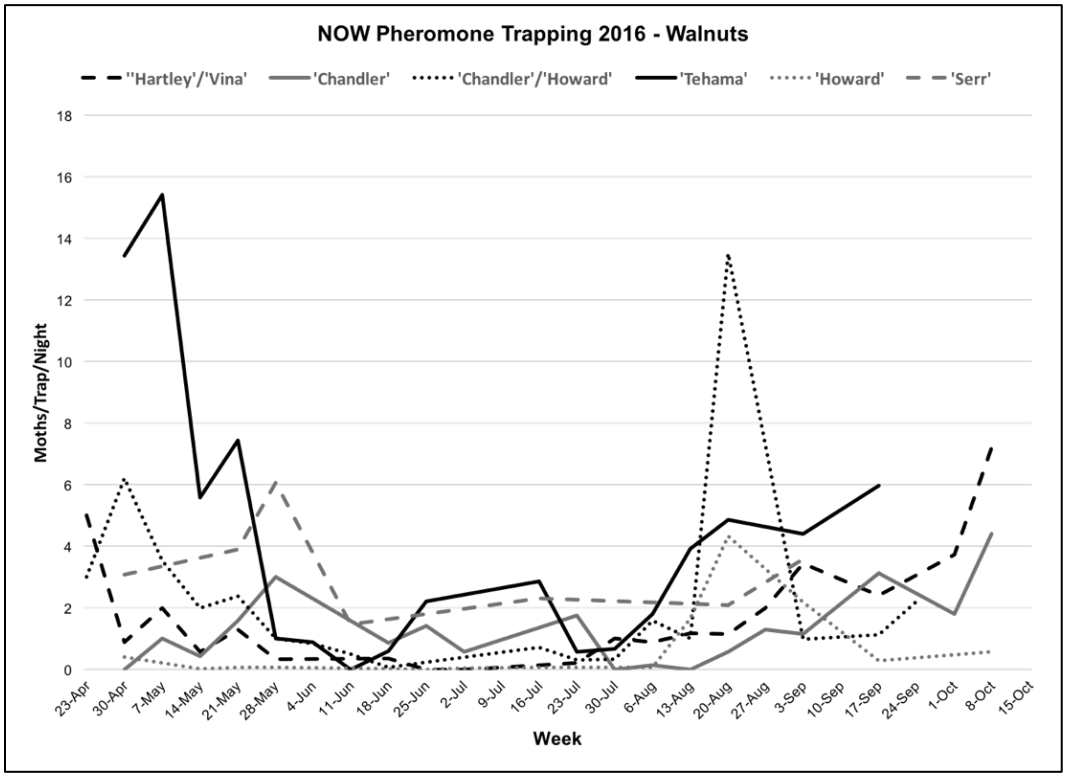
Now that the 2016 season has come and gone, it is a good time to reflect on pest management issues and use information learned to improve our IPM program in the coming year. Navel orangeworm (NOW) appeared to be a significant factor again in 2016 in harvest damage assessments. Of particular concern was the earlier-than-typical, and in some cases, spread out husksplit observed in later varieties, which have historically been considered less vulnerable to significant levels of worm damage. A number of growers and PCAs were caught off-guard by the worm damage present in these varieties in 2016.

Some considerations when planning your integrated NOW management program for 2017:

- **Consider all varieties important for NOW IPM activities.** These include sanitation, in-season monitoring, harvest timing, and minimizing other sources of in-season damage (codling moth, blight, and sunburn). There were areas in the Sacramento Valley last year where early season hail storms caused damage to developing walnuts. This resulted in malformation, and in some cases, enough damage that as nuts developed, openings were left in the husk, providing a prime opportunity for entry by early season NOW. Although we cannot protect against hail storms, be aware of the impact they may have on NOW infestation. For walnut photos of hail damage, see http://cesutter.ucanr.edu/newsletters/Orchard_Notes63563.pdf.

- **High NOW damage at harvest means the possibility of large overwintering populations.** Keep in mind that the thicker shell of walnuts offers overwintering NOW more protection than the softer shell of almonds. Therefore, less natural mortality should be expected in walnuts, even in wet years, and mowing or discing walnut mummies should always be done regardless of weather conditions. This concept for adequate sanitation for NOW management in walnuts is not new. Research in the early 1990s by UCCE Advisor Steve Sibbett and Specialist Bob Van Steenwyk showed that increasing levels of walnut mummy destruction after removal from the trees resulted in greater reductions in emerged NOW adults. Mummy nuts were placed on bare berm, in weeds, double-disked, or shredded. Over the two-year study, shredded nuts showed the highest levels of NOW reduction relative to those placed on bare berm (100% and 97%), followed by nuts double disked (95% and 68%), and nuts placed in the weeds (86% and 24%). A summary article of this research can be found at http://ucanr.edu/repositoryfiles/ca4705p26-70062.pdf.

- **Pheromone trapping for NOW in walnuts – what does it all mean?** Well, the short answer, is that we are still not entirely sure how to use the pheromone traps for treatment timing or thresholds for NOW in walnuts. The graph below shows season-long 2016 trapping data for six orchards spread throughout Butte and Glenn Counties. Trap numbers were relatively high during the first flight, less so during the second flight, and picked up in numbers again later in the season during the third and fourth flights. While research is ongoing to determine exactly how to use early, mid-, and late-season trap counts to inform NOW management activities, this suggests that there may be some value in monitoring traps season-long in walnuts, rather than focusing only on late-season trapping in early varieties.



- **Pheromone trapping for NOW in walnuts – which lure works "best"?** There are now four commercial NOW pheromone lures available: Suterra Biolure®, Trece Pherocon® L2 high and low amplitude, and AlphaScents Amytra®. In a study last season in Butte County, all four lures performed comparatively well in tracking male NOW flights relative to traps baited with live virgin females, and all exhibited the same lower trap captures during the second flight. There may be some value in consistency in your lure of choice, particularly when looking at historical trap catch data (year-to-year comparisons). If you decide to switch from one lure product to another, be sure to note the change along with any unusual observations that may be related to the new trapping method. With any lure, be sure to use according to its particular manufacturer specifications (replacement interval, etc.) and remember that storage and handling can affect performance. Some lures may be particularly "hot" when initially deployed, which can cause issues in interpreting trap catch data. This was observed in particular for AlphaScents Amytra® lures during the first week of deployment. To avoid misinterpretations caused by fresh lures (not just the AlphaScents product), consider opening and pre-aging the lure for a day prior to deploying in your field trap.

In short, don't take your eye off NOW in walnuts, no matter what variety you grow. Much research is still needed to determine the relative importance of a number of factors that may contribute to NOW damage (e.g., native versus immigrant populations; proximity to external sources; previous season's damage; orchard sanitation; overwintering populations; in-season codling moth, blight, and sunburn damage; degree day accumulation; populations cycles in surrounding crops; harvest timing; ethephon application; pesticide choice and application timing; and various environmental conditions). In order to answer the outstanding questions, large data sets will provide the most value. If you would like to discuss the possibility of contributing data to further the cause, please contact me at ejsymmes@ucanr.edu. All private data and site-specific identifiers will be kept anonymous.