



UNIVERSITY OF CALIFORNIA ≈ COOPERATIVE EXTENSION  
SUTTER/YUBA COUNTIES  
142A GARDEN HIGHWAY, YUBA CITY CA 95991  
TEL: (530) 822-7515 ≈ FAX: (530) 673-5368  
<http://cesutter.ucdavis.edu>



# ORCHARD NOTES

June/July 2009

## SAVE THE DATE

CODLING MOTH MANAGEMENT IN WALNUTS  
USING PHEROMONE MATING DISRUPTION



FIELD MEETING  
THURSDAY, AUGUST 6, 2009

LOOK FOR THE PROGRAM IN THE NEXT ISSUE OF  
SACRAMENTO VALLEY WALNUT NEWSLETTER

For more information: Janine Hasey (530) 822-7515

## WALNUT HUSK FLY

Mid-June is the time for walnut growers, especially those with big trees and lots of shade, to place walnut husk fly traps on the north side of trees in their orchards. One Sutter County orchard with heavy damage last year started trapping husk flies on June 16, 2009. Husk flies can emerge from the soil all summer long and sometimes a grower may need to spray 2 to 3 times where there is a high population. Continue monitoring at least twice a week until hull split with yellow sticky traps that are charged with ammonium carbonate. The goal is to spray before the female lays her eggs in the husk.

After husk fly emergence, it takes about 2 weeks for the female fly to feed, mate and develop eggs before she starts laying them into the husk. The first spray is applied either when eggs are found in female husk flies or when a sharp increase in trap catches occurs. However, if using GF-120, start spraying when the first fly is trapped. GF-120 is only recommended in low population orchards.

There are several insecticides effective against husk fly and bait should be added to lure the fly to the treated leaves. Full coverage is only critical in high population orchards where full rates of insecticides and baits should be used and every row sprayed. Visit the UC IPM Pest Management Guidelines website at <http://ipm.ucdavis.edu> for a list of registered materials.

Usually there is about a 3 week interval between sprays. This includes the 2 weeks needed for egg development plus most of the short residual insecticides and bait kill walnut husk fly for about 10 days. This 3 week interval is based on killing all the flies with the previous spray. Be prepared to treat up to 3 weeks before harvest. For more information on husk fly and its life cycle, visit my 2008 husk fly article in the Sacramento Valley Walnut Newsletter at [http://cesutter.ucdavis.edu/newsletterfiles/Sacramento\\_Valley\\_Walnut\\_News14498.pdf](http://cesutter.ucdavis.edu/newsletterfiles/Sacramento_Valley_Walnut_News14498.pdf)

### SUBMITTED BY

JANINE HASEY  
U.C. FARM ADVISOR  
SUTTER/YUBA COUNTIES

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## Predicting Cling Peach Harvest Timing

Peach harvest timing can be predicted based on the heat units accumulated driven by temperature the first 30 days after bloom. Temperatures those first 30 days are critical and what happens after that has a much smaller effect on harvest date. Weather near harvest coupled with soil, tree nutrition, water status, etc. can also have some effect on harvest date. Peach harvest data indicate that sizing fruit is more difficult when growing degree hours (GDH) 30 days after bloom are above 6,000 whereas it is generally a better fruit sizing year when springtime temperatures are cooler and GDH<sub>30</sub> is below 6,000.

The table below lists full bloom dates, growing degree hours (GDH) 30 days after bloom using the Nicolaus CIMIS weather station, and the general harvest timing from 2003-2008. Also included is the prediction for 2009.

Year	2009	2008	2007	2006	2005	2004	2003
Full Bloom	Mar 16	Mar 10	Mar 9	Mar 14	Mar 3	Mar 9	Mar 9
GDH <sub>30</sub>	5,764	5,548	7,420	4,375	6,153	7,788	5,953
Harvest Timing	Predict slightly later than normal	Normal	Early	Very late	Normal	Very early	Normal

### PEST TRACKER

The Pest Tracker has been reinstated this year. Weekly updates on peach twig borer, oriental fruit moth, and codling moth are sent out through email, posted to our website online at [http://cesutter.ucdavis.edu/Orchard\\_Crops](http://cesutter.ucdavis.edu/Orchard_Crops) or as hard copy in our front office. Please send your email address to [jkhasey@ucdavis.edu](mailto:jkhasey@ucdavis.edu) if you want to receive it directly via email.

## USEFUL INFORMATION

- **The UCIPM Walnut Pest Management Guidelines was updated in April 2009.** It can be accessed at <http://ipm.ucdavis.edu> or as hard copy from our office.
- **National Weather Service Forecasts.** To obtain local weather forecasts as often as on a hourly basis, go through a link provided through our Biometeorology Group at UC Davis <http://biomet.ucdavis.edu>. Click on
  - Valuable links
  - Then on "NWS California Forecasts: Sacramento"
  - On the left side, "Forecast Weather Tables"
  - Select the "Interval in Hours" and "Duration in Days" for your location
- **Labor Management Publications:** Over 50 documents on topics from employee selection to conflict management by Gregorio Billikopf, Labor Management Farm Advisor in Stanislaus County, are accessible from the UC ANR repository. You can download any of the publications in English and Spanish at <http://ucanr.org/repository/index.cfm?groupid=12>.

## Thousand Cankers Disease and Walnut Twig Beetle Update

Over the last decade, both planted stands of eastern black walnut (*Juglans nigra*), and native stands of southern California black (*Juglans californica*), northern California black (*J. hindsii*), and Arizona black walnut (*J. major*) have been dying in the western United States. Tree death has been attributed to a disease called thousand cankers (Photo 1) that is spread from attacks by a tiny beetle called the walnut twig beetle (*Pityophthorus juglandis*) (Photos 2 & 3) and subsequent canker formation. Two fungi are associated with the cankers, a *Geosmithia* sp. and *Fusarium solani*. Symptoms begin with a thinning and yellowing of the upper crown, followed by dieback of larger branches (Photo 4) and eventual collapse. Trees often die within three years of initial symptoms.

As reported in the March issue of "Orchard Notes", the walnut twig beetle had been found in many counties in California including Yolo and Butte. It was first collected in 1959 in Los Angeles County, but has only recently been associated with the disease. As of April 2009, the beetle was found in Sutter County as was thousand cankers disease in an old eastern black walnut tree that had extensive dieback. The tree had been showing symptoms for about four years. I have continued to trap walnut twig beetles from that tree since April and a few from a trap on a nearby northern California black walnut tree.

So far, English walnut (*J. regia*) does not appear to be a significant host for the disease although some trees in Davis and Utah have shown symptoms but at a very low frequency. The primary management method thus far for this disease is rapid detection and removal of infected trees. Scientists at UC Davis and the US Forest Service are working on the behavior and life history of walnut twig beetle in California, including host attraction, pheromone biology, and attack density. There are proposals to further determine the extent of this pest complex in western stands of walnut and its impact on black walnut rootstock and black walnut seed trees for commercial English walnut production.

**Please call me if you see black walnut trees with dieback or dying suddenly. Of particular concern are northern California black walnut seed trees displaying any of these symptoms.**



**Photo 1:** Branch staining and cankers from thousand cankers disease, *Geosmithia* sp. on eastern black walnut, *Juglans nigra*, in Sutter County, April 2009. (J.K. Hasey, photo).



**Photo 3:** Transverse galleries (tunnels) of the walnut twig beetle, *Pityophthorus juglandis*, on eastern black walnut, *Juglans nigra*, in Sutter County, April 2009. (J.K. Hasey, photo).



**Photo 2:** Exit hole from the walnut twig beetle, *Pityophthorus juglandis*, on eastern black walnut, *Juglans nigra*, in Sutter County, April 2009. (J.K. Hasey, photo).



**Photo 4:** Dieback of eastern black walnut, *Juglans nigra*, infected with thousand cankers disease in Sutter County, May 2009. (J.K. Hasey, photo).

## LEAF ANALYSIS

Many growers are still not taking advantage of the return on their dollar invested by taking July leaf samples for assessing tree nutrition. Sampling leaves is a relatively inexpensive way to determine nutrient deficiencies, toxicities or excesses and help pinpoint any developing nutritional problems in orchards.

By designing a fertilizer program to match the tree's nutrient needs, and taking other sources of nitrogen into account such as from a legume cover crop, excessive fertilizer use can be eliminated. Make an effort to take leaf samples this year whether it is the first time or has been two years or longer since last done. Annual sampling is recommended. The helpful and comprehensive publication "Guide to Efficient Nitrogen Fertilizer Use in Walnut Orchards" is available from our office.

### Leaf sampling techniques:

- Sample in July (August for pistachio) when nutrient levels in leaves are relatively stable
- Test annually for nitrogen, potassium and zinc
- Check for any other suspected deficiencies or toxicities
- Each sample should be of the same variety, age, rootstock and soil
- Take comparison samples between poor vs. good trees

*WALNUT* - select 25-30 terminal leaflets from spurs or from the middle of moderately growing shoots.

*PEACH* - select 60-80 mid-shoot leaves from moderately vigorous fruiting shoots.

*KIWIFRUIT* - select 25-30 mature leaves, just past the fruit on the shoot.

Put leaves in paper bags and keep them cool until they are delivered to the lab. We have a list of laboratories that do plant, soil and water testing in our office.

<b>CRITICAL NUTRIENT LEVELS</b> <i>Based on July leaf samples</i>			
	<b>Cling Peach</b>	<b>Walnut</b>	<b>Kiwifruit</b>
% Nitrogen (N) Deficient below Adequate	2.4 2.6-3.5 <sup>(1)</sup>	2.3 2.4-3.2	1.6 2.2-2.8 <sup>(2)</sup>
% Potassium (K) <sup>(3)</sup> Deficient below Adequate over	1.0 1.2	0.9 1.2	1.0 1.5
% Magnesium (Mg) Adequate over	0.25	0.3	0.3
% Calcium (Ca) Adequate over	1.0	1.0	2.0
% PPM zinc (Zn) Adequate over	20	18	15
% Chloride (Cl) <sup>(4)</sup> Excess over	0.3	0.3	1.1
% Sodium (Na) <sup>(4)</sup> Excess over	0.2	0.1	(?)

Adequate levels for all orchard crops:

Phosphorus (P) 0.1- 0.3%; Copper (Cu), over 4 ppm; Magnesium (Mn), over 20 ppm.

<sup>(1)</sup> Best to keep around 2.8-3.0%

<sup>(2)</sup> 2.5% or lower is recommended to maximize storage potential

<sup>(3)</sup> K levels between deficient and adequate are considered 'low' and may cause reduced fruit sizes in some years.

<sup>(4)</sup> Excess Na or Cl cause reduced growth at the levels shown; leaf burn may or may not occur when levels are higher

## IRRIGATION MANAGEMENT

The monitoring options available to help you optimally manage irrigation to avoid tree stress and economic losses include weather based, soil based, and plant based monitoring. Many local growers are using one or more of these methods to irrigate more efficiently and effectively.

In **weather based monitoring**, weather measurements are used to calculate tree water use which is mainly driven by climatic conditions. Evapotranspiration (ET) information is presented as water use per day or week to determine how fast the water is being depleted. ET information is available as long term, average estimates helpful in developing an irrigation schedule or as real-time estimates used to determine when and how long to irrigate. ET values are very useful for low volume drip and microsprinkler systems where the goal is to run the system frequently and just long enough to replace daily water use. For example, one mature walnut tree with no cover crop in mid-July can use over 100 gallons of water per day that needs to be replaced with an irrigation. Set times should be no longer than 18 hours to avoid soil saturation that can lead to Phytophthora spore production. We have a worksheet in our office and in an Excel spreadsheet to help you determine your irrigation set times using historical ET data. Please call me if you would like to develop an irrigation schedule for your orchard.

For **soil based monitoring**, there are many tools available that either detect and indicate soil water content or the degree of tension that soil-water is held by the soil and available for uptake. Soil moisture monitoring helps you know how deep water penetrates after irrigation and to determine seasonal water extraction trends in the root zone. The granular matrix sensor known as the Watermark is a grower friendly monitoring tool that we have had success with locally. Watermarks are generally installed at 3 depths depending on the rooting depth, e.g. 1, 3 and 5 feet in peaches and 2, 4, and 6 feet in walnuts. After an irrigation, if the lowest sensor gets wetter, you are possibly over irrigating.

With Watermarks, generally a reading of 40-60 centibars indicates an irrigation is needed. After irrigation, the Watermark reading should be around 20 centibars. A reading between 0 to 20 centibars indicates the soil is too wet. Although soil monitoring tools can be used alone, we have found it most useful to use them in conjunction with plant based monitoring. Locally, we have found both methods critical for timing irrigations, especially in those orchards with a soil limitation and/or high water table.

**Plant based monitoring** can be used as an adjunct to either soil or ET based irrigation scheduling. We use a pressure chamber device for measuring how much tension the leaf is experiencing and the degree of water stress. Midday stem water potential values for our tree crops integrate environmental factors and soil factors and indicate when the tree is stressed and needs irrigating. Midday stem water potential values for walnut trees should be maintained at minus 4 to minus 7 bars and should be irrigated around minus 7 bars to minus 7.5 bars. Peach trees should be maintained at minus 7 to minus 8 bars. The pump-up pressure chamber is a great tool for helping diagnose and correct water stress or over irrigation problems and is reasonably priced.