Sacramento Valley Walnut News
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In This Issue

Submitted by:

Janine Hasey
UCCE Farm Advisor
Emeritus
Sutter, Yuba and Colusa Counties

Time for a Hard Look

Franz Niederholzer, UCCE Farm Advisor, Colusa and Sutter-Yuba Counties

Current tree crop economics are tougher now than at any time in the last 20 years. The outlook is not encouraging. Costs are way up and may not ease anytime soon. Net acreage is up, sustaining market volume and soft pricing. Labor is hard to find, and expensive if found, while labor-saving solutions often require major capital investments. Water, if you can get it, will most probably cost more over time. More water per acre will be needed for good crop health and production if average temperatures continue to rise. The way forward to a better future is not clear. All is not lost (despite how this paragraph reads) but forging ahead with the same practices and expecting a natural return to better times is looking like a long shot.

Given all the above, this off-season should be a good time to take a particularly hard look at your operation. Every farm is different, so solutions and especially decisions must come from inside the operation. However, basic guidelines for finding the best way "out of the woods" follow four simple steps; stop, think, observe, and plan.

Stop. Block out some time on the late fall/winter calendar to think, observe and plan. If time is not set aside, the final planning may be incomplete or not done at all.

Think about the current state of the operation. Use the most recent UC Davis Cost of Production studies to build a spreadsheet, entering past and/or projected costs and income for each orchard. Consider production history along with soil salinity and irrigation water quality trends when evaluating the production potential of an orchard.

Observe. Talk with neighbors, friends, PCAs, industry members, your local UC farm advisor, bankers, and others to see what they think about the future. Read up on world energy and trade trends. Compare what is heard and read to the reality of your situation. Attend industry meetings. The following steps are just examples. The North Valley Nut Conference will be held on January 19, 2023, in Chico. Check the Events page (sacvalleyorchards.com) for upcoming meetings. Read about world trends in energy and fertilizer (examples include the Midwest and California). Be a healthy skeptic but look around.

Plan for several futures (costs, water, production, prices) as nothing is certain. Prepare to move into 2023 with flexible practices but a solid, realistic goal. With the current world and local conditions unimaginable just a few years ago, it may be necessary to make previously unthinkable decisions. Go big? Sell out? Lease? Shift crops? Limit personal spending? Invest in technology? All options should be on the table. This is a difficult process, but one that should lead to a better outcome than just plowing ahead.

Best wishes to all as the holidays approach.

Save those Thursdays! Upcoming Orchard Meetings	
Thursday September 29	Prune & Almond Canker Zoom Webinar (9-10:30 AM)
Thursday January 19	North Valley Nut Conference - Silver Dollar Fairgrounds
Thursday February 23	North Valley Prune Meeting - Red Bluff Elks Lodge
Thursday March 2	Tehama Walnut Meeting - Red Bluff Elks Lodge
Many more meeting dates to come! Details will be at www.sacvalleyorchards.com	

Walnut Management Considerations – Fall 2022

Clarissa Reyes, North Sacramento Valley Orchard System Staff Research Associate

Pre-harvest

• End nitrogen applications: Finish nitrogen (N) applications by the end of August. There is not much N uptake during the fall, and you do not want to stimulate new growth that is susceptible to freeze injury.

• Proper water management is key for kernel quality. Cutting it short on water during hull split can lead to stuck hulls and darkened kernels. Too much water this time of year can deprive nuts of carbohydrates, leading to bronze pellicles. For optimal kernel color, maintain orchards using a pressure chamber midday stem water potentials of about 2 to 3 bars drier than the baseline during late summer.

• Water management is also key to avoiding freeze damage. More details can be found in this newsletter.

• Should you use ethephon? Using ethephon can advance harvest. An economical approach in a lower price year is to use ethephon to promote a one-shake harvest by applying it about 10 days before normal harvest. More details about ethephon use can be found at sacvalleyorchards.com.

• Evaluate navel orangeworm (NOW) damage risk. Healthy, intact walnuts are most susceptible to NOW damage once husks begin to split. Continue to monitor for NOW in walnuts, using pheromone or female traps, as well as visual observations of infestation and egg-laying activity on codling moth- or sunburn-damaged nuts and early splits. Watch for fourth flight activity in later harvesting varieties. Consult with your PCA or crop consultant to determine if treatment is needed and economical.

Harvest

• Harvest Timing: Harvest as early as possible to reduce quality losses due to navel orangeworm, mold development, and darkening kernel color. At harvest, the objective is to shake what you can pick up that same day. Walnut quality declines most rapidly during the first 9 hours after shaking.

• Collect harvest samples: A sampling protocol and damage identification guide will help you distinguish sources of damage in greater detail than is provided on grade sheets.

• Potassium: where leaf sample analysis indicates your orchard is potassium deficient, consider applying potassium sulfate. Even though potassium chloride (KCl) may save money initially, with drought conditions, it's riskier since there may be insufficient winter rainfall to leach chloride out of the root zone before spring leaf-out. If you have full coverage sprinklers and the water available to flush out the chloride during a winter drought, KCl is an option for you.

Post-Harvest

• Sanitize: Once harvest is complete, clean out processing facilities and harvesting equipment parked adjacent to orchards to eliminate nuts that may harbor moth larvae. Walnut mummies on the orchard floor provide overwintering survival sites for NOW, so even if you have few mummies remaining in the trees - blowing and destroying mummies on the ground helps reduce carry-over NOW populations.

• Cover crops: Typically cover crops are planted in the fall but require winter rainfall or irrigation for continued cover crop growth. With drier winters seeming to occur more frequently, a healthy stand of resident vegetation provides much the same benefit as a cover crop and comes at no additional cost.

• Botryosphaeria or Phomopsis: Cut out all dead wood and prune with new BOT infections in mind. If pruning or hedging is planned this year, aim for as early in fall as you can and when weather is forecast to be dry to avoid infection.

• Scouting for weeds: Walking the orchard in the fall provides the ability to evaluate the current year's weed control program. By scouting and spraying select areas where weed species escaped control, you could save yourself from an expensive full orchard spray in the coming year. You might need to water in your pre-emergent herbicide if we have a dry fall/early winter.

• Considerations for Walnut Removal and Replanting. If you're removing an orchard, October is the time to kill roots with Garlon® to reduce nematode populations. It is critical to paint stumps with Garlon® within five minutes of cutting trunks and leave stumps for 60 days.

Six Steps to Prepare for the Next Sudden Autumn Freeze

Luke Milliron, UCCE Farm Advisor Butte, Glenn, and Tehama Counties; Janine Hasey, UCCE Farm Advisor Emerita; Joe Connell, UCCE Farm Advisor Emeritus

With sudden autumn freeze damage occurring in three of the last four years, preparing for these freeze events needs to be a regular part of every walnut grower's summer and fall orchard operations.

How to reduce future damage.

1. For mature trees, don't apply any additional nitrogen (N) from September onwards to prevent tender new growth that is most vulnerable to freeze damage. For young trees, it's best to cut off N applications by mid-August.
2. For young trees, withhold irrigation starting in early to mid-September, waiting to resume irrigation until after a terminal bud (left photo) is set on the trunk. After the terminal bud has set, resume irrigation to avoid tree stress and defoliation, without the fear of pushing tender new growth.

   For bearing trees, terminal buds may set as a positive side effect of the water cutoff done ahead of harvest to avoid shaker injury.
3. Maintain short groundcover during autumn frost season, beginning mid-October. Keeping groundcovers cut to 2 inches or less during frost season allows sunlight to reach the soil surface, increasing soil heat storage for a warmer orchard through the night. Recently cultivated soil has many air spaces, low heat storage capacity, and low heat conductivity resulting in colder minimum temperatures. The ground surface must be moist for bare ground to be

the warmest (see steps 4 and 5). Be familiar with the infiltration rates of your soils to be able to better plan for irrigations for freeze mitigation.

4. Trees with adequate soil moisture are better able to withstand low temperatures without damage than trees in dry soil since water-filled spaces in the soil conduct and store more heat than empty airspaces. If there has not been adequate rainfall by the end of October, irrigate both young and mature orchards so the soil surface is kept moist going into November. To know if rainfall is meeting this moisture need or if irrigation is necessary, compare rainfall totals with ET, and monitor soil moisture levels by hand or with sensors, with a focus on the top 12 inches of soil. These top 12 inches of soil are the most important for freeze mitigation and should be kept at field capacity (not saturated/ponding) if possible. Either a dry surface crust on one extreme or a frozen sheet of ponded water on the other extreme will both hinder the re-radiation of stored daytime heat during the night.

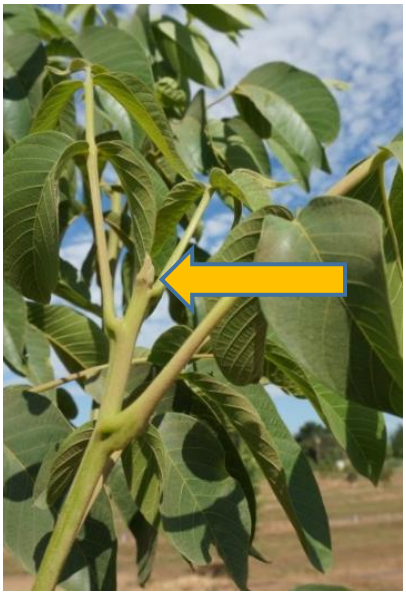
5. Continue to actively monitor soil moisture and freeze predictions in November and December (until trees are acclimated to frost – see note below). Since frost is variable depending on location, monitoring each block remotely with a frost alarm makes good sense. If a freeze is predicted and the soil is dry, it should ideally be wetted 2 to 3 days before a freeze event to fill the air spaces so the soil will store more heat. Light irrigation to moisten a dry soil surface the morning before a frost will help obtain the greatest heat storage for re-radiation at night (as long as there is no standing water during the freeze event).

6. Some growers with the ability to actively irrigate during sudden autumn freeze events have reported great success in preventing damage. We know from work in almonds that active frost protection can achieve as much as 4 degrees protection with solid set irrigation if your system can run 40 gpm/ac. With micro-sprinkler irrigation, 1-2 degrees of warming can be achieved with at least 30 gpm/ac. Running a drip system during a frost may provide very slight benefits due to radiation from freezing water in the wetted area beneath the trees.

   The best approach to escape damage from a fall freeze is to have frost alarms ready and turned on by October 15, completely rehydrate trees after harvest, and actively irrigate during frost events.

If you suspect freeze damage occurred, cut into the branches shortly after the freeze event and check the tissue for drying or browning (photo 2). Swift action in the week after a freeze event can significantly decrease damage. Sunburn after freeze can further damage tissue on the southwest side of the tree. Paint the southwest side of damaged trees with 50% diluted (1:1 water to paint) white interior latex paint. Painting up to a week after the freeze event can reduce additional damage by half or more. You can learn more about freeze recovery in our article 2020 Walnut Freeze: Road to Recovery.

When do you no longer have to worry about preparing for the next freeze? Fully dormant mature healthy trees can tolerate temperatures to the low 20's (°F) or below. However, walnut trees must first fully acclimate to withstand severe freeze events. We believe walnuts acclimate by having the first frost events in autumn with lows near 32° F, or just below. However, we do not know how many (one, two, three, etc.) freeze events are required to acclimate trees in autumn. If the soil is dry ahead of the third, fourth, and maybe additional freeze events – it's better to irrigate and be safe if you can do so. In addition, consider keeping up your freeze response program longer into fall or early winter for younger orchards with lots of current season's growth. As growers were reminded this past **April,** autumn is not the only time that walnuts can be damaged by a freeze event. Learn more about preparing for an extreme spring frost at SacValleyOrchards.com.



Left: Withhold irrigation until a terminal vegetative bud sets on the trunk. **Right:** After a severe freeze event cut into the southwest-facing trunk, looking for dark brown discoloration of the cambium (photos: Janine Hasey).

New IPM Advisor Introduction

Sudan Gyawaly, *UCCE Area Integrated Pest Management Advisor Butte, Sutter-Yuba, Glenn, Colusa, and Tehama Counties*

I joined UCCE as an Area IPM Advisor based in Butte County in July and am very excited about this opportunity. I will oversee Butte, Sutter-Yuba, Glenn, Colusa, and Tehama counties and look forward to working with the growers in the region. I was born and raised in Nepal, a south Asian country, where I completed an undergraduate degree in Agriculture. I worked in rural areas of Nepal for a couple of years, providing sustainable vegetable production and pest management training to growers before moving to the United States in 2009 for graduate studies.

I have an academic background in pest management and have an M.S. and a Ph.D. degree in entomology from West Virginia University and Virginia Tech, respectively. Most recently, I worked as an Associate Specialist at UCCE Stanislaus County, where I worked on various tree nuts pests, including walnut husk fly, navel orangeworm, and Pacific flatheaded borer. Before that, I was a post-doc at North Carolina Agricultural and Technical State University in Greensboro, NC. At Greensboro, I researched pest management on vegetables and fruit trees on small farms.

I am currently learning about the crops and pests in the region by meeting and talking with growers and other stakeholders. I plan to develop a need based applied IPM research and extension program for orchard crops. I will design and deliver IPM information using various extension tools, including personal consultations, print publications, public presentations, and field days.

I can be reached by phone at 530-538-7201 or by email at sgyawaly@ucanr.edu.

In-season-& Post-harvest Management of Navel Orangeworm (NOW)

Sudan Gyawaly, UCCE IPM Advisor, Butte, Colusa, Sutter-Yuba, Glenn, and Tehama Counties
Jhalendra Rijal, UCCE IPM Advisor, Stanislaus, Merced & San Joaquin Counties

1. In-season NOW Management

Navel orangeworm is a pest remaining on most nut growers' and pest control advisors' minds regardless of the time of the year. There is always room for improving IPM, including adopting effective winter sanitation, implementing a season-long monitoring program, deploying mating disruption tools, spraying insecticides, and performing timely harvest.

a. Pre-husk-split consideration:

NOW larvae cannot infest healthy, intact walnuts; however blighted, sunburnt, and codling moth-infested nuts can be infested by NOW. Such nuts provide suitable egg laying and larval development sites allowing NOW to build up prior to hull split. Therefore, practices minimizing the number of NOW susceptible nuts during the growing season can go a long way toward reducing NOW damage risks. As important as some of these practices are to minimize NOW damage, we are almost too late to use these methods for this season. Tactics still ahead and outlined below need to be incorporated for sustainable NOW management in walnuts.

b. Post-husk-split considerations:

Walnuts generally become susceptible to NOW at husk split. NOW can feed and survive on many other host plants, mainly other tree nuts - almond and pistachio. NOW can fly from one orchard to another depending on the presence and susceptibility of the hosts. Therefore, we must keep monitoring NOW populations to make pesticide application decisions. Walnuts are at greatest risk at husk split, and all walnut varieties are susceptible at that stage.

Assessing the nut susceptible stage (husk-split) and moth activity (adult flight, egg laying, etc.) is most critical in deciding the need for and timing of insecticide application. If you have been following your pheromone and egg trap counts, the NOW population increases exponentially as the number of generations increases. Walnuts are at higher risk by the 3rd – 4th NOW moth flights when early or late maturing varieties are typically at husk-split. Moreover, late walnut varieties are at greater risk of NOW damage because almonds, the most common alternate host, are already harvested. Your pest control adviser or crop consultant can help you decide if an insecticide treatment at husk-split is needed.

Early harvest, or more precisely “timely harvest,” is one of the important ways to reduce NOW damage in walnuts. One more thing worth considering, particularly if you have high NOW pressure, is the application of ethephon. Ethephon expedites husk split and helps synchronize an early harvest. Ethephon application allows harvesting walnuts at least 7-10 days earlier than normal and can reduce the risk of NOW damage. More information on ethephon use is available at UC IPM.

2. Post-harvest NOW Management

a. Harvest damage evaluation:

In-field harvest samples are vital since through sample evaluation they can determine the source of damage, help assess the current year's IPM program, and help in planning for next year's IPM program.

Collect at least 1,000 nuts from each block for harvest sampling. The sample should represent the whole block. For insect damage evaluation, collect 100 nut samples per bag and ten bags representing the different parts of the block. NOW damaged walnuts can be differentiated from codling moth damage, by the absence of entry holes on the husk, presence of a large amount of frass and webbing in the kernel, and presence of often many larvae in the kernel. The details on harvest sampling and sample evaluation are available in another article at SacValleyOrchards.

Left: Navel orangeworm damage. Right: Codling moth damage.

b. Orchard sanitation:

Winter orchard sanitation is the foundation of NOW management because it minimizes the 'within orchard' NOW population and lowers the risk of NOW damage in the coming season. Dry winters make winter sanitation more crucial since they favor higher NOW over-wintering survival. NOW larvae overwinter in leftover 'mummy' nuts in trees and trash nuts on the orchard floor, uncleaned harvesting equipment, and other facilities and processing plants around the field.

Keep orchards, equipment, and facilities adjacent to the orchard as free of mummy nuts as possible. If the orchard has high NOW infestation, this is vital to reduce the NOW pressure. Clean up mummy nuts any time after harvest but be sure to complete the job by mid-March at the latest. Wait until a rainstorm or 1-2 wet/foggy days before a mummy shake as wet conditions facilitate easier nut removal compared to dry conditions. Hand poles can also be used to remove mummy nuts from trees, unfortunately hand poling crews come at significant cost. Once on the orchard floor, mummy nuts should be swept into rows and flail mowed.

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