Sacramento Valley Walnut News
Issue 51, Fall 2023
Part 1
University of California
Agriculture and Natural Resources | Cooperative Extension

In This Issue

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Fall Walnut Considerations

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Harvest is just around the corner, and the management decisions you make between now and then can affect the quality of, and return on, your crop. Post-harvest management is also crucial to prepare your orchard for winter and next season.

Pre-Harvest

If you plan to use ethephon, monitor packing tissue brown starting 35 days before your expected harvest date. Your ethephon application timing will depend on whether your goal is to improve kernel quality with an early harvest or to enable a one-shake harvest. Only apply ethephon after 100% of nuts reach packing tissue brown.

Protect your orchard from early frost. For young trees, cut off N fertilization by mid-August and withhold irrigation starting in early to mid-September. For mature trees, cut off N fertilization by early September. See the article on Minimizing Potential Sudden Autumn Freeze Damage in this newsletter for more detail.

Harvest

Plan a timely harvest: leaving nuts on the tree exposes them to damage by navel orangeworm (NOW) and leaving them on the ground reduces quality and increases the risk of mold. Plan to pick nuts up on the same day you shake.

Collect a nut sample from across each orchard block to evaluate the efficacy of your IPM program. Grade sheets don't give the detail you need to determine where damage is coming from. Compare damage in your samples to this post on Harvest Damage Evaluation for Walnuts to determine how you can improve your IPM program next year.

Set your frost alarms no later than mid-October.

Post-Harvest

Sanitize orchards to remove mummy nuts that harbor overwintering NOW. By mid-March, blow nuts into row middles and flail mow. If you saw high NOW damage in your IPM evaluation, you may consider shaking remaining nuts out of trees prior to flail mowing. Clean out processing facilities which are adjacent to orchards.

If you are removing and replanting an orchard, October is the time to kill roots with Garlon. It is critical to paint stumps with Garlon within five minutes of cutting trunks and leave stumps for 60 days.

If you are planning to prune this year, prune as early in the fall as possible to avoid *Botryosphaeria* infections. Avoid making pruning cuts when wet weather is forecasted.

If leaf samples indicated potassium deficiency, consider fall bandings of potassium sulfate or potassium chloride (KCl). If you're considering KCl to save money, be sure that the chloride will be

able to leach out of the root zone before spring leaf-out. Avoid using KCl where there is a perched water table, heavy clay, or less than 8" of winter rainfall.

With a wet winter predicted this year, you may consider planting a cover crop to help increase infiltration and prevent ponding. Cover crops should be seeded before leaf drop. See the article on cover crops in this newsletter for more information.

Please note: Any mention of a chemical is not a chemical recommendation, merely the sharing of research results. Always read the pesticide label, the label is law.

Minimize Potential Sudden Autumn Freeze Damage

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Damage from a sudden autumn freeze can occur when trees experience freezing temperatures prior to going into dormancy. With sudden autumn freeze damage occurring in three of the last five years, preparing for these freeze events needs to be a regular part of every walnut grower's summer and fall orchard operations. 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.

Steps to prepare:

1. Tender new growth is most vulnerable to freeze damage: prevent trees from pushing late-season growth by cutting off N applications by mid-August (young trees) or early September (mature trees).
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. For bearing trees, terminal buds usually set as a side effect of the water cutoff done ahead of harvest.
3. Keep groundcovers cut to 2 inches or less starting in mid-October. This allows sunlight to reach the soil surface, storing heat for a warmer orchard through the night.
4. Rehydrate trees immediately after harvest, and actively monitor soil moisture and freeze predictions (usually from mid-October through December) until trees are acclimated to frost (see note below). Trees with adequate soil moisture are better able to withstand low temperatures without damage than trees in dry soil. This is because water-filled spaces in the soil conduct and store more heat than empty airspaces. If a freeze is predicted and the soil is dry, it should ideally be wetted 2 to 3 days before a freeze event. 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 (if there is no ponding going into the freeze event).
5. 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 of warming with solid set, 1-2 degrees with micro-sprinkler, and maybe even some benefit running a drip system.

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. We believe walnuts acclimate by having the first mild frost events in autumn with lows near or just below 32° F. However, we do not know how many mild freezes 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.

If you suspect freeze damage occurred, cut into the branches shortly after the freeze event and check the tissue for drying or browning (right photo). 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.

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).

Plant Cover Crops Now to Prepare for Another Wet Winter

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Weather forecasts for the upcoming winter months are leaning heavily toward another wet and cold winter due to the predicted *El Niño* conditions. Unlike last year, however, our reservoirs are already full, or close to full, going into this new water year. This is true for storage basins across the northern Sacramento Valley, due largely to the heavy mountain snowpack from last winter being ideally time-released over the summer months. Should *El Niño* bring heavy rainfall back to the region, any on-farm water capture that can be done should be done to keep as much water locally banked as possible. The weeks immediately following harvest present the best time of the year to plant cover crops to reap their various benefits in the months ahead.

So what are those potential benefits? Well, in the context of cold, winter rains, there are two primary components of orchard management that you should be considering:

Infiltration

Last winter, we published the article *Vegetation for Infiltration* which offered guidance on how to best capture any winter rain that may fall after several consecutive years of drought. Of course, by the time the article was published after the

holidays, the rain had started to fall, and continued to fall, and it became clear just how large a role vegetation in the orchard can play during sustained rain events.

Standing water in an orchard indicates that the rate of precipitation (rainfall or irrigation) is exceeding the infiltration rate of the soil. Last year, orchards with vegetation in the middles typically had far less standing water than those with bare soil. Standing vegetation physically slows the flow of water across the orchard floor, and the roots of any native or cropped vegetation create downward channels, deep into the soil profile. These channels increase the rate at which water percolates through these soils when compared to soils left bare (Figure 1). The combined effect is overall increased infiltration and water storage in the soil profile and underlying aquifer due to reduced runoff from the soil surface.

Figure 1. Photos: Curt Pierce, Jan 2023

Frost Protection

Moisture in the soil profile helps to hold soil temperatures slightly higher than that of dry soil. However, if water has ponded on the soil surface, the sun's heat is reflected up and away so that it cannot further warm the soil. During nighttime hours, when the sun has set and temperatures drop, those few degrees of higher soil temperatures can make the difference in frost damage being sustained by your trees or not. With vegetation in the orchard, water from precipitation (or irrigation) can be more effectively introduced to the soil profile where it can aid in this warming effect. You will want to keep any vegetation in the orchard managed, though, as taller stands will block the sun's rays and keep them from warming the soil just as ponded water can. Aim to keep any vegetation from growing much over 2" or so by mowing as needed - hopefully when the orchard is dry to prevent any unnecessary compaction from equipment in the lanes.

Check out *Cover Crops for Walnut Orchards* for more detailed guidance and information.

"Field Visit: Nematode Management in Walnut" was held in Escalon, CA

Andreas Westphal, Ph. D. UC Riverside Professor of Cooperative Extension Nematology

Establishing a new walnut orchard is a long-term investment that requires detailed planning to enable 35 to 40 years of bountiful and sustainable production. Among other soil-borne maladies, soil-dwelling plant-parasitic nematodes can severely damage walnut. On susceptible rootstocks, root lesion nematodes, *Pratylenchus vulnus* (RLN) can increase to high numbers over time, reaching damaging levels in established orchards, and frequently old orchards leave behind populations of this nematode. RLN is estimated to be present in 85% of California walnut orchard soils. This nematode is highly damaging with a population density of one nematode per 250 cc of soil potentially reducing the growth of a newly planted orchard. Because it can inhabit the upper 5 ft of soil its suppression is challenging. After the ban of methyl bromide fumigation in 2005, alternative fumigants containing 1,3-dichloropropene (1,3-D, Telone) are increasingly regulated. Regulation to start on January 1, 2024, will make 1,3-D use more expensive and potentially less effective.

A California Walnut Board-supported trial was planted in 2021 to 'Livermore' walnut on seedling 'Paradox hybrid' rootstock following an old walnut planting. In August 2023, a field meeting was held at the trial on the farm of Robert Longstreth in Escalon, CA. The previous orchard had been removed in winter 2020, and the ground deep ripped and leveled. Experimental preplant soil treatments were applied in August 2020. These included the AITC-containing material Dominus, Reklemel (Salibro) (both not currently registered), Velum One, and different forms of anaerobic soil disinfestation (ASD). All treatments received 6 acre inch of water on treatment day except the comparative treatment of Telone II – chloropicrin application. In anaerobic soil disinfestation, easily decomposable substrates are spread on the soil surface, incorporated, drip irrigation lines installed, and totally impermeable film (TIF) used to cover the soil to exclude atmospheric oxygen. Under heavy irrigation, the process starts and microorganisms decompose the substrate, the aerobic microbes eventually deplete the soil oxygen, so anaerobic microbes become dominant and continue decomposing the material while producing secondary metabolites. The created conditions reduce nematode population densities. The potential and limitations of the different treatment options were discussed. In general, alternative preplant soil treatments resulted in less tree growth than Telone fumigation but several of them improved growth over the non-treated control. It remains challenging for treatments to compete with a properly done fumigation but treatment programs are being developed. A more comprehensive field day covering more soil treatment options and additional management tools including improved rootstocks is planned at the Kearney Agricultural Research and Extension Center in Parlier in the fall of 2023.