UC Cooperative Extension
University of California
Agriculture & Natural Resources

The Scoop
on Fruits & Nuts in Stanislaus County

January 2026, Vol. 31 Issue 1

Save the Dates!

🌰 **2026 North San Joaquin Valley Almond Day**
📅 **Tuesday, February 10, 2026**
📍 **Ceres Community Center**
2701 4th Street, Ceres, CA 95307
⏰ **8:00 a.m. – 12:30 p.m.**

Join us for the annual North San Joaquin Valley Almond Day, a must-attend event for almond growers and industry partners. This year we're excited to announce a **NEW location**—no downtown Modesto traffic and plenty of parking, conveniently located just off Highway 99!

Mark your calendar!

In this issue...

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You may reach us at 209-525-6800 or by email

To view online:
Scan the QR Code

🌱2026 IPM Breakfast Meetings

📅 **March–June 2026 (1st & 3rd Wednesdays)**
⏰ **7:00–8:00 a.m.**
📍 **Old Mill Café**
600 9th Street, Modesto, CA

Grab breakfast, bring your questions, and start your day with practical IPM insights. More details will be shared as the season approaches.

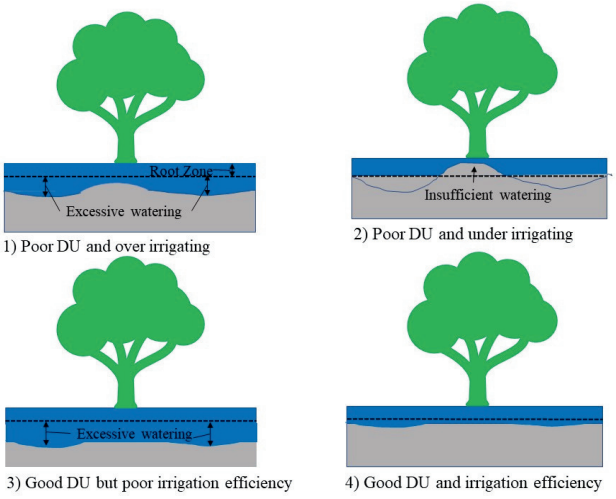
Resilient Ag Practices for Competitive Nut and Fruit Production in California

Moneim Mohamed, Irrigation and Soil Advisor for North San Joaquin Valley, UCCE Stanislaus County

Weather and water supply variability in California, coupled with Sustainable Groundwater Management Act (SGMA) regulation, will force many fruit and nut growers to reduce the amount of groundwater they can pump. There is a need for strategies to reduce water use and sustain production in a water-scarce environment. This article discusses these strategies that focus on water management to keep the specialty crop industries competitive despite climate and regulatory pressures.

1) Fix Distribution Uniformity (DU) before you add inches

The first recommended task before you add any inches of water is to run a catch can test to evaluate DU. Run the test annually or at least every other year. DU is a commonly used irrigation performance measure of how evenly water is applied across a field during irrigation so that the same amount of water is received by each tree or vine. The more DU can be improved, the more water will be conserved and the better the crop will perform. Gross irrigation amounts are often increased to account for poor DU by dividing the net irrigation required by the DU as a decimal. A system with poor DU wastes water and creates stress zones that cut yield. Target DU should be ≥ 0.80. To improve DU, flush laterals, clean filters on schedule, replace clogged emitters, correct pressure variation (regulators, valve zoning), and fix leaks.



1) Poor DU and over irrigating

2) Poor DU and under irrigating

3) Good DU but poor irrigation efficiency

4) Good DU and irrigation efficiency

2) Schedule irrigation from the weather, plant and soil; not the calendar

Optimize irrigation application efficiency to maximize root-zone storage; this requires accurate irrigation scheduling (proper timing and volume). There are three main irrigation scheduling methods for orchards: irrigation scheduling based on soil, plant, and weather measurements. No irrigation scheduling method is perfect. Using just one irrigation scheduling method is still effective but using two is even better. However, combining all three methods is recommended, as it gives you more confidence in making informed and effective water management decisions.

A) Weather based method

Evapotranspiration (ET) based irrigation scheduling matches the water your trees have used since the last irrigation: transpiration (T) through leaves, plus soil evaporation (E). Replacing only the amount used by the tree plus an appropriate leaching fraction can improve water use efficiency and reduce pumping costs. Determining the amount of water a crop uses though evapotranspiration, or ET_c, is calculated by multiplying the known ET value of a reference crop, usually grass, (ET_o) by a percentage, or crop coefficient (K_c), which changes through the season based on canopy cover, weather, and day length [$ET_C = ET_o \times K_C$]. If you don't want to run these numbers yourself, subscribe to our Weekly Crop Water Use email report, scan the QR code or call our office at 209-525-6800. Each week you will receive the estimated ET_c for almonds, peaches, walnuts, winegrape vineyards, alfalfa, pasture, and pistachios in Stanislaus County.

B) Plant-Based method

Out of the many plant-based irrigation scheduling sensors, the pressure chamber, which measures the tension of water within the plants, has shown its reliability as a physiological indicator of water stress in trees and vines. This method tells us when to irrigate and to check on the other methods (weather and soil). Weather- and soil-based irrigation scheduling methods tell us how much irrigation is required but you need to make assumptions about the root zone depth. Thus, plant-based methods can determine if those assumptions are accurate. Use crop-specific thresholds from University of California Agriculture and Natural Resources (UC ANR) guidelines for "fully watered," "moderate deficit," and "mild deficit" targets in different growth stages. We offer free training on how to use pressure chambers and how to interpret the data.

C) Soil based method

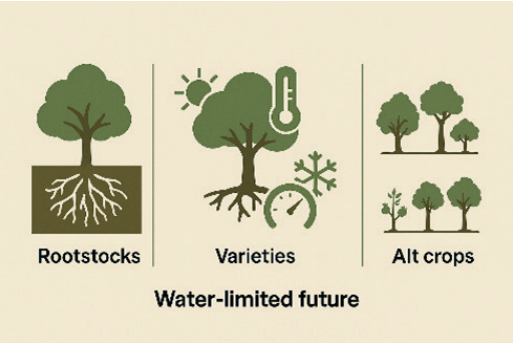
The look-and-feel method of soil used to be the most common field method to check soil moisture, but this takes time and experience to train yourself and it is subjective especially when soil is dry or wet. There are sensors that can tell you when to irrigate (tensiometers, granular matrix sensors). These sensors measure how strongly water is held by soil particles: the drier the soil, the higher the tension, and the more difficult it is for a plant to extract water. The reading provided by these sensors is in cb or kPa. On the other hand, some sensors tell you when and how much to irrigate (neutron probe, resistance, capacitance, time domain reflectometry (TDR)). Neutron Probe will give you the most correct answer while the others will give you a trend that is usable for scheduling irrigation. When we talk about how much water soil can hold for plants, we use three terms. The first term is "field capacity" (FC) and it is how much water the soil holds a few days after irrigation or rain, once most of the free water has drained—usually about two to four days, depending on soil type. The second term is "permanent wilting point" (PWP). PWP is when the soil has so little water left that plants cannot take up anymore. And the third term is "total available water" (TAW) and is the difference

between FC and PWP and is the space to manage your soil water depletion. Deciding how dry you want the soil to get before irrigation, is called management allowable depletion (MAD) and is usually set around 50%. Depleting the soil water beyond this point will negatively impact plant growth and yield.

3) Phenology-based deficit irrigation

Deficit irrigation is a water application practice that applies less water than the evapotranspiration requirement. Phenology based deficit irrigation or regulated deficit irrigation (RDI) practice is achieved by reducing irrigation amount during specific growth stages. Avoid imposing water stress during periods of rapid fruit growth. For species with a double-sigmoid fruit growth pattern, moderate deficit irrigation can be applied with relatively low risk during the phase of growth (stage II). If stage II occurs in mid-summer and persists, this window can offer meaningful water savings. In contrast, stone fruits are highly sensitive to stress immediately before and after stage II; they should be fully irrigated throughout these rapid-growth intervals. Young orchards (years 1–3) use less water than full canopy orchards, however, growers should not apply deficit irrigation to young trees to avoid delay until they come to full production.

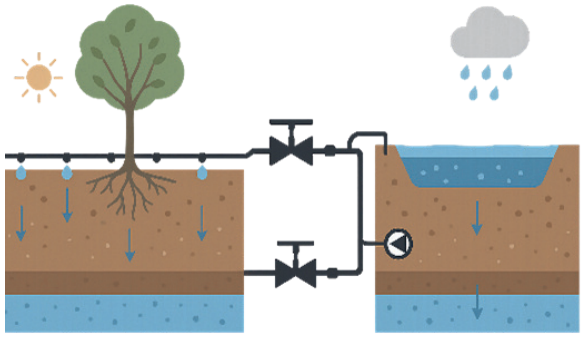
4) Additional Considerations



- **Climate-smart cropping systems**: Incorporate drought-tolerant rootstocks into replant decisions to help mitigate a future with limited water. Also, choose varieties with lower chilling needs and heat tolerance where applicable or consider different crops that are drought tolerant.
- Automation: Automating start/stop and irrigation set length based on sensors feedback will result in savings on water and energy bills.
- **Variable Frequency Drive (VFD)**: If your field has different soil types, consider variable rate (zoning) irrigation by installing a VFD to your pump. A VFD allows the pump to speed up or slow down to meet the needs of an irrigation system. If the system requires less flow or pressure (for example, when watering fewer blocks), the VFD slows the pump down. VFD will reduce the electricity/energy the pump is using , which results in savings on pumping costs. SWEEP, Utility companies or NRCS might offer rebates for VFDs.
- **Cover crops**: Cover crops can be used to work as a mulch to limit soil evaporation and improve infiltration. In dry springs, terminate early to avoid water competition with trees.
- **Thinning**: Thinning can slightly reduce a tree's water use. In a drought year, thinning more heavily than usual may be needed so the remaining fruit reaches acceptable size.
- **On-Farm Recharge** (often called Ag-MAR, agricultural managed aquifer recharge): Consider Ag-MAR if your soil allows. Expanding microirrigation to address drought and improve irrigation efficiency has led to reduced groundwater recharge (GWR). Winter groundwater recharge during wet years could be used to replenish overdraft aquifers using a hybrid irrigation system (microirrigation for in season irrigation and flood for Ag-MAR).

During the recharge process, water infiltrates through the soil profile, reaches, and stores in the aquifer for use later during the growing season. You can determine if the field is suitable for GWR by knowing the infiltration rate. Infiltration rate is the rate of water that enters the soil layers. Soil starts to percolate if a watermark sensor is used and gives a zero reading of soil moisture potential. You can quickly check your field infiltration rate from Web Soil: https://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx. You can also check your soil's suitability for groundwater recharge from Soil Agricultural Groundwater Banking Index (SAGBI) interactive map https://casoilresource.lawr.ucdavis.edu/sagbi/.

- **Whole Orchard Recycling (WOR)**: WOR can increase irrigation water use efficiency, improve soil health and tree water status.



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Orchard Sanitation in Winter: A Simple Practice that Helps Fight Two Key Pests of Nuts

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Introduction

Navel orangeworm (NOW) and the new invasive carpophilus beetle (CB; Scientific name: *Carpophilus truncatus*) are two important pests that significantly affect the California nut industry by directly infesting nutmeat and reducing yield and quality. For decades, NOW has been the most destructive pest of almond and pistachio orchards in California. More recently, after its first detection in 2023, CB has become established in the San Joaquin Valley, infesting nut orchards. In the Sacramento Valley, only limited surveys have been conducted; however, in 2025, monitoring traps captured a few CB adults in an almond orchard in Colusa County. Although both NOW and CB can attack walnuts, the risk to walnuts from CB appears lower compared to almonds and pistachios, based on our observations so far.

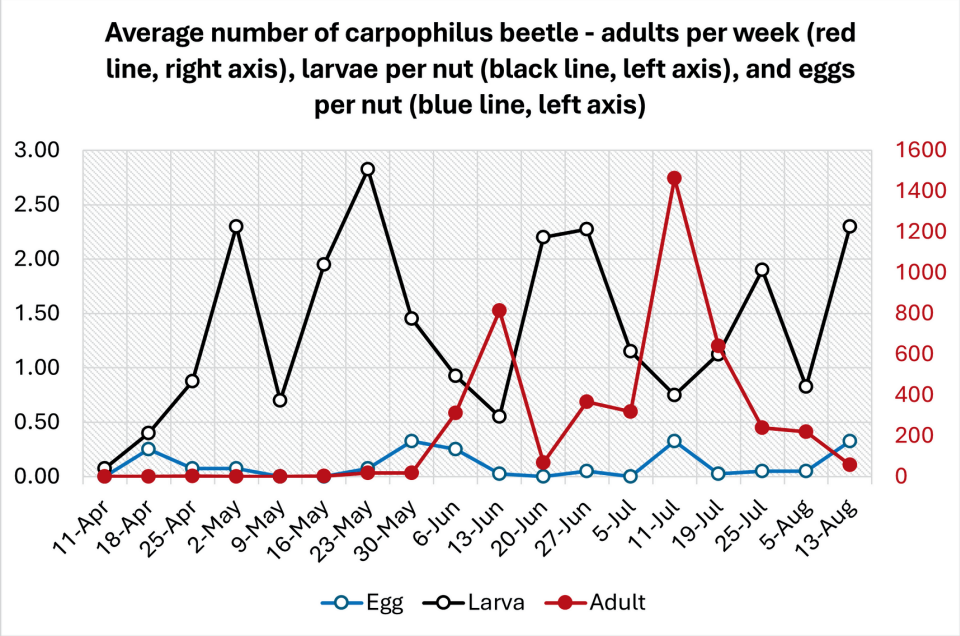
Navel orangeworm moths lay eggs on maturing nuts after the hull opens (i.e., hull-split in almonds; hull-slip in pistachios). After hatching, NOW larvae enter the nuts and consume the kernels, leaving large amounts of brown frass and webbing. Similarly, CB uses hull-split or hull-slip nuts for egg-laying, and both larvae and adults consume the nutmeat, leaving the creamy (almond) or greenish (pistachio) powdery dust. Both NOW and CB can also cause postharvest issues, capable of reproducing and causing nut damage in stockpiles or storage facilities. Both species have multiple generations per year, but CB most likely has more generations than NOW. Please scan the QR code for details on how to differentiate NOW vs CB life stages and damage.

Carpophilus beetle (CB) ID Guide

Winter sanitation is the best available tool

Navel orangeworm survives the winter as a mature larva inside the mummy nuts, while CB overwinters as an adult in mummy nuts, predominantly those on the ground. These mummy nuts provide overwintering shelter, food, and egg-laying resources for earlier generations of both NOW and CB when in-season nuts have not yet reached the hull-split stage. They can multiply rapidly and build their populations early in the season by utilizing mummy nuts left in the orchard. Tree mummies are most critical for NOW survival, while ground mummies are extremely important for CB survival during the winter and early summer.

Winter sanitation is the foundation of NOW control. The benefits of orchard sanitation in reducing NOW damage were studied in the early 1980s, when average statewide almond damage from NOW was estimated at over 8% annually. By the late 1980s, with greater adoption of winter sanitation practices, this damage had been reduced to 4%, with minimal to no insecticide use. The carpophilus beetle, however, is a new pest, and as we learn more about it, it seems that mummy nuts, especially those on the ground, are a "must-have" resource for its survival. Its dependency on mummy nuts appears to be even more critical than that of NOW. In the 2024 and 2025 seasons, we conducted a study to monitor CB activities in mummy nuts on the ground. From these studies, we found that CB adults actively fly to seek new crops to infest around mid-June in the upper San Joaquin Valley. In contrast, eggs and larvae were constantly present in those mummy nuts throughout the season (See figure below). This suggests that CB adults utilize the mummies on the ground, particularly in the spring and early summer, only flying when new nuts are ready in the tree canopy. Therefore, mummies on the ground become a breeding resource, exponentially increasing their population. The only effective way to discontinue that trend is to ensure the mummy nuts are shredded as much as possible.



Multiple reasons why orchard sanitation is essential for managing NOW and CB:

- ***Reducing Pest Pressure***: One of the most effective methods for NOW management is mating disruption. However, for mating disruption to be most effective, the pest pressure should ideally be moderate to low. This can be achieved through proper winter sanitation, ensuring the spring population begins with low numbers.
- ***Emerging Threat***: We now have an emerging pest, CB, which relies even more heavily on mummy nuts than NOW. Sanitation allows "killing two birds with one stone".
- ***Insecticide Ineffectiveness***: Studies have repeatedly shown that insecticide sprays for NOW control at hullsplit is, at best, only 50% effective. For CB, the benefits of applying insecticides at hullsplit have not yet been proven. In the last two years, we have conducted efficacy trials using multiple insecticides applied twice during the almond hullsplit (at 1% hullsplit and 14 days after), but we did not observe a significant reduction in CB damage.

Conditions for Effective Sanitation

Any time after the regular harvest that aligns with the grower's operational schedule is the right time to perform winter sanitation. Conditions like light rain or fog can help loosen the nuts, making them more likely to fall off. This year's Tule fog, which has covered the entire Central Valley for several weeks (mid-November to mid-December), provides ideal conditions for winter sanitation.

Once nuts are on the ground, moving them into a windrow and shredding them completely is equally, if not more, critical, especially for CB. When operating the mower or shredder, the goal is to pulverize the nuts as thoroughly as possible. Growers should check the mower blades and replace them as needed, operate at a slower speed, and confirm that the nuts are being adequately shredded. If necessary, return in a few days or perform a double pass. Again, these practices are critical to making the nuts unsuitable for both NOW and CB, thereby preventing their survival and reproduction.

Summary
"An ounce of prevention is worth a pound of cure". For nut crop orchards, sanitation is no longer just about managing the navel orangeworm—it is currently the only effective control available against the emerging threat of invasive carpophilus beetles as well. Although it can be expensive, one preventive approach can help address two major pest issues.

Oak Root Fungus: Rootstock Considerations in 2025-2026

Luke Milliron, Farm Advisor, UCCE Butte, Glenn and Tehama Counties
Roger Duncan, Farm Advisor Emeritus, UCCE Stanislaus County

Photo: A 13th leaf Nonpareil on Krymsk 86 infected by *Armillaria mellea* (oak root fungus, ORF). The photo was taken by Roger Duncan in 2020 and the tree is still alive as of 2025 (18th leaf).

If you have an orchard plagued by oak root fungus (ORF, *Armillaria mellea*) generation after generation, disease resistance should be at or near the top of your list of rootstock attributes (PDF / comparison tool) when replanting that orchard. Rootstock is the key management tool in a very limited toolbox against this disease (University of California Integrated Pest Management (UCIPM)/podcast / podcast). Rootstocks with plum parentage, specifically the species *Prunus cerasifera*, are most likely to have some level of ORF resistance. Marianna 2624 was California's standard answer to orchards with a history of ORF. However, Marianna 2624 is considered to be incompatible with some important standard almond varieties, including most critically, Nonpareil and Butte. In addition to incompatibility, the rootstock suckers from the crown and roots near the soil surface profusely, requiring costly maintenance. Finally, Marianna 2624 confers relatively low vigor on the almond scion, and therefore less yield potential compared to more vigorous rootstocks used in California almond production. Given these flaws, growers have largely abandoned planting new orchards to this historic standard, and many nurseries no longer provide the rootstock.

To help inform almond growers who face the dilemma of which rootstock to plant, we are monitoring a young almond rootstock trial in the Patterson area where we planted trees on nine rootstocks and are comparing their survival in an orchard infested with ORF. A few trees are already beginning to die from this disease, but it will be a few years before we can make recommendations based on the results of this trial. In the meantime, what should growers do?

In lieu of Marianna 2624 on ORF ground, growers have largely shifted to planting with Krymsk 86 (plum x peach) rootstock. This newer rootstock confers superior anchorage and vigor compared to Marianna 2624, and suckering is not usually a problem. Krymsk 86 is not immune to ORF (see photo) and field data on its level of resistance is still limited. However, grower and UC Farm Advisor observations, as well as USDA lab data all indicate that it offers higher survival rates against ORF compared to the historic standards Lovell and Nemaguard peach rootstocks.

Unfortunately, no rootstock is perfect, and Krymsk 86 is no exception. Krymsk 86 is one of the most sensitive rootstocks to nematodes (especially root knot), and excessive salts (Cl, Na, B). In addition, much like Marianna 2624, Krymsk 86 is not fully compatible with every almond (scion) variety. There's the yellowing Krymsk 86 malady which has appeared periodically in young Monterey trees, often induced by excessive spring rain. More recently, orchards planted with the new self-fertile almond varieties Independence and Shasta have failed to thrive with Krymsk 86 rootstock. There is also some early evidence of Krymsk 86 incompatibility with new self-fertile varieties Lassen and Pyrenees. However, there are other self-fertile varieties that, to date, appear to be compatible with Krymsk 86, including Yorizane, Parpareil (new USDA release, formally Y117-91-03), and Early Bird.

Which other rootstocks may hold promise? Rootpac R (plum x almond) is assumed to have some ORF resistance because it is half *P. cerasifera*, but this is unproven. However, the relatively low vigor can be a concern, especially if paired with a low vigor scion like Independence. Rootpac R can also have the same issue as "yellowing Krymsk 86" with young Monterey trees.

What doesn't work? Following the problems with Independence and Shasta on Krymsk 86, some Sacramento Valley growers have instead planted those same varieties on Viking (interspecific hybrid of peach, almond, apricot, and plum; only 1/8th plum). Very early results from Roger Duncan's trial indicate that Viking is susceptible to ORF. Peach (Lovell, Nemaguard), and peach/almond hybrids (Hansen 536, Bright's Hybrid 5, SG1, etc.) are not ORF resistant.

Bottom line: If you are concerned about ORF, and don't want to plant on Marianna 2624, Krymsk 86 is the alternative we have the most evidence in favor of so far. The selection of Krymsk 86 then adds the complication of potentially eliminating certain self-fertile varieties because of rootstock incompatibility concerns. When planting trees on plum hybrid rootstocks like Krymsk 86 and Rootpac R, remember to plant them more densely because of their relatively low vigor. This is especially true if the soil is a sandy loam or sandier. We will continue to vet Krymsk 86, along with newer alternatives both for resistance to ORF, as well as for compatibility with an ever-growing list of new self-fertile varieties.

The Scoop

on fruits and nuts in Stanislaus County

Look What's Inside:

To simplify information, trade names of products have been used. No endorsement of named products is intended, nor is criticism implied of similar products which are not mentioned.

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