Sacramento Valley Prune News
Spring, 2021
University of California
Agriculture and Natural Resources | Cooperative Extension

# Spring & Early Summer Orchard Considerations

*Franz Niederholzer, UCCE Farm Advisor, Colusa, Sutter and Yuba Counties*
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*Katherine Jarvis-Shean, UCCE Farm Advisor Sacramento, Solano & Yolo Counties*

## Late April

✓ **Got a crop?** In late April a clearer picture of the 2021 crop is just beginning to come into focus. Bloom was generally strong and late with full bloom dates scattered from roughly March 20 to April 1 around the state. However, it was dangerously hot (80+ $^{o}$F) for successful prune fruit set in many prune growing regions on March 31-April 2. Be ready to check cropload and shaker thin, where needed, once reference date arrives, around 7-10 days after pit tip hardening. Thin early for best fruit size improvement. See the thinning article in this newsletter for details on cropload checking and thinning.

✓ **Irrigation:** Water supplies vary widely going into the 2021 season. Special attention to orchard water status, irrigation timings and amounts is always needed to maintain crop quality and orchard health. It may be needed to conserve limited water this year. Adequate moisture is critical through the spring. Irrigating very dry trees can cause end cracking of fruit. A free guide to prune orchard irrigation under drought conditions is available at: anrcatalog.ucanr.edu/pdf/8520.pdf.

Track the water status of your orchard and time irrigations using a combination of ET, soil moisture sensors and pressure chamber readings. The most direct measure of water status is the pressure chamber, read more at: sacvalleyorchards.com/manuals/stem-water-potential. ET reports are also published weekly: sacvalleyorchards.com/et-reports/2020-et-reports. Information on soil moisture monitoring is available at: ucanr.edu/sites/Tehama/files/20513.pdf. See the article in this newsletter on irrigation water quality.

✓ **Fertilization program starts:** Consider a nitrogen (N) application before the end of April if there is a good crop set. If using foliar potassium nitrate sprays as your potassium (K) program or to supplement soil applied K, begin spraying in late April and make additional applications every 2-3 weeks. More details at sacvalleyorchards.com/prunes/horticulture-prunes/prune-orchard-nutrition-thoughts-for-2017.

✓ **Aphid:** Monitor for leaf curl plum aphid and mealy plum aphid since colonies can grow soon after bloom. Monitoring details (with video) at: ipm.ucanr.edu/PMG/r606900211.html. Oil sprays anytime from petal fall to May 15 can reduce mealy plum aphid to acceptable levels with good to excellent coverage. Oil is not effective against leaf curl aphid during this period as the spray can't reach inside the curled leaves where the aphids are feeding. Other pesticides are effective in controlling aphids during the spring, but be careful to avoid flaring mites with pyrethroids (Asana®, Warrior®, etc). or neonics (Actara®, Provado®, etc.). Movento® and BeLeaf® can provide excellent aphid control when monitoring shows a need.

## In This Issue



*Submitted by:*
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More information on leaf curl plum aphid at: ipm.ucanr.edu/PMG/r611301811.html

More information on mealy plum aphid at: ipm.ucanr.edu/PMG/r611301711.html

**May**

- ✓ **Rust:** Monitoring commences with the start of the month, surveying 40 trees every 1-2 weeks. Pay close attention to non-bearing replants, exceptionally vigorous trees, and previous hot spots. Consider treating when the first leaf with rust is found. For more on rust see: ipm.ucanr.edu/PMG/r606100611.html
- ✓ **Peach twig borer (PTB) and Oblique-banded leaf roller (OBLR):** These worms feed on the fruit surface later in the season, damaging the fruit skin and "opening the door" for fruit brown rot infection later in the season. Don't assume earlier sprays worked to control these pests. Inspect fruit at 400 degree days after the first PTB biofix. In the orchard, look for larval entry points on the fruit (ideally 15 fruit from 80 trees), especially at fruit to fruit or fruit to leaf contact points. Treat if 2% or more (24+ of 1,200) of the fruit have damage. For OBLR, begin fruit inspections at 930 degree days after biofix for that pest, following the same sampling protocol and treatment threshold. More on PTB at: ipm.ucanr.edu/PMG/r606300211.html and on OBLR at: ipm.ucanr.edu/PMG/r611300511.html
- ✓ **Aphids:** Leaf curl plum aphids move to summer hosts in May, but mealy plum aphid stay in orchards until mid-July. Heavy infestation of mealy plum aphid can limit flower bud development this year, which can mean less crop next year.
- ✓ **Irrigation:** Continue monitoring pressure chamber, soil moisture and/or weekly ET to manage irrigation and maintain adequate orchard moisture. May and June are the most critical months for end-cracking, which occurs when very dry orchards are irrigated.
- ✓ **Fertility:** Continue with nitrogen and potassium fertilization program if a good crop is set. More than 50% of annual N budget should be applied before June 1st.

**June**

- ✓ Continue monitoring for **aphids** and **rust**.
- ✓ **Spider mites:** Begin scouting by checking two different sections of the orchard each week. Spend about five minutes in each section, checking 2-3 leaves (some inside and outside of the canopy) on 10 trees. Look for spider mites and predators (predaceous mites and sixspotted thrips). Treatment decisions should be based on population levels of both mites and predators. If more than 20% of leaves have mites, but less than 50% of the leaves have predators, treat for mites. If more than 60% of leaves have mites, treat even if most leaves have predators. For more on mites, see ipm.ucanr.edu/PMG/r606400411.html.
- ✓ To avoid excessive vegetative growth and associated pruning costs next winter, maintain a mild to moderate tree water stress with the pressure chamber from late June, through early August to reduce shoot growth without slowing fruit sizing. Learn more at sacvalleyorchards.com/prunes/irrigation-prunes/pre-and-post-harvest.

**July**

- ✓ **Leaf pests:** Continue monitoring for late summer (preharvest) outbreaks of rust and/or spider mites. Infestations of these pests can cause leaf drop that weakens trees and slows harvest.
- ✓ **Brown rot**: Clustered fruit is more vulnerable to brown rot infections as harvest approaches. Fungicide timing and material efficacy info at: ipm.ucanr.edu/PDF/PMG/fungicideefficacytiming.pdf.
- ✓ **Monitoring Fruit Maturity:** Fruit should be mature in roughly 30 days after the first color shows on the suture. Begin measuring fruit internal pressure once fruit shows color.
- ✓ **July leaf samples:** Mark your calendar for July leaf sampling. Leaf sampling details at sacvalleyorchards.com/prunes/horticulture-prunes/july-leaf-sampling-a-critical-task-in-prune-production.
- ✓ **Clean up orchard ahead of harvest for faster operation.**

# Checking Cropload and Shaker Thinning Prunes

*Franz Niederholzer, UCCE Farm Advisor, Colusa and Sutter/Yuba Counties*
*Dani Lightle, former UCCE Orchards Advisor, Glenn, Butte & Tehama Counties*

When needed, shaker thinning can improve a grower's bottom line this year and next year. Careful, timely thinning increases A & B size fruit production, limits small, lower value prunes in the bin at harvest and improves return bloom next year.

We strongly recommend checking fruit load (prunes/tree) every year. If you need to thin, we recommend thinning. If you don't need to thin, don't thin. To check fruit number from 2-3 trees per orchard at or just before reference date, which usually falls between April 20th and May 10th. Reference date occurs when 80 to 90% of the fruit have a visible endosperm (see Figure 1), which is approximately one week after the pit tip begins to harden. The endosperm, a clear gel-like glob, the beginning of the developing seed, will be found in the seed cavity on the blossom end of the prune (Figure 1) and is solid enough to be removed with a knife point.

To check fruit number per tree and decide whether or not to thin, follow these steps. **Estimate** the number of fruit per tree needed to produce your desired crop, **determine** the number of fruit on 3 representative trees, at or just before reference date, and, using those numbers, **decide** if you need to thin. **Calculate** how much fruit needs to come off if thinning is needed. Finally, **shake** ASAP after reference date if thinning is needed. Below we walk through the math, step by step. Or, skip doing the calculations by hand and use the prune thinning calculator on phone, tablet or laptop, available at: sacvalleyorchards.com/prunes/horticulture-prunes/prune-thinning-calculator.

1. **Estimate** the targeted tonnage from a given block by considering orchard history, age, etc. Let's assume a target of 3 tons/ac, and shoot for 55 dry count/lb in an orchard spaced 16' x 18' (151 trees/acre). From there, calculate a targeted number of fruit per tree:

(Dry pounds per ac x Dry count per lb) ÷ Trees per ac = Target number fruit per tree (at harvest)

$$6{,}000\,\frac{lbs}{ac} \times 55\,\frac{count}{lb} \div 151\,\frac{trees}{ac} = \ 2{,}185\ fruit/tree \text{ (target)}$$

2. **Determine** the actual number of fruit in a sample tree and compare that number to the target of 2,185 fruit (from step 1). Ideally, repeat this procedure on 3 representative trees to ensure accuracy. Place a tarp under the tree and mechanically shake off as much fruit as possible, then hand strip any remaining fruit. Collect all the sound fruit and weigh them (for easy math, let's assume it weighs 100 lbs). Take a 1-lb subsample of the fruit and count how many sound fruit are in a pound (assume 90 fruit/lb). Don't count fruit that looks like it wouldn't have stayed on the tree until harvest - these fruit are light green or otherwise look slightly "off" compared to the strong fruit. Then use those numbers to determine the total number of fruit per tree:

Total tree fruit weight x Number of prunes per lb = Total number of fruit per tree

$$100lbs\ \times 90\,\frac{fruit}{lb} = 9{,}000\ fruit/tree \text{ (actual)}$$

3. **Decide** if you need to thin. Subtract the target number of fruit (at harvest) from the number of fruit on the tree now (reference date). In this example, there is roughly 4 times the number of fruit on the tree than desired to hit the target of 55 dry count/lb. You don't want to simply remove all those extra fruit, because you need to account for natural fruit drop and variability in fruit per tree across the orchard. Estimates of natural fruit drop range from 10% to 40%. Selecting the appropriate drop percentage should account for orchard history, as well as your own risk threshold. Based on years of experience, many growers prefer to leave approximately 50% more fruit on the tree after mechanical thinning than they want remaining on the tree at harvest [to avoid the risk of over thinning across an orchard]:

Target number prunes per tree x 1.5 (= 50% fruit drop buffer) = Adjusted number fruit per tree

$$2{,}185\ x\ 1.5 = 3{,}278\ fruit/tree \text{ (adjusted target)}$$

4. **Calculate** how many fruit to remove by subtracting the adjusted target number from the actual number of prunes on the tree:

Actual fruit per tree – Adjusted target fruit per tree = Number fruit to remove

$$9{,}000\,\frac{fruit}{tree} - 3{,}278\,\frac{fruit}{tree} = 5{,}722\ fruit/tree\ to\ remove$$

5. **Shaker thin** (if needed). Use harvest machinery (shaker) to remove the approximately 5,700 excess fruit. Shake a tree for one second, and following the steps above, calculate how many fruit were removed. If needed, increase the shaking time until the desired numbers are removed. Typical shaking time is 2 to 4 seconds; avoid shaking for longer than 6 to 7 seconds to prevent unnecessary tree damage. Once you've calibrated your shaking time, go through and thin the block. If you are thinning for more than a week, check fruit per tree and green fruit per pound every few days to make sure that your shake time doesn't need to be adjusted down as fruit grow.

Reminder: Check out the free prune thinning calculator on your phone, tablet or laptop available at: sacvalleyorchards.com/prunes/horticulture-prunes/prune-thinning-calculator.

Figure 1. Extraction of the endosperm on a developing prune.

**Did You Miss the 2021 UCCE Statewide Prune Day?**
**You can now watch the recording!**

Full meeting recording at: youtu.be/fOv6wkCJMkE

Speakers are timestamped:

| | |
|---|---|
| 00:00 | Opening Remarks — Luke Milliron, UCCE Orchard Systems Advisor, Butte County |
| 00:56 | Louie Mendoza, Butte County Agricultural Commissioner |
| 31:24 | Sarah Castro, Department of Plant Sciences, UC Davis |
| 58:20 | Dr. Themis Michailides, Plant Pathology Specialist, UC Davis |
| 1:34:10 | Daisy Hernandez, PhD Candidate, Plant Pathology, UC Davis |
| 2:01:48 | Break |
| 2:02:32 | Joe Turkovich, Grower in Winters, California |
| 2:34:29 | Franz Niederholzer, UCCE Farm Advisor, Colusa, Sutter, and Yuba Counties |
| 3:12:22 | Panel with Donn Zea, Gary Obenauf and Kiaran Locy, California Prune Board |
| 3:36:58 | Closing Remarks — Luke Milliron, UCCE Orchard Systems Advisor, Butte County |

## Evie Smith joins Sacramento Valley UCCE Extension Team as a Staff Research Associate

I am excited to be starting my position as a Staff Research Associate working under Dr. Katherine Jarvis-Shean and Dr. Franz Niederholzer in orchard crops in the Southern Sacramento Valley. I was born and raised in Georgia, and attended Auburn University in Alabama for my undergraduate studies in Horticulture and Agronomy. I moved to California in 2017 to do a master's in International Agricultural Development and subsequently a masters in Horticulture and Agronomy at UC Davis. My research experience and interests focus on connecting farmers with science-based strategies for climate change adaptation, water management, pest management, and other agricultural challenges through applied research and effective communication. In my free time, I enjoy gardening, cooking, hiking, camping, and drinking good coffee. I am grateful to the Almond Board of California, California Pistachio Research Board, and the California Walnut Board for funding my position with UC Cooperative Extension.

## Irrigating with lower quality water? What to consider first

*Katherine Jarvis-Shean, UCCE Orchard dvisor Yolo, Solano, & Sacramento Counties*
*Allan Fulton, UCCE Irrigation and Water Resources Advisor Emeritus*

Given low precipitation this past winter and low surface water allocations, many growers may be faced with the difficult prospect of using lower quality water for irrigation this season, either using more groundwater than usual or using groundwater that may have decreased in quality. What should be considered before irrigating with lower quality water?

**What do we mean by "lower quality" water? And why does it matter?**
Water can be low quality in a number of ways – high salinity, high sodicity, high in specific toxic ions, and/or high in bicarbonates.

**Saline** irrigation water can interfere with water uptake in the roots. Water moves into roots through osmosis. A high concentration of ions (dissolved salts) in the roots draws water into the roots, but if ion concentrations are also high in the soil-water solution, this root draw won't be as powerful. The end result is decreased growth due to reduced water uptake by the tree. Electrical conductivity of the water (ECw) is a measure of the potential for this osmotic effect.

Does $EC_w$ pose a potential problem (osmotic effects)?

| Unit | Degree of Growth or Yield Reduction | | |
|---|---|---|---|
| | None | Increasing | Severe |
| dS/m | < 1.1 | 1.1 - 3.2 | > 3.2 |

**Sodicity** is specific to the influence of sodium relative to other positive ions. High sodium relative to calcium and magnesium can lead to structural soil crusting. Water with a high sodium adsorption ratio (SAR) is dominated by sodium that elbows calcium off clay soil particles, destabilizing soil aggregates and causing problems with water infiltration. If the SAR/EC ratio is greater than 10, amendments are beneficial to avoid soil dispersion and sealing, either by directly adding calcium (e.g. gypsum) to the water or soil, or driving off bicarbonate and freeing up more calcium (i.e. acidifiers) to increase EC of the irrigation water and soil-water solution. Between 5-10 SAR/EC, amendments may be beneficial. If magnesium is high relative to calcium and sodium is low, magnesium may also act as a dispersant, destabilizing soil aggregates and causing slow water infiltration. If the Ca/Mg ratio is less than 1 (i.e. more Mg than Ca), this could be a red flag.

Could the water chemistry reduce soil tilth, porosity, and cause slower water infiltration rates?

| | Potential of Water Infiltration Problems Developing |
|---|---|

| Lab Information | Unit | Unlikely | Increasing Likelihood | Likely |
|---|---|---|---|---|
| Ratio of SAR/ECw | ratio | <5.0 | 5.0- 10.0 | >10 |
| Ratio Ca/Mg | ratio | < 4.0 | 2.0- 1.0 | <1.0 |

**Toxicity from specific ions** occurs when these ions move into the plant with water and accumulate in plant tissue to a level that kills the tissue. Depending on your region, sodium (Na), boron (B), and chloride (Cl) could be at toxic levels in some water sources.

Could specific elements (B, Cl, and Na) accumulate in the tree or soil to potentially toxic levels?

| Element | Unit | Degree of Growth or Yield Reduction | | |
|---|---|---|---|---|
| | | None | Increasing | Severe |
| B (boron) | mg/l (ppm) | <0.5 | 0.5 - 3.0 | >3.0 |
| Cl (chloride) | meq/l | <4.0 | 4.0 - 10 | >10.0 |
| Na (sodium) | SAR (none) | <3.0 | 3.0 - 9.0 | >9.0 |
| Na (sodium) | meq/l | <4.0 | 4.0 - 7.0 | >7.0 |

**Irrigation water high in bicarbonates** ($HCO_3$), greater than 2 meq/l, precipitates Ca with $HCO_3$, forming lime which can clog drip emitters, microsprinklers and filters, leading to issues with irrigation distribution uniformity, with some trees getting over- or under-irrigated, or a mix of both across an orchard. High bicarbonates may also influence balances between Ca, Na, Mg, and K but there is much to still be learned on this subject.

Could the water chemistry be prone to plugging emitters or filters and reduce distribution uniformity?

| | | Potential for Plugging Problems Developing | | |
|---|---|---|---|---|
| Lab Information | Unit | Unlikely | Increasing Likelihood | Likely |
| ECw | dS/m | <0.8 | 0.8 to 3.0 | >3.0 |
| HCO3+CO3 | meq/l | <2.0 | 2.0 - 4.0 | >4.0 |
| Mn (manganese) | mg/l | <0.1 | 0.1 - 1.5 | >1.5 |
| Fe (iron) | mg/l | <0.2 | 0.1 - 1.5 | >1.5 |

See similar tables for other orchard crops at [sacvalleyorchards.com/walnuts/irrigation-walnuts/evaluating-water-supply-for-irrigating-nut-crops.](sacvalleyorchards.com/walnuts/irrigation-walnuts/evaluating-water-supply-for-irrigating-nut-crops.)

**What to watch for this year?**

Before you make any decisions, get a sense of where you're starting from. Without a large amount of heavy, drenching rain this year, there was not much leaching of specific ions from the root zone. With each irrigation, sodium, boron and chloride can build up over the growing season. If you are concerned about toxic ions and considering using lower quality water this year, it would be prudent to test your soils around the root zone to see the baseline specific ion levels with which you are coming into the season. Make sure you test different depths in the root zone, ideally to at least three feet. It's important to understand the distribution of salts in the root zone. They may have moved down the soil profile but not all the way out of the root zone. Also consider reviewing leaf (Cl and Na) and hull (B) analysis results from last year.

As you consider the short- and long-term potential impacts of using lower quality water this year, think through what tools are at your disposal to mitigate those potential impacts. If you are worried about increased SAR or low Ca/Mg ratio leading to soil crusting, what are your options for adding calcium to the water or soil? What options do you have to add acidic amendments to lower bicarbonates or lower soil pH to liberate calcium from lime when it's present in the alkaline soils? Running these amendments in your irrigation water is generally the

most efficient, direct approach, especially with drip systems. Even though these amendments may be more expensive, they will be going directly to the point of the problem, rather than cheaper broadcasted products that may improve infiltration in the middles, far from where your irrigation water touches. See fruitsandnuts.ucdavis.edu/files/73695.pdf for more on product purity and calculating amendment rates.

If you are concerned about lower quality water leading to salt build up in the root zone and reducing yield, how easy or difficult will it be to leach those salts this fall/winter? Do you have a clay layer or other soil profile issues that would make leaching difficult? Whereas soil crusting can happen with just a few irrigations and be easily perceived with the eye, root zone salinity build up may happen slowly over time. This is why having a beginning of season soil baseline that you can compare against at the end of the season is valuable, to know if leaching intervention after the end of the season is warranted.

When you have two sources of irrigation water, one better quality than the other, you have the options to irrigate with them separately or blend them into one source. If you choose to use them separately, keep in mind that early stages of growth are more likely vulnerable to stress related to water quality, particularly the osmotic root zone salinity stress that can result in plant tissue being water stressed even though there is ample water in the root zone. If you are more interested in blending the two sources of water into one supply, you can find some help with blending water calculations here: fao.org/3/T0234E/T0234E03.htm#ch2.4.7.

As we go through the season, if pumping depths change, water quality from the same well can change. Rather than paying for multiple water tests throughout the season to know if you have a problem, you can keep an eye on the EC levels with a portable EC meter (~$50). Use this to monitor the total salinity of the well water every 4 to 8 weeks. If total salinity (ECw) increases by 20 percent or more, submit a new sample for lab analysis to include SAR and specific ions.

If your water samples indicate specific ion levels that may eventually exceed healthy levels in your trees, be sure to take leaf samples to monitor impact mid-season for sodium and chloride and hull samples for boron. Compare your values with previous years and hold onto them in case the next couple of years are lean water years, too. It is important to compare your tissue samples against critical values (sacvalleyorchards.com/almonds/horticulture/july-leaf-analysis). But it is also valuable to watch how management changes like changing water sources influence these levels over time, and if additional adjustments are needed. A similar approach is prudent for soil sampling, especially if you continue to rely on lower quality water for many years. How frequently you should sample soil depends on your starting baseline and how marginal your water quality is, but generally sampling every three years should be adequate.

**Summary**

We're going into the season with the water we have, not necessarily the water we want. Water quality may not be ideal, but with careful planning and consideration many of the risks associated with low quality water can be managed in the short-term: one year to a few years.

## Tree and Vine Crop Herbicide Chart – Updated (2021)

Please also find attached to this newsletter the updated tree and vine crop herbicide chart organized by Brad Hanson, UCCE Weed Science Specialist. Please remember that rotating and/or mixing herbicides with different modes of action (MOAs) is critical to good weed management, particularly with herbicide-resistant populations. Notes: R = registered, N = Not registered, NB = registered only for Non-Bearing. Always check the current specific herbicide label before use because labels change and there are occasionally differences among products with the same active ingredient.

## Glenn County Orchard Newsletters are Online:
### Are your friends receiving them?

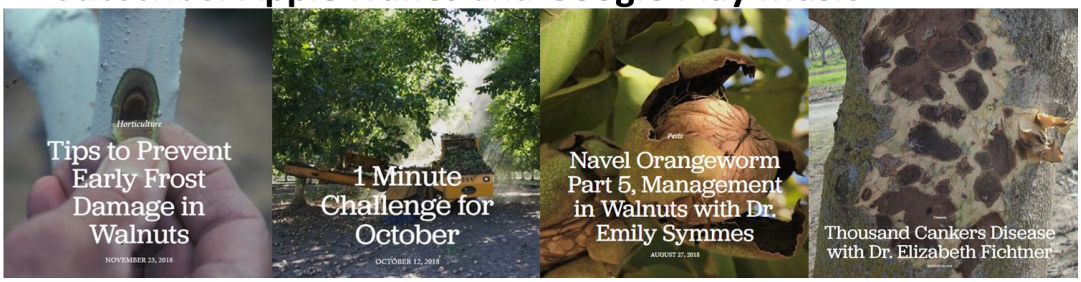
They can sign up today for full color, full content, and immediate orchard newsletters and other updates delivered to your email! Sign up at: ucanr.edu/glennnews. Upcoming issues will be emailed to you, and old issues will be archived at: ucanr.edu/glennnews. You can also learn about upcoming meetings and orchard research updates at sacvalleyorchards.com.

**We are no longer mailing hard copy newsletters,** unless you make a special request by calling the office at (530) 865-1107 (note: substantial delivery delay, limited content, and black and white photos will apply to hard copy mailings).

## Latest from UCCE orchard farm advisors…

**Podcast:** GrowingTheValleyPodcast.com

Subscribe: **Apple iTunes** and **Google Play Music**




**Website:** SacValleyOrchards.com



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Prune Newsletter

## Herbicide Registration on California Tree and Vine Crops - *(reviewed March 2021 - UC Weed Science)*

| | Herbicide-Common Name *(example trade name)* | Site of Action Group[1] | Almond | Pecan | Pistachio | Walnut | Apple | Pear | Apricot | Cherry | Nectarine | Peach | Plum / Prune | Avocado | Citrus | Date | Fig | Grape | Kiwi | Olive | Pomegranate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | ----- tree nut ------- | | | | - pome - | | ---------stone fruit --------- | | | | | | | | | | | | |
| Preemergence | **dichlobenil** *(Casoron)* | L / 20 | N | N | N | N | **R** | **R** | N | **R** | N | N | N | N | N | N | N | **R** | N | N | N |
| | **diuron** *(Karmex,Diurex)* | C2 / 7 | N | **R** | N | **R** | **R** | **R** | N | N | N | **R** | N | N | **R** | N | N | **R** | N | **R** | N |
| | **EPTC** *(Eptam)* | N / 8 | **R** | N | N | **R** | N | N | N | N | N | N | N | N | **R** | N | N | N | N | N | N |
| | **flazasulfuron** *(Mission)* | B / 2 | **R** | N | **R** | **R** | N | N | N | N | N | N | N | N | **R** | N | N | **R** | N | N | N |
| | **flumioxazin** *(Chateau)* | E / 14 | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | NB | NB | N | NB | **R** | N | **R** | **R** |
| | **indaziflam** *(Alion)* | L / 29 | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | N | **R** | N | N | **R** | N | **R** | N |
| | **isoxaben** *(Trellis)* | L / 21 | **R** | **R** | **R** | **R** | NB | NB | NB | NB | NB | NB | NB | NB | NB | N | NB | **R** | NB | NB | NB |
| | **mesotrione** *(Broadworks)* | F2/27 | **R** | **R** | **R** | **R** | N | N | N | N | **R** | N | **R** | N | **R** | N | N | N | N | N | N |
| | **napropamide** *(Devrinol)* | K3 / 15 | **R** | N | N | N | N | N | N | N | N | N | N | N | N | N | N | **R** | **R** | N | N |
| | **norflurazon** *(Solicam)* | F1 / 12 | **R** | **R** | N | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | N | N | **R** | N | N | N |
| | **oryzalin** *(Surflan)* | K1 / 3 | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | N | **R** | **R** | **R** | **R** | **R** |
| | **oxyfluorfen** *(Goal, GoalTender)* | E / 14 | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | NB | **R** | **R** | **R** | **R** | **R** | **R** |
| | **pendimethalin** *(Prowl H2O)* | K1 / 3 | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | N | **R** | N | N | **R** | **R** | **R** | **R** |
| | **penoxsulam** (*Pindar GT*) | B / 2 | **R** | **R** | **R** | **R** | N | N | N | **R** | **R** | **R** | **R** | N | N | N | N | N | N | **R** | **R** |
| | **pronamide** *(Kerb)* | K1 / 3 | N | N | N | N | **R** | **R** | **R** | **R** | **R** | **R** | **R** | N | N | N | N | **R** | N | N | N |
| | **rimsulfuron** (*Matrix*) | B / 2 | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | N | **R** | N | N | **R** | N | N | N |
| | **sulfentrazone** *(Zeus)* | E / 14 | N | N | **R** | **R** | N | N | N | N | N | N | N | N | **R** | N | N | **R** | N | N | N |
| | **simazine** *(Princep,Caliber 90)* | C1 / 5 | **R** | **R** | N | **R** | **R** | **R** | N | **R**[2] | **R** | **R** | N | **R** | **R** | N | N | **R** | N | **R** | N |
| | **trifluralin** *(Treflan)* | K1 / 3 | **R** | **R** | N | **R** | N | N | **R** | N | **R** | **R** | **R** | N | **R** | N | N | **R** | N | N | N |
| Postemergence | **carfentrazone** *(Shark EW)* | E / 14 | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** |
| | **clethodim** *(SelectMax)* | A / 1 | **R** | **R** | **R** | **R** | NB | NB | NB | NB | NB | NB | NB | N | **R** | N | N | NB | N | NB | N |
| | **2,4-D** *(Clean-crop, Orchard Master)* | O / 4 | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | N | N | N | N | **R** | N | N | N |
| | **diquat** (*Diquat*) | D / 22 | NB | NB | NB | NB | NB | NB | NB | NB | NB | NB | NB | NB | NB | NB | NB | NB | NB | NB | NB |
| | **fluazifop**-p-butyl *(Fusilade)* | A / 1 | NB | **R** | NB | NB | NB | NB | **R** | **R** | **R** | **R** | **R** | NB | **R** | NB | NB | **R** | N | NB | NB |
| | **glyphosate** *(Roundup)* | G / 9 | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** |
| | **glufosinate** *(Rely 280)* | H / 10 | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | N | **R** | N | N | **R** | N | **R** | N |
| | **halosulfuron** *(Sandea)* | B / 2 | N | **R** | **R** | **R** | **R** | N | N | N | N | N | N | N | N | N | N | N | N | N | N |
| | **paraquat** *(Gramoxone)* | D / 22 | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | N | **R** | **R** | **R** | **R** | **R** |
| | **pelargonic acid** (*Scythe*) | NC | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | N |
| | **pyraflufen** (*Venue*) | E / 14 | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | N | N | **R** | **R** | **R** | **R** | **R** | **R** |
| | **saflufenacil** (*Treevix*) | E / 14 | **R** | N | **R** | **R** | **R** | **R** | N | N | N | N | N | N | **R** | N | N | N | N | **R** | **R** |
| | **sethoxydim** *(Poast)* | A / 1 | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | NB | NB | **R** | NB | NB | **R** | N | NB | NB |
| Organic | **ammonium nanoate** (*Axxe*) | NC | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | N |
| | **ammoniated fatty acids** (*Final-San-O*) | NC | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** |
| | **caprilic/Capric acid** (*Suppress*) | NC | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | N | N | **R** | **R** | N | **R** |
| | **d-limonene** *(AvengerAG)* | NC | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | N | **R** | N | N | **R** | N | N | N |
| | **eugenol** *(Weed Slayer CA)* | NC | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** | **R** |

**Notes: R = Registered, N = Not registered, NB = nonbearing.** This chart is intended as a general guide only. Always consult a current label before using any herbicide as labels change frequently and often contain special restrictions regarding use of a company's product.

[1] Herbicide site of action designations are according to the Herbicide Resistance Action Committee (letters) and the Weed Science Society of America (number) systems. NC = no accepted site of action classification; these contact herbicides are general membrane disruptors. [2]Simazine is registered on only tart cherry in CA. Weed susceptibility information and the most up to date version of this table can be found at the Weed Research and Information Center