

Cindy Fake, Horticulture & Small Farms Advisor, Nevada & Placer Counties

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### Irrigation & Water Storage

- Develop an irrigation schedule based on CIMIS data and/or soil moisture monitoring.
- Learn to estimate soil moisture by feel. Go to [http://www.nrcs.usda.gov/wps/portal/nrcs/detail/wy/soils/?cid=nrcs142p2\\_026833](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/wy/soils/?cid=nrcs142p2_026833) for instructions. You will need to know your soil texture in order to use the guide. Find instructions for soil texture-by-feel at <http://www.ext.colostate.edu/mg/gardennotes/214.html>.
- Monitor and measure soil moisture with tensiometers or matrix blocks to schedule irrigations. (see Irrrometer source below).
- Plan for storage of water, if possible, whether in tanks or ponds. Ponds will need filtering.
- If you have overhead sprinklers, apply to Natural Resources Conservation Service (NRCS) for EQIP cost-sharing to change to microsprinklers. Contact Placer County NRCS at 530.823.6830.

### Orchard Practices

- Keep orchards well irrigated in winter and spring. Continue to refill the soil profile if we do not receive adequate rains. If you do not have winter water, request it for next year. You may need to file a hardship application with your water agency during a declared drought. Even in non-drought years, you should buy winter water because there are typically three to four weeks without rain in mid-winter, and the trees need to be irrigated. If no water is available, consider storing collected rainwater.
- Weed, weed, and weed some more! Keep on top of weed growth around the tree trunk. Grasses and other weeds can out-compete citrus for water and nutrients. With limited water, all the water needs to be going to the trees.
- Mulch 2-4" deep along tree rows, keeping mulch 4" away from trunks. Mulch out to the drip line of the trees. Use compost, manure, wood chips, or other organic material. Organic materials will decompose and increase the soil organic matter. Soil organic matter increases water holding capacity; especially in decomposed granite soils. A 1% increase in soil organic matter can store 16,000 gallons of water per acre-foot of soil. Mulching reduces moisture losses from the root zone and keeps roots cooler, thus reducing tree and crop stress.
- Mow orchard cover as low as possible. In overhead/impact sprinkler orchards, keep orchard middles mowed low. Low volume microsprinklers allow row middles to dry down, but vegetation still protects the soil.

### Critical Periods for Drought Stress in Citrus

Citrus are subtropical plants. Optimal growth conditions are warm temperatures and relatively high humidity. Hot, dry summers in the foothills can be stressful to citrus if they are not adequately irrigated before and throughout periods of high summer heat.

Citrus roots are shallow, with most absorbing roots in the top 12" of soil. Since they are unable to mine deeper layers of soil, providing adequate water in the root zone is critical. High summer temperatures, intense sunlight, and insufficient water in the root zone may cause sunburned leaves and fruit. Mulching and increasing soil organic matter can help reduce stress, but monitoring soil moisture depletion is critical.

Critical periods for avoiding drought stress in citrus are from flowering to fruit set, usually April through May or early June in the foothills. Drought stress during this period will reduce fruit set or cause increased "June drop". Maintaining soil moisture can help reduce "June drop". During the fruit growth period in June/July/August, water stress can cause fruit drop; may reduce fruit size and may suppress the summer leaf flush. Suppression of the summer growth flush reduces flowering for the next season, and exacerbates alternate bearing.

Citrus can tolerate some (moderate) drought stress at certain periods. During flower bud induction and initiation (fall), moderate drought stress can actually increase flowering for the following season. From late summer through fall, as fruit are increasing in size, some reductions in irrigation can be tolerated without significantly affecting size. Once fruit have sized up, and are maturing, extending irrigation intervals is a good practice as it can bring on maturity and increase sugars. However, too little water (e.g. "turning off the water") in this period reduces shelf life and may increase incidence of rind breakdown.

### Resources for Drought Management

CIMIS Irrigation Scheduling <http://www.cimis.water.ca.gov/cimis/infoIrrSchedule.jsp>

Foothill Farming Drought page: [http://ucanr.edu/sites/placernevadasmallfarms/Drought/Drought\\_Planning/](http://ucanr.edu/sites/placernevadasmallfarms/Drought/Drought_Planning/)

Irrigation scheduling <http://www.wateright.org/>

Soil Moisture Monitoring Tools (Tensiometers & matrix blocks) <http://www.irrometer.com/sensors.html>

UC Drought Management Website <http://ucmanagedrought.ucdavis.edu/index.cfm>

Western Australia Department of Agriculture and Food. <http://tinyurl.com/WAusCitruswaterstress>

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