

Considerations for November/December, 2014

David Doll UCCE Tree Nut Pomology Farm Advisor, Merced County

Winter is here. Doesn't the year go fast? The days are shorter, the nights are cooler, and the trees are shutting down. This probably means that there is less to do around the orchard, right? Nope! There are plenty of tasks that must be planned and completed now in order to maximize the return on our orchard operations next year. Below are a few considerations for your operation.

Winter Sanitation for Navel Orangeworm (NOW) Control. The most effective way to reduce overwintering NOW populations is sanitation. By removing the 'mummy' nuts from the tree and destroying them before mid-March (when moths begin to emerge), NOW damage at harvest can be reduced. These nuts serve as the overwintering point for the pupae and developing larvae, and are the in-season food source for adults and second flight larvae.

The recommended industry practice is to reduce the average mummy nut count to less than two per tree. This recommendation was developed by performing research and reviewing the data collected from plots throughout the San Joaquin and Sacramento Valley. The research showed that for every mummy nut left in the tree, 1% damage from NOW should be expected. In other words, 5 mummies per tree equals 5 % NOW damage. Therefore, in order to meet the industry standard of 2% NOW damage levels, there should be 2 or less mummies per tree.

Recent research, however, conducted by Brad Higbee (Paramount Farms) and Joel Siegel (USDA-ARS) has shown that a greater reduction of mummy nuts is needed in areas with higher NOW pressure. In Kern County, they have found that the standard for sanitation has to be less than 0.7 mummy nuts per tree in order to keep NOW damage below the industry standard of 2%. They also found that the quantity of mummies on the ground influences NOW damage : having more than 8.9 ground mummies per tree increased NOW damage above the 2% industry standard. These results were drawn from research conducted over a 5-year period reviewing data from plots established on fifty orchards.

By reviewing this data, does that mean everyone across the state needs to sanitize to less than 0.7 mummy nuts per tree? The short answer is "it depends." Insect pressure will vary by location due to more degree days and lower rainfall that is generally characteristic of the southern San Joaquin Valley and some micro-climates in the Sacramento Valley. Regardless of location, all of the research indicates that the fewer mummies within the orchard (both tree and ground), the less NOW damage to expect at harvest. Therefore, higher standards of tree and ground sanitation are recommended for orchards in high pressure, higher heat unit/degree day areas. Growers in cooler, low pressure areas should still reduce average mummy nut counts to 2 or less per tree and destroy any mummies that are on the ground.

Pruning: Should I throw away the shears? Pruning of mature and young trees often occurs during the winter months. Research has shown that reduced pruning on younger trees can lead to larger, earlier yields. This is mostly due to increase canopy that is able to produce crop. Nevertheless, some structuring of first and second leaf trees may be needed to address tight branch angles and close proximity of scaffolds, which leads to included wood and weak branches. These branches will split when the crop load begins to increase, typically around year four or five. Prune only when rain is not in the forecast to avoid wound infections by pathogenic fungi that disperse spores during rain events. Wounds can be susceptible up to two weeks after pruning, with larger wounds taking the longest to heal. Even with this

healing time, pruning paints are not recommended as they can slow the healing process. Pruning as late as leaf out will have no impact on tree growth.

Mature tree pruning may also be needed. Many are aware of the multiple research trials that have shown no yield benefit from pruning mature trees. There are, however, other reasons to prune mature trees, including: easier access, worker safety, increasing the amount of light to the orchard floor to assist with drying, and to remove broken, dead, and diseased limbs. Another reason that is often not discussed is to reduce pest and disease pressure. UCCE research out of the Sacramento Valley has shown a 6% decrease in NOW infestation in the upper canopy in pruned trees due to better insecticide spray distribution in the upper canopy.

Soil Sampling for Salinity Monitoring. Since we are in our third year of drought, soil sampling is recommended to determine the levels of toxic salts that may have accumulated over the past few years. When sampling soil for salinity management, varying depths of soil must be collected to determine where the salts have accumulated. We recommend sampling in 12-18 inch increments down to five feet. If you're dealing with soil infiltration issues, also sample the top 6" to determine if there is a soil imbalance in the ratio of calcium, magnesium, and sodium.

Almond trees are relatively sensitive to sodium, chloride, and boron. Yields are impacted when average root system salinity increases above 1.5 dS/m, with research indicating a 19% decrease in potential yield with every 1.0 dS/m increase. This yield reduction is due to the osmotic effects of the salts, which basically makes the tree "work harder" for water, reducing growth and vigor. If excess salts continue to accumulate within the rooting zone, trees will ultimately take up the salts and cause tissue toxicity. The salts of primary concern are sodium, chloride, and boron. A leaching program should be implemented when sodium, chloride, and boron exceed an exchange saturation percentage of 5%, 5 meq/l, and 0.5 mg/l, respectively.

Leaching is typically done with either an application of a leaching fraction in-season or applications of water during dormancy, when evapotranspiration rates are low. If planning to leach during the dormant period, it is important to begin this process early in the dormant period prior to root expansion (mid-January). Enough water must be applied to fill the soil profile. Once the profile is full, smaller quantities of water applied either through rain or more frequent irrigation is the best way to move salts below the root-zone. Ideally, it is best to refill the profile early with irrigation water, as subsequent rainfall will aid the leaching process. Be careful not to saturate the soil for prolonged periods because this may increase the risk of root diseases.

Calcium amendments are also a benefit when trying to leach sodium and boron. Calcium competes for the exchange sites within the soil. This keeps sodium and boron in the soil water, allowing it to be leached. Calcium is sourced through a variety of products, but the cheapest and most effective for leaching programs are either lime or gypsum. Lime should only be used when pH is below 7, while gypsum can be used at any pH. If the soil is alkaline (high pH) and has high amounts of calcium, acidifying the soil will free up calcium. A soil analysis is necessary to determine the appropriate amount of calcium or acid to apply. Once you have the results, contact your local UCCE farm advisor or agronomist for a recommended amendment rate and application procedure for your soil type.

The final thought.

The water shortages encountered around the state this past year may continue into next year, regardless of the amount of rain received. Taking a few extra steps now to reduce salinity within soils will help maintain higher production if another season of well water will have to be used.

I wish you and your families a very happy holiday season. I am looking forward to seeing many of you at The Annual Research Conference of the Almond Board of California held in Sacramento on December 9th-11th.