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Kern Citrus and Subtropical Fruit

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Abnormal Hot Temperatures Produce Some Abnormal Citrus Tree Responses

The rapid rise in temperature from the low 80's °F. to above 100°F. in late May provoked one of the largest and latest fruit drops that the citrus industry in Kern County has seen in years. Virtually within a week, the navel crop in Kern County that looked like it was going to peak on fruit sized 113's changed to one that looks like it will peak on 72's. Overall, yields may be down as well. Fewer, but larger sized fruit may increase grower returns.

Several reports have come to this office of excessive leaf drop following applications of oil or tank mixes of oil and insecticides. This leaf drop is probably associated with the recent high temperatures as well, even if the water status of the soil under the tree was at field capacity when the oil was applied. The hot daytime temperatures in May were associated with cool nights and thus, relatively cool daytime soil temperatures. The ability of roots to absorb water is related to soil temperature. The increased evaporative demand of the atmosphere, tender and poorly acclimated new leaves, and cooler soil temperatures that limited the flow of water from the soil to the canopy, all conspired to produce a water-stressed tree. Applying oil to a stressed tree may cause excessive leaf drop and, eventually, sheep nosed, sunburned fruit and reduced yield. The hot temperatures also appeared to increase leaf drop in trees suffering from other forms of stress, like excessive citrus red mite feeding and late-stage bud union incompatibility caused by overgrowth of the scion by the rootstock.

Irrigating Citrus Efficiently: Not As Easy As It Looks

Assuming that the grower can keep the major insect pests under control, two variables, water and nitrogen, account for most of the yield response among all grower-supplied inputs to citriculture. If the water is not right, neither will be the nitrogen, or any of the other hundreds of other minor factors that influence the final yield and quality of the fruit that goes to market. Implementing an irrigation schedule and developing an irrigation distribution system with high efficiencies will become increasingly important in surviving the current citrus market and the new governmental regulations relating to using and protecting groundwater.

The historical average evapotranspirational requirement for mature citrus in the southern San Joaquin Valley in June and July is in the range of 1.15 to 1.21 inches of water per week. Generally the soils in Kern County are well drained, and over-irrigation is not always obvious since water applied in excess of crop needs flows out the bottom of the root zone. Drainage water can leach valuable nutrients and herbicides from the soil, polluting ground water. Excess water in the root zone can also make root rot problems more severe. Young trees damaged in the 1990 freeze continue to succumb to dry rot in some Kern County orchards, and over-irrigation makes the problem worse. Newly planted orchards have also been found to be losing trees to the same pathogen, *Fusarium solani*, again more commonly in fields that appear to be over-irrigated. Other orchards have the opposite problem. Common reasons for under irrigation, in addition to improper irrigation scheduling, include systems with poor distribution efficiency resulting in over irrigation in some parts of the field and under irrigation in others, heavy soils on sloping ground with water intake rates that will not keep pace with evapotranspiration, excessive delays in irrigation while cultural, harvesting, or pest control activities are conducted, or land that was developed without access to the 1.15 to 1.21 inches of water/week required by healthy mature citrus trees during the summer. The costs of improving an irrigation system are obvious and appear as separate lines on a budget sheet. The costs of failing to improve an irrigation system are relatively invisible in that the magnitude of loss of fruit yield and quality remain largely unknown. There is no budget line for what might have been. In some instances, all that separates a financially mediocre grove from a star performer is the irrigation system and how it is designed, maintained and operated.

Reducing Puff and Crease Using Irrigation Management

Development of puff and crease in navels, a problem in varieties like Frost Nucellar, Atwood and Fischer, commonly becomes one of the biggest reasons for reduction in fruit grade and pack out percentage as the harvest season progresses. Generally, the longer the fruit is held, the worse the problem with puff and crease becomes. In some years, like this year, the problem may show up relatively early in the season. Neil O'Connell, UC Citrus Farm Advisor in Tulare County, describes experimental work conducted by Dr. David Goldhamer, UC Cooperative Extension Specialist, that has been taking place in northern Kern County over the past four years. The California Citrus Research Board, from money provided by growers, funds this research. The following information is an excerpt from Neil O'Connell's June of 2000 newsletter, *Citrus Notes*:

"An ongoing water management research trial is producing some interesting results in regard to puff and crease. Stress is being imposed on trees by reducing applied water in varying amounts and at varying times in the irrigation season. One of these treatments, 25% of the applied water in the fully irrigated control from mid-May to mid-July, has resulted in significantly less puff and crease than that in the fully irrigated control trees. This result has been produced in two crops. Yields and fruit size have not been negatively affected by this treatment. Trees in this trial are irrigated with a low volume system on a deep sandy loam soil. Achieving this effect on puff and crease requires producing a required level of stress at a particular time in the development of new fruit. This requires the ability to monitor stress in the tree. This involves taking leaf samples and measuring for stress to confirm that a given level of stress has been established in the target trees. The level of stress and the time and length of the stress period are important

in creating the desired effect on puff and crease. Uncontrolled stress may increase fruit drop or reduce fruit size, so attempts to recreate the requirements of this research should be approached carefully. The potential payoff from reduced puff and crease and increased packouts is certainly intriguing at this point. Training in the use of the instrument required to monitor stress in the trees can be provided if there is interest. Equipment required for an individual to monitor their trees runs approximately $1400."

Dr. Goldhamer has volunteered to demonstrate how to measure water stress in trees using this instrument. Growers in Kern County that are interested in attending his class, should contact me, Craig Kallsen, by phone, 868-6221, or by mail, 1031 S. Mt. Vernon Avenue, Bakersfield CA 93307, or by sending an E-mail to me at cekallsen@ucdavis.edu .

Improving Fruit Set of Mandarins with Gibberellic Acid

Most varieties of Clementine mandarins become excessively seedy if allowed to cross-pollinate with adjacent citrus varieties like Valencia, lemon, grapefruit or other pollen-producing mandarins. To greatly reduce seediness, some Clementine varieties are being grown in isolated areas, or in areas surrounded by navels or satsumas. Navel oranges and satsuma mandarins produce very little viable pollen so will not pollinate neighboring Clementine. Generally in citrus, no cross pollination means few or no seeds. Unfortunately, in some varieties, no pollen may also mean no fruit. Much remains unknown about the pollination requirement of some varieties of Clementine mandarins, but it is becoming clear that some require pollination, or at least the stimulation of pollen, to produce economically acceptable yields of fruit.

It is possible to 'trick' Clementines to produce fruit without pollination by the application of gibberellic acid. Monty Peckinpah, with Abbot Laboratories, has written a proposed special local need label for their ProGibb 4%® gibberellic acid product. Contact your Abbot rep for the status of this label. The citrus industry has a lot to learn about growing Clementine mandarins in California. Now, growers will have the ability to legally experiment with gibberellic acid, at least within the confines of this label without having a research authorization.

European Earwigs Damage Leaves and Fruit of Citrus in May and June

For the past three years European earwigs have been found to be damaging citrus, especially fruit and leaves from younger citrus plantings, in a geographical area running roughly from Arvin, to Mettler to Maricopa. Earwig feeding occurs primarily on partially expanded new leaves and on young, green fruit. Damage is usually found on baby trees in new citrus plantings or on skirts of older trees. The damage to leaves, initially looks similar to that done by snails, and results in a leaf with a torn and ragged appearance. Snails, however, frequently remove only the surface layer of the leaf while these earwigs cut entirely through the leaf. Earwigs also produce crescent-shaped gouges in young developing fruit especially on the stylar end. A bait containing carbaryl is registered for this pest and when ants in baby citrus trees were treated with chlorpyrifos, European earwigs were effectively controlled as well.

Fukumoto Bark Rot Appears in Hot Weather

Fukumoto bark rot, thought to be a caused by bacteria, normally becomes apparent in a grove with the first hot temperatures of spring or summer. The disease is most commonly seen in the Fukumoto navel orange variety and in trees that are one to two years old, although older trees may show symptoms as well. The usual tip-off to the disease is dying branches. Closer inspection of the dying branches reveals cankers with prolific gumming. In hot weather, apparently, a species of yeast uses the gum as a food source, and a light, frothy sudsing is produced, that smells somewhat like brewing beer. I would appreciate obtaining fresh samples from trees showing bark rot so they may be forwarded to plant pathologists at UC Riverside,

who hope to develop a better understanding of what is causing this disease.

Glassy-winged Sharpshooter Update

Eggs laid by the over wintering generation have hatched. The extended period of hatching was obvious with newly hatching eggs, all nymphal stages and even adults all present at the same time. Because the yellow sticky cards are not especially attractive to adults, yellow hopper tape commonly used in vineyards is probably a better way to monitor their presence of absence because of the greater trapping area it affords. This sharpshooter can now be found in numerous localities in Bakersfield, including the west side of the city and throughout the citrus belt southeast of Bakersfield, especially where citrus is adjacent to grapes. The new adults, very heavy on young citrus in some locations, are now ovipositing. These eggs will hatch into the over wintering generation. Egg parasitism rates as high as 80% have been reported. Attempts to control this insect with insecticides have been disappointing in several citrus groves.

California Citrus Clonal Protection Program New Website

The California Citrus Clonal Protection Program has a new website at www.ccpp.ucr.edu. This website is under development and contains or will contain information on characteristics of many new and existing varieties of citrus and how they perform at various locations across the citrus growing areas of California. Eventually, pictures of fruit from most of the varieties in the program will be available at this site as well as directions on how to obtain disease free budwood for propagation.

Disclaimer

Discussion of research findings necessitates using trade names. This does not constitute product endorsement, nor does it suggest products not listed would not be suitable for use. Some research results included involve use of chemicals which are not currently registered for use, or may involve use which would be considered out of label. These results are reported but are not a recommendation from the University of California for use. Consult the label and use it as the basis of all recommendations.

Craig Kallsen, Farm Advisor
Citrus, Subtropical Horticulture, Pistachios