

Summer tree care practices to improve fruit quality and yield

By Fernando Alferez and Tripti Vashisth

s summer approaches and citrus trees bear developing fruit, growers can engage in several practices to improve fruit quality and yield.

As temperatures rise and daylength

increases, conditions are conducive for enhanced photosynthesis and accumulation of soluble sugars in the fruit. It is important to note that, in general, the temperature is negatively correlated with the amount of

free acids in the juice. This means that the acid content decreases and sugars increase as temperatures increase. However, extremely high temperatures have the opposite effect, and acid content decreases less, especially if relative humidity is low. This causes high evapotranspiration, stomata

closure and less

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In subtropi-

maturation is faster

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> regions. This article reviews some of the current knowledge associated with summer tree

care as well as nutrient and fruit load management practices for better fruit quality, retention and yield. Data is also presented from ongoing experiments that study factors to improve fruit retention.

THE ROLE OF NUTRITION

The highest demand for nutrients in the tree begins at the end of the winter and extends to the first part of summer, as fruit set and early fruit development occur. This means that spring vegetative flush competes for resources with the growing fruit, which in turn is a high-demanding nutrient sink. Then, after the fruitlets drop (June drop), the tree retains only the fruit that it can support during development and maturation. Hence, after May-June drop, nutritional requirements for fruit development decrease compared with spring. As a rule of thumb, any time there is growth in the tree, nutrient supply should be higher so there are enough nutrients available.

It is well known that potassium (K) increases fruit size, especially if applied in summer. This nutrient accounts for more than 40 percent of the total fruit mineral content and is a major component of cell walls. The beneficial effect of K is visible immediately after bloom, i.e. during the fruit cell division phase. Deficit in K during this phase and during the fruit cell enlargement phase, which occurs in summer, has been linked to albedo weakness leading to peel creasing. This is a deleterious peel disorder, especially in mandarins and early Navels.

In grapefruit, late summer foliar applications of K may increase fruit size, although this effect seems to vary depending on each growing season. However, regarding internal fruit quality, foliar K applications seem to have no effect on juice volume, acid, Brix or Brix/acid ratio. In Valencia, summer K sprays combined with previous pre- and post-bloom applications may increase average fruit diameter.

In general, later summer applications can be performed in a wetter-than-normal summer. An additional consideration is that since summer is the rainy season, leaching may occur, especially with nitrogen (N) fertilization. N uptake and assimilation is greater in summer, as water availability and temperature foster plant growth.

STRATEGIES TO REDUCE DROP

Trees displaying fewer HLB symptoms or less HLB-induced decline and better canopy density tend to have less preharvest fruit drop and can hold on to fruit for a longer time. Studies are currently being conducted to determine the effects of off-bloom on fruit retention in HLB-compromised trees.

Hamlin and Valencia orange trees present several off-blooms, resulting in new fruit set as the current crop is already developing. This is common in healthy trees growing in subtropical and tropical regions. In HLB-affected trees, off-blooms can compromise fruit

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Figure 1. Effect of fruitlet removal after fruit set on retention of maturing Valencia fruit. Fruit detachment force (FDF) in maturing fruit was measured 15 days after fruitlet removal. Data are means ± standard error of 30 fruit in five trees per treatment.

Treatment

retention and ultimately yield, due to competition for carbohydrates and early fruit drop. A decrease in the fruit detachment force (FDF) of the developing fruit has been measured when new bloom and fruitlets are present at the same time. This is especially true for Hamlin oranges during late summer, and it may increase the incidence of preharvest fruit drop of more mature fruit.

Preliminary experiments indicate that removal of fruitlets increases FDF in maturing or nearly mature Hamlin fruit, maintaining above 6 kilograms, which is the consensus threshold for fruit retention in mature fruit (Figure 1). Hence, removing the off-bloom fruitlets could be a strategy to maintain mature fruit on the tree and increase yield.

SUMMER CANOPY MANAGEMENT

Traditionally, for juice-producing varieties such as Hamlin oranges, light maintenance pruning through hedging



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can be conducted throughout the summer with no effects on fruit yield. Severe pruning should be avoided as loss of canopy can result in significant fruit drop.

In Valencia oranges or lateharvested grapefruit, hedging may be problematic due to overlapping canopies. In this case, hedging should be performed in late spring, after the old crop has been harvested and the new crop is already set. A light maintenance topping may be performed in late summer because regrowth will not be as vigorous as in spring.

Severe pruning should be avoided as loss of canopy can result in significant fruit drop.

Light maintenance topping should not affect fertilizer requirements or application. Always remember that after severe hedging or topping, nitrogen application may need to be increased because a vigorous vegetative regrowth could negatively affect fruit yield. Therefore, N applications should be adjusted according to the severity of hedging and/or topping. Reducing or omitting an N application before or after heavy hedging will reduce both cost and excessive vegetative regrowth.

In HLB or canker-affected trees, hedging and topping in early summer may induce heavy flushing in late summer and contribute to increased populations of leafminers and psyllids, which spread canker and HLB, respectively. For fresh fruit production, pruning in summer is not recommended as it may stimulate vigorous vegetative (flush) growth that would compete with the developing fruit for resources.

In summary, considerations to follow during summer months to improve fruit yield and quality include specific nutrition practices with a special focus on K and N, and canopy management through light pruning.

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