

Preparation for FREEZES

By Larry Parsons

Citrus growers who had forgotten the freezes of the 1980s were reminded in early 2009 that freezes can still damage their trees. Temperatures during the periods of Jan. 20-23 and Feb. 4-7 dropped near or below freezing for several nights in most all citrus-growing locations. Temperatures in parts of Central Florida dropped to 28° F on the night of Jan. 21-22, and Immokalee was a full degree colder than Lake Alfred. That same night, the temperature in Kenansville in southeast Osceola County dropped to nearly 20° F. The temperature on Feb. 5-6 dropped below 27° F at Lake Alfred, and minimum temperatures were within 1° F of that temperature from Apopka to Immokalee. Some places were noticeably colder.

These freeze events were some of the coldest temperatures in Central Florida since the tree-killing freeze of 1989. As with typical freezes, the first night was fairly windy, but the next one or two nights were relatively calm and frost was common. Trees that were not protected with microsprinklers were damaged in many locations. In some cases, the upper and outer canopies of mature trees were injured and some unprotected young trees were killed.

Not only were citrus trees hurt, but those trying to grow *Jatropha* in Central Florida as an alternate fuel crop found that most of their unprotected *Jatropha* plants were killed back. In many locations, it was a classic radiation situation, and frost was heavy on the second night of the cold event. Temperatures were noticeably colder in the low pockets and more damage occurred there than higher up on the hillside.

Here are some things that growers need to keep in mind to prepare for winter:

- Herbicide and/or mow weeds and row middles. Vegetation in the row middles can act as an insulating layer and prevent soil heat from being released into the grove on a freeze night. Weeds also shade the soil and reduce solar heating of the soil during the day. Heat collected during the day can come out more easily at night when the grass is cut close to the soil surface. Some growers may remember that it was suggested to use trunk-to-trunk herbicides in the 1980s to create a bare soil surface, minimize insulating vegetation, and increase solar heat absorption by the soil. While the theory was correct, herbicide cost and concerns about potential groundwater contamination limited this practice.

- Check microsprinkler systems for plugged jets or leaks. In the severe freeze of 1989, some younger trees that had plugged jets were killed while neighboring trees with operating microsprinklers survived. The same thing happened in these 2009 freezes.



Above photo: a freeze-damaged citrus tree. At left, a banked tree with no microsprinkler protection. Upper part of the tree is killed.

- Make sure that microsprinklers are on the north or northwest side of the tree. During freezes, winds usually come from the north or northwest and will blow the water from the microsprinkler continuously onto the tree. In past advective freezes, north winds periodically blew water from jets positioned on the south side of the tree away from the tree. This caused intermittent wetting of the trunk. With low dew points, evaporative cooling from the erratic wetting chilled the trees below the air temperature. This killed or significantly damaged young trees. Water application, particularly to young trees, needs to be continuous throughout the night and even into the next day if temperatures do not rise above 36° F. As new water freezes, it releases heat. With erratic wetting, evaporation can steal that heat away.

- Check out pumping equipment, clean filters and fill up fuel tanks. Believe it or not, in past freezes, some growers ran out of diesel fuel before dawn during the coldest part of the night.

- Get trees into a healthy condition by appropriate autumn fertilizer applications, pest and disease sprays. Do not stimulate growth with excessive nitrogen application in the fall. Healthy trees with good dense canopies come through freezes better than trees with thin canopies. Groves that had poor care or were abandoned suffered more damage in these

2009 freezes than those that were well-managed.

- Greasy spot control is particularly important. Inadequate greasy spot control can lead to a thinner canopy. In the freezes in the 1980s, trees with poor greasy spot control had thinner canopies and were increasingly damaged by the freezing temperatures. Fungicide or petroleum oil applications for greasy spot control on the spring flush are normally made in late May or June with a second in July for the summer flush. Copper applications for limiting citrus canker should provide good control of greasy spot as well.

- Reduce irrigation in the fall and early winter. Mild water stress can improve citrus cold hardiness, but stress should not be excessive to the point of allowing severe wilting or leaf curl to occur. Trees that are weakened by excessive drought can be damaged more than healthy trees. If it has not rained recently, irrigate the grove a day or two before a predicted freeze. It is not necessary to irrigate for more than

three to four hours. Water has a high heat capacity and moist soil can store heat. Wetted upper soil layers can hold more heat from the sun than dry soil, and this heat can be released at night.

- Do not disc or loosen the soil before a freeze event. A soil that is fluffed up or loosely compacted will not hold as much heat or release it as well as a firm, moderately compacted soil.

- Put grove thermometers in areas of particular interest, such as low cold pockets. Be sure the thermometers are properly working and in a suitable shelter. If a serious freeze is predicted, start the microsprinklers when the temperature drops to 36° F so irrigation lines do not freeze up.

Freezes can occur in any winter, but if growers are adequately prepared, damage can be reduced.

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