Citrus and Freezing Temperatures

Texas A&M AgriLife Extension Service — Galveston County Office

Placing 12-to-15 inches of mulch around the lower trunk(s) of a citrus tree help to insulate the area around the graft union of a grafted tree from cold damage.

PHOTO BY Dr. William M. Johnson

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I normally write this garden column a several days prior to it being published. Given all the dire prognostications put forth by Mayan calendar doomsayers who had predicted an apocalypse would occur on December 21, I did not want to expend good energy putting forth research-based information writing a column that no one would get to read.

So you're reading this column which means we made it past yet another predicted and apocalyptic end of the world.

A more reliable prediction would be that temperatures will likely dip into the very low thirties on Wednesday in the northern areas of the county and several citrus growers have already e-mailed questions about the sensitivity of citrus to cold temperatures.

Cold weather can cause problems for home citrus in our area. My greatest concern is in regard to citrus that have not "hardened off" due to the warm days over the past several weeks. Such citrus tend to be more cold sensitive that citrus grown when day time temperatures have gradually decreased.

Among the citrus types that are most easily killed by freezing are citrons, lemons and limes. Temperatures in the high 20s will kill or severely damage these plants. Sweet oranges and grapefruit are somewhat more cold hardy and usually require temperatures in the mid-20s before incurring major damage to large branches.

Tangerines and mandarins are quite cold hardy, usually withstanding temperatures as low as the low 20s without significant wood damage. But among the edible types of sweet citrus, the satsuma and kumquats have the greatest degree of cold hardiness. Properly hardened bearing trees will withstand temperatures as low as 20 degrees F without appreciable wood damage.

Temperatures at ground level can be several degrees lower than temperatures around the canopy of the tree, especially if there is no wind.

Keep in mind that the temperature ranges given above refer only to leaf or wood damage. Citrus fruits easily freeze at 26 to 28 degrees F when these temperatures last for several hours. A longer duration of freezing tempera-

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tures is required to freeze grapefruit compared with sweet oranges. And tangerines and satsumas are the most easily frozen of the common citrus fruits.

The particular temperature at which tissue of a given plant will freeze and the degree of the damage sustained are functions of a number of factors in addition to the species and variety involved. Some of the more important are:

- The freezing temperature reached
- The duration of the minimal temperature
- How well the plant became hardened or conditioned before freezing temperatures occurred (the freezing point of tissue of a hardened citrus plant may be 5-to-6 degrees lower than an unhardened plant)
- Age of plant (a young plant cannot withstand as much cold as a more mature tree)
- Healthy trees are hardier than diseased trees.

On a windy night with clear or cloudy skies, leaf temperature will be approximately the same as air temperature. On a cold, clear night with little or no wind movement, however, leaf temperature can easily drop several degrees (3-to-4 degrees F) below air temperature because of supercooling caused by frost. Thus, under the latter circumstances, while the minimum air temperature on a given night may have only been 25 degrees F, actual leaf temperature of the plants may have reached 21-to-22 degrees F. The critical temperature is that of the leaf or fruit and not the air temperature itself. Trees with a good fruit crop are less hardy than those with no fruit.

Research reports provided by Louisiana State University indicate that trees growing on bare ground have a higher probability of survival than trees growing in turf areas. The heat from the ground can radiate up on bare areas. The difference in the canopy of the tree can be up to 5 degrees F.

In general, it is recommended that citrus trees be protected when the temperatures are expected to go below 27 degrees F for an extended period. This protection must:

- Entirely cover the plant
- Extend all the way to the ground
- Must be removed the next morning or next day or once temperatures begin to rise to nonthreatening levels.

You can also install small lights such as outdoor-rated Christmas lights on the trees to increase the temperature around the trees.

Another option would be to place 12-to-15 inches of mulch around the lower trunk(s) of a citrus tree. Normally, I strongly recommend against such “volcano” style mulching of but this process helps to insulate the area around the graft union of a grafted tree. Even if the top growth is damaged, you can expect new growth to develop that produce citrus true to the original variety. However, be sure to remove the mulch after the threat of cold temperatures is over as the winter season ends.