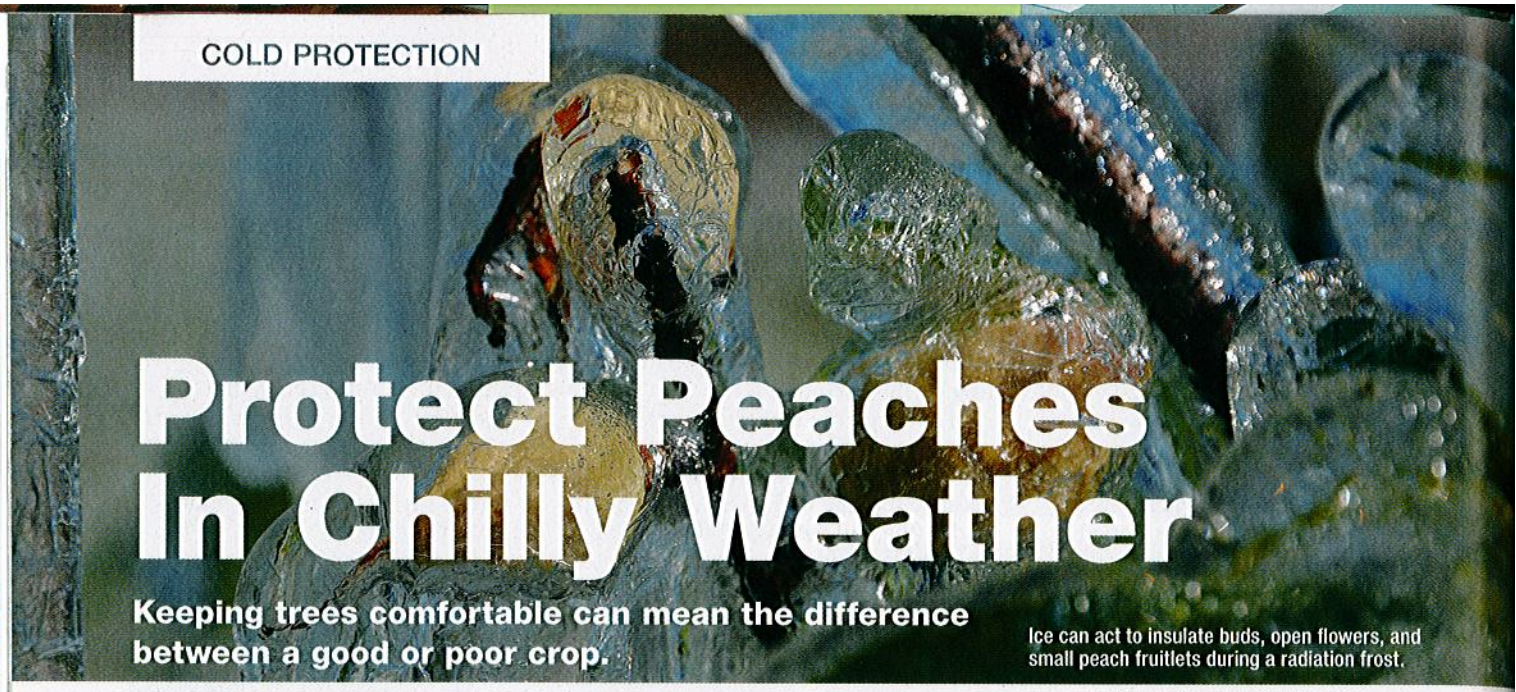

# Protect Peaches In Chilly Weather

**Keeping trees comfortable can mean the difference between a good or poor crop.**

Ice can act to insulate buds, open flowers, and small peach fruitlets during a radiation frost.

Photo credit: Mercy Olmstead, University of Florida

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PROTECTING peach trees from freezing temperatures includes protecting young emerging buds, flowers, and small fruitlets. During dormancy, trees are quite resistant to the deleterious effect of freezing temperatures. After this period of rest and temperatures begin to warm, peach trees become more physiologically active. Provided the chilling requirement has been met, both vegetative and fruit buds swell. At this point, peach trees become more sensitive to the effects of freezing temperatures.

Cold events in Florida are typically classified as two types, advective freezes and radiation frosts. When a cold front approaches the state of Florida, the first night of the freeze event is typically an advective freeze. During an advective freeze, wind speeds are above 5 mph and come from a northwest or northerly direction. There is a consistent linear drop in temperature from sunset to sunrise. A radiation frost will typically follow (on subsequent nights) an advective freeze. In a radiation frost, winds are calm and there is a drop in temperature after sunset. This significant rapid temperature drop occurs for the first third to half of the night with the balance dropping more slowly through the night. Due to the calm winds, a temperature inversion develops where the air temperature at the ground level is colder than the air temperature aloft (about 30 feet or more). Frost formation in the tree is a significant concern to peach growers as significant damage can occur to buds and flowers. Ultimately, it is the minimum temperature that causes the damage and not the freeze type.

## Going Overhead

Freeze protection practices for peach trees in Florida needs to address the preservation of emerging vegetative and flower buds. Overhead irrigation can be used if a sufficient volume of water is available, provided that dew point temperatures are not too low and wind speeds are not excessive (more than 5 mph), commonly called the potential for evaporative cooling. Evaporative cooling is the process in which heat is removed from the system (orchard) due to the evaporation of water to vapor or ice to vapor. In physics, the latter (ice to vapor) is called sublimation and it takes the freezing of 7½ gallons of water to replace one gallon of water evaporated. If this does not occur, the plant temperature can fall below the air temperature approaching the wet bulb temperature.

Applying irrigation provides the sensible heat released from the ambient temperature of well water and the latent heat of fusion provides warmth (1 gram = 80 calories of heat energy released) when this water changes from a liquid to a solid. In addition, ice forms an insulating layer around the buds or flowers. In some advective freeze conditions, overhead irrigation can provide a level of protection, although the effectiveness is directly related to dew point, wet bulb temperatures, and wind speed. The benefits of irrigation can be much greater in a radiation frost due to the reduced potential for evaporative cooling.

Irrigation systems must be constantly monitored while operating, otherwise severe damage can occur from evaporative cooling.

## Micros In Canopy

Some peach growers have elevated their microsprinkler irrigation systems during the winter by placing high volume 3600 flat-fan pattern emitters on PVC pipe stakes to provide protection during radiation frost events. These emitters are placed at a 4-foot height with the sprinkler tubing wrapped around the stake to prevent downward movement of the emitter due to ice loading. This method does not apply water over the tree canopy, but can modify the climate within the tree structure. This method will not coat the tree in ice and may leave some outer areas of the canopy unprotected. Although the benefit of this methodology is untested in peach orchards, it is successful in young citrus tree protection.

Wind machines can be used effectively during radiation frost events when a good temperature inversion is present. Wind machines will mix the warmer air aloft with the cold air at the surface, resulting in increased orchard temperatures. This increase can provide a level of protection from freezing temperatures and reduce the potential for frost formation.

Cold protection is a complex process for perennial fruit crops, and a good understanding on freeze conditions and how these interact with the crop is important in making successful cold protection decisions. ●