

# Freeze Protection for Avocados

AvoFacts 2

## KEY FREEZE FACTS:

- Severe freezes are capable of destroying individual trees; particularly freeze temperatures falling below 30° F
- Healthy avocado trees can tolerate freezes between 30° and 32° F
- Young trees are most susceptible to freeze conditions
- The most susceptible tree parts are (from greatest to least): young growth (new shoot flush and flowers); young fruit; small branches (one to two years old); mature leaves; mature fruit; large branches and trunk
- Select varieties are more susceptible than others (from greatest to least): West Indian (28° to 29° F); Guatemalan (27° to 29° F), Hass (25° to 29° F), Mexican (21° to 27° F). *These are general-temperature indications only*
- Freezes can be widespread and last up to several-consecutive days
- Avocado trees can recover from a freeze with correct cultural management (*please read further to identify tips*)
- The colder and longer the freeze, the greater the damage

## FREEZE SYMPTOMS:

- Firm, brittle, dead and curled leaves, with a brown or bronze hue
- Water-soaked/discolored small branches
- Larger branches and trunks can split and lose bark
- Discolored fruit, with bronzed to blackened skin
- Browened buds and flowers
- Fruit stems can be killed or ring barked, causing heavy-fruit drop



## COLOR VARIANCE:

*Fruit harmed by the freeze; notice the bronze-colored fruit*

*\*Photo courtesy of Dr. Mary Lu Arpaia, University of California*

## PRE-FREEZE CULTURAL MANAGEMENT:

- Pay attention to the weather forecast; if a freeze is predicted, act quickly to protect your trees (*several suggestions listed below*):
- Irrigate a few days prior to freeze, to:
  - *Remove water stress, as this improves tolerance to low temperatures*
  - *Increase soil water, as this can release heat during a freeze*
- Maintain proper leaf-nitrogen levels, to:
  - *Increase leaves' tolerance to low temperatures*
  - *Develop thick-foliage cover, so outer leaves can protect inner leaves*
- Ensure trees are well nourished, as healthy trees recover faster
- Avoid severely pruned, top-worked and/or crowded trees
- Reduce weeds surrounding the tree, as they make the soil colder, restricting heat release from the ground during a freeze



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## PROTECTION DURING FREEZE:

- Minimize freeze severity, by slightly warming the grove, using:
  - **Heat release from water, via the irrigation system;** only possible, when irrigation is designed for frost protection and substantial water is available;
  - **Mixed air layers, via helicopters or wind machines;** only possible, if the freeze is an inversion frost, with warm air above cold air;
  - **Low-speed air circulated through groves, via wind machines;** or, drainage channels for cold air on the grove, to minimize air retention in “ponds”;
  - **Heat pots, where permitted;** however, avoid dry mulch, as this is a potential fire hazard

## FOLLOWING THE FREEZE:

- After leaves fall, whitewash affected trees with diluted latex, or lime-based paint, to protect the exposed wood from sunburn
- Avoid sealing cracked bark, as it might strengthen bacterial or fungal opportunistic infections
- Prune dead wood in the Spring or Summer, once new growth has developed
- Minimize irrigation, in proportion to amount of healthy canopy remaining, to avoid root stress through water logging
- Adjust fertilizer applications, often using less nitrogen; zinc sprays can be applied to young, newly expanding foliage



**FREEZE DAMAGE:** Notice the brittle, curling, brown leaves, as a result of freeze conditions

*\*Photo courtesy of Dr. Mary Lu Arpaia, University of California*

## POST-FREEZE HARVESTING:

- Stem-damaged fruit can drop within seven to 10 days, following a freeze
- Harvest mature fruit with damaged stems, as quickly as possible, following a freeze
- Do not harvest fruit with freeze damage (bronzed to blackened skin), as this fruit will represent poor quality
- Please contact your University of California Cooperative Extension (UCCE) specialist and/or respective handler for further advice

## FURTHER READING:

**Frost & Freeze Watch December 2009**, Guy Witney, California Avocado Commission

**Tree Recovery After the December 1990 Freeze**, Guy Witney, Mary Lu Arpaia, California Avocado Society 1991, Yearbook Volume 75, Pages 63-70

**Ventura County Extension's Fall 2010 Newsletter**

**Cold Resistance of the Avocado**, H.J. Webber, California Avocado Society 1917, Yearbook Volume 3, pages 49-51

**Integrated-Pest Management for Avocados**, University of California, Agriculture and Natural Resources, Publication 3503, pages 51-56