

Best Pruning Practices to Help Control Branch Canker and Stem-End Rot

As winter approaches, California avocado growers are preparing to prune their groves. Winter pruning helps to devigorate the trees, control tree size and shape. Pruning in January and February can also promote shoot-flush during fruit set, prompt early fruit development and delay leaf hardening. Recent research indicates another reason for pruning this winter — minimizing branch cankers and stem-end rot by removing inoculum from the canopy. However, pruning must be avoided during or shortly after periods of rain to reduce the spread of pathogen propagules.

Branch Canker and Stem-End Rot Pathogens

According to a new research report from Dr. Akif Eskalen's group at UC Riverside, the majority of fungi that cause avocado tree branch cankers are the same as those that lead to stem-end rot. Previous branch canker research conducted in Southern California indicated that "82 percent of the fungi associated with avocado branch cankers belonged to the Botryosphaeriaceae, with *Neofusicoccum luteum* and *N. australe* being the pre-dominant species."

The latest research confirmed that stem-end rot and branch canker isolates of *N. luteum* caused similarly severe cases of stem-end rot. While there has never been a reported case of avocado stem-end rot caused by *N. australe*, the researchers did find it to be "highly virulent" when they



Dieback symptom on an avocado branch

conducted stem-end inoculations of avocados. These findings led the researchers to conclude that branch cankers can be a source of pathogens for stem-end rot, that there may be species not detected in their survey that could lead to stem-end decay, and that pathogens from stem-end rot lesions could conversely lead to branch cankers.

Signs of Disease

Avocado tree cankers occur on twigs, branches or trunks and are caused by fungal pathogens that enter through wounds on the bark surface, caused primarily by pruning, frost damage and mechanical injury.

Avocado branch canker symptoms include:

- Reddish sap that dries to a brown and white powder
- Cracked, darkly discolored, or slightly sunken avocado tree bark

- Bark may be friable and easily removed from older cankers
- Under the canker, inner bark and wood is red-brown to brown
- When an avocado tree branch is cut, a characteristic wedge-shaped canker extending deep into the xylem may be visible
- Limbs may collapse, and leaves may turn brown and show leaf scorch

While fruit is exposed to the stem-end rot pathogens contained in living and dead branches, twigs, leaves, stems and soil, most infections and symptoms do not occur until after harvest when fruit have a reduced concentration of fungal inhibitors. The first sign of stem-end rot is shriveling around the base of the stem. Fruit typically then decays, becomes discolored, and softens.

Because California has low humidity and rainfall during the grow-

ing and harvest seasons, stem-end rot has remained a minor problem. However, losses can be heavy during rainy harvest periods and early-season spring harvests. High humidity results in stem-end rot inoculum and if fruit is harvested when it's raining, the inoculum can be spread by rain splash, wind and shaken branches. Contaminated harvest tools can also spread the spores.

Integrated Disease Management

Because of the potential impact branch canker disease can have on the occurrence of avocado stem-end rot, the researchers stress the importance of integrated disease management in groves.

In the United States, preharvest and postharvest fungicide applications have not been successful. The following cultural management practices may help minimize incidences of branch canker disease and stem-end rot:

- Prune and harvest only when it is dry
- Prune out dead limbs and twigs where the pathogen pycnidia (spore forming structures) exist
- Apply pruning wound protectants to open wounds
- Dispose of dead wood and old fruit away from avocado groves
- Sufficiently irrigate the grove
- Manage nutrients for optimal health
- Harvest fruit by clipping, not snapping stems
- Frequently sterilize clippers with either 25 percent household bleach or 70 percent ethanol or Lysol
- Store harvested fruit at optimal temperatures

Pruning Basics

As growers prepare to prune their groves this winter, it's important to review pruning basics. Hygiene is always important, but when pruning diseased avocado trees hy-

giene is especially important. Pruning tools should be cleaned regularly, and sick – or unhealthy – trees should be pruned separately from the healthy trees in order to prevent the spread of diseases. Be certain to dispose of infected prunings away from the grove.

General avocado pruning principles are:

- Prune horizontal branches developing low to the ground, as these interfere with tree access
- Push enough light into the tree interior, by cutting “windows” in the canopy
- Trees grown on slopes should be pruned to a lower height than trees on flat land
- Space the main limbs three to four feet apart, to allow access inside the tree
- Rejuvenation can require cutting the tree back to the main trunk; however, don't expect production in the second year
- Eliminate 'v-type' crotches, as these are mechanically weak and prone to developing rots
- Remove dead wood, as much as possible
- Make major cuts clean, and in line, with the trunk contour
- When renovating a grove, aim to remove large, interfering — and low-lying — laterals, badly crossed limbs and split crotches
- Pruning needs to balance the side-shoot growth and remove strong, upright water shoots
- A conical, or pyramidal, tree shape enables good light interception and minimizes unproductive bare areas
- Constant attention to pruning detail, with small cuts at the correct time, minimizes need for additional major pruning cuts

Removing branch cankers this winter may decrease stem-end rot incidences and thus help ensure a healthy volume of 2014 premium California avocados. 🥑



Cross section of an avocado branch showing wedge shape wood canker symptoms extending into the xylem tissue.



Internal discoloration symptom of stem end rot on an avocado fruit



Stem end rot symptoms of avocado



Branch canker extending into the xylem tissue

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