

Recovery from Fire Damage in Avocado Groves

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The aftermath of fire in an avocado grove looks devastating, but most of the trees have the potential to recover and be productive again. Unfortunately, it is difficult to determine immediately after the burn the extent of damage to the trees because of the variability of the fire. A slow burn through a grove can be very hot and may kill the living cambium layer (just ¼ inch below the bark) in the trunk. In this case, if the cambium is completely dead, the top of the tree will soon die. Suckers will eventually grow from below the graft union of these trees; these suckers can then be grafted to an appropriate variety. However, many trees in the grove may still be alive internally because there was a quick burn through the grove, or the leaves merely died from heat generated by burning surrounding trees, vegetation and mulch.

What should be done first?

Fire damaged trees that have leaves that are completely brown do not use water, but there may be trees that have escaped the fire in the irrigation block and these need to be irrigated as soon as possible. The first thing to do is to repair the irrigation system. Risers, sprinklers, pressure regulators and poly-hose on the ground are probably melted and should be replaced as soon as possible. PVC pipe that is buried underground is usually OK. If part of the trees in the irrigation block are alive and OK, and part is damaged, it would probably be a good idea to roll out poly-hose onto the damaged trees and set up a separate irrigation block. As the trees recover and start using water, you can eventually go back to the permanent system.

Trees that are heavily damaged do not use water (transpiration), but the feeder roots need to be wetted and short irrigations should occur to replace water evaporating off of the soil surface. Start with a one hour irrigation and monitor the soil closely. Do not irrigate damaged trees normally; a ten hour irrigation will not “force” the trees to grow, and roots could easily be damaged by lack of oxygen in the lower soil profiles.

What about tree recovery?

The key to recovery is **patience**. Immediately after the fire, it is difficult for us to determine how much of the tree is alive, even by cutting into the cambium with a knife. If the cambium layer below the bark is green and moist, then this tissue is still alive. If the cambium layer is drying, then this tissue is probably dead or will be dead soon. Tissue that is charred black deep into the bark and cambium layer is obviously dead. Tissue may be alive on one side of the trunk or branch, and dead on the other side. Faced with this difficulty, the preferred method of handling trees is to **do nothing** for at least three months. The tree will re-grow shoots from buds that were not injured and begin to form a tree. After it is clear how much wood is alive and dead, then the dead wood should be cut out with a chain saw.

As an alternative method which is rather unique to the avocado industry, **the burned trees can all be stumped immediately and allowed to re-grow**. “Stumping” is a normal practice in the industry when avocado trees have reached such heights that fruit is high off the ground and picking becomes difficult. In many of the groves that were burned, stumping was probably

needed anyway; therefore after a burn stumping would be a reasonable alternative for many growers.

The Decision: Be Patient and Prune... vs. Stumping Immediately:

If the goal of the grower is to bring trees back into production as soon as possible, the avocado tree will usually recover production faster if the grower is patient and prunes only the dead wood three months after the fire. Unfortunately, this practice creates a permanent problem in the grove as far as irrigation scheduling and application. Mixing full-grown trees (untouched by the fire) with partially pruned trees (and stumped trees) in an irrigation block means that some trees will be over-watered, or under-watered, depending on their size. Adjustments can be made in the sprinkler sizes, but generally this is an undesirable cultural practice.

If the goal is to reduce the size of all trees in the irrigation block to a manageable size, then stumping the block immediately after the fire is the best solution. Trees will be out of production for two years and have about 50% production in the third year, and some re-grafting may have to be done, but fertilizing and watering properly is manageable.

A third option could be to scaffold all trees in an irrigation block to 12' in height. This would get rid of a lot of dead wood immediately, and might allow the trees to come back in production faster than the stumping the trees.

Things to Do:

- **Repair and replace melted risers and sprinklers.** It is important to get the irrigation system functioning as soon as possible. A short irrigation (perhaps only for an hour or two) is necessary to moisten the soil to keep the feeder roots alive.
- **Make the decision to stump or delay pruning.** Stumping can be done immediately. If the decision is made to wait, pruning should be delayed until new growth appears. If the trunk (cambium layer) is damaged over 30-40 % of the circumference, the tree should be stumped. The tree may have to be re-grafted if damaged within a few inches of the soil.
- **Paint the trunks and large limbs with whitewash or water-based white paint.** Exposed bark can sunburn easily, therefore stumps should be painted immediately after cutting. Un-pruned trees, if exposed significantly to open sun, should also be painted, especially on the south-west side of the tree. Paint doesn't have to be full strength, paint mixed 50/50 with water is sufficient.
- **Reduce irrigation substantially.** Damaged trees cannot use the amount of water they used when healthy. Unneeded irrigations are wasteful, expensive and potentially hazardous to root health. Weed growth should be controlled as weeds use a lot of water. Water should be increased gradually as the trees leaf out and begin to use water. Use soil probes or tensiometers to determine soil moisture.
- **Withhold nitrogen fertilization** until mid-summer or longer. Reduce the amount of nitrogen when application is eventually made. Fertilizer is used to support growth, not to force growth.
- **Apply zinc** as a foliar spray when leaves are two-thirds to three-fourths fully expanded, or through the irrigation system.
- **Apply greenwaste (chipped wood) mulch to the soil.** Since the leaf mulch has burned off (exposing feeder roots to the air), now would be a good time to apply mulch to the

soil (at least to a depth of 4 inches). Make sure the mulch has been composted. The heat from composting will kill any spores of Phytophthora root rot fungi and most weed seeds.

- **Contact the County Assessor's Office.** The grove or portions of the grove could be re-assessed for a period of time to reduce the tax liability. In San Diego County, call (760) 940-6868.