

Root Rot Control Requires Systems Approach

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Much has been written about root rot caused by the fungus, *Phytophthora cinnamomi*, but have we managed to control it? The answer is, of course not! The disease appeared to have slowed during the drought years, but spread is again rampant; I have recently seen several 5 acre groves that are well on their way to dying, just in the last two years. The reason we have not controlled the disease is the simple fact that effective control requires a systems approach. All systems must be used; a single spray with Aliette is not going to do the job.

There are several things that need to be done to control the disease.

Runoff water from neighboring groves should be controlled. If you have water entering your grove from anywhere (it doesn't have to be an avocado grove), you have a recipe for disaster. Remember, *Phytophthora* can be harbored in pine trees, eucalyptus, junipers and many other types of ornamentals. If you have water entering from a neighboring citrus grove, you probably don't need to worry.

Also, think about your irrigation practices. The fungus moves easily in overly moist soil. If a tree is suffering from root rot it will not be using very much water. If you are applying the same amount of water to the root rot tree as to healthy trees in the block, the soil around the root rot infected tree stays saturated, never dries out and the disease accelerates. Cutting back on the water in the entire block would only under irrigate the healthy trees.

One option is to change the orifice in the sprinkler to a smaller size so that it applies less water. The infected trees could also be put on a different irrigation block, and watered less often. Researchers Lutz and Menge at UC Riverside discovered that, in citrus, alternate side irrigation could control species of citrus *Phytophthora*. This is done by drying down one side of the tree to 70 cb on the 12 inch tensiometer, while irrigating on the other side of the tree. The next irrigation would occur on the dry side of the tree, allowing the wet side to dry down. This system requires two irrigation systems in the grove, and we haven't experimented with this system in avocados yet, but in theory it could be useful.

The application of chemicals is important. Aliette is registered as a foliar spray, and Ridomil is registered as a soil application. One grower reported to me that he used both and his trees recovered very nicely. Still, a few problems occur with chemicals. Sick trees by nature don't have very many leaves, so a lot of the chemical is sprayed right through the tree and lost into the atmosphere (I would like to see an irrigation label for Aliette; I think it would be more efficient). Second, many growers spray one time and

give up. They look at the cost, and the lack of response in the tree, and they don't carry out the three sprays per year program. It must be remembered that trees need to grow a healthy root system before they can begin to grow leaves; this will take some time. While it is expensive to apply chemicals, it may be worth it if you can stop the spread of the disease in your grove.

Mulching should also be considered among your production methods. Work by Ben Faber and John Menge in Ventura County has demonstrated that a two inch thick layer of green waste mulch (ground tree trimmings) under the trees, applied twice a year, will help to control the disease in replant areas, when the replants are clonal rootstocks. Adding gypsum to the mulch contributes to the effect. Gypsum reduces sporangium production by the fungus and lessens the number of zoospores released from the sporangia.

Replants should be planted into mounds, with the root ball completely above the surface of the native soil. This is especially important in soils that don't drain well.

Use resistant rootstocks for replants. Mexican seedling rootstocks have no resistance to the disease; unfortunately almost all groves are planted on these seedling rootstocks. Although more expensive, partially resistant rootstocks such as Thomas or Duke 7 should be used in replant situations.

Using all of these methods is important. Remember, your real concern is not with saving the existing root rot infected trees, but in saving the entire grove.

An irrigation tip — CIMIS station readings in September, 1995 indicated a water usage of 27 gallons per tree per day in Escondido, and 19 gallons of water per tree per day in Oceanside (for trees on a 15x20 foot spacing). This should be considered a minimum amount of water for decent production. September is the month for Santa Ana winds from the east that can dry trees out very rapidly. Pay close attention to the 8-inch deep tensiometers. Don't let the readings go above 25-30 cb at any time if you have a decomposed granite hillside soil.