

Dothiorella Fungus In Frozen Avocado Trees

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The problem of how best to treat avocado trees injured by cold has brought forth many divergent ideas, but generally, the program recommended by the University of California for frozen citrus trees has been accepted. This program suggests no pruning until the trees are again in normal growth—perhaps a year after the injury.

For avocados, the question arises as to what effect this treatment may have with respect to the *Dothiorella* fungus (*Botryosphaeria ribis*), which has caused trouble with surface rot of softening fruit. See University of California Agr. Exp. Sta. Bulletins 585 and 594.

Condition of the avocado orchard at the Citrus Experiment Station, Riverside, is fairly representative of what may be found in thermal belts generally, although there is much local variation as to severity of injury. At the Experiment Station, Fuertes have only a few leaves and twigs killed, and fruit on the same tree varied from unhurt to entirely spoiled. Mexicans, seedlings and named varieties, vary from a little more injury than Fuerte to entirely unhurt. Guatemalans were badly frozen as to fruits, leaves, and small twigs but the larger stems and trunks survived and the trees are now rapidly restoring themselves with new foliage. The Fuertes and Mexicans have a crop for the coming season. When the Guatemalans will again have a crop is, of course, uncertain but there seems reason to hope they may blossom fairly well next spring.

No heating was undertaken in the Citrus Experiment Station avocado orchard and temperatures were not recorded but the minimum was estimated at 26°. A navel orange tree among the avocados was entirely unhurt in tree or fruit.

Frozen leaves and twigs dried promptly and have mostly remained on the tree until now (July). Between decidedly frozen and entirely uninjured parts of the tree is a border-line area in which many curious phenomena appear. With time, a sharp limit of killing is established.

The mass of frozen foliage would be expected to retain moisture and favor the growth of fungi like *dothiorella*. This mass may furnish a favorable protection to slightly injured bark and to emerging new shoots.

Representative situations have been examined from Riverside to the coast, and *dothiorella* is generally present though somewhat less uniformly abundant as one goes from the coast toward the interior.

Severely frozen fruit dropped rather promptly. *Dothiorella* has been found abundantly in hard shelled fruit apparently frozen in January.

Leaves and leaf petioles frozen last winter have no dothiorella except in tipburned areas in which doubtless it was developed before the freeze.

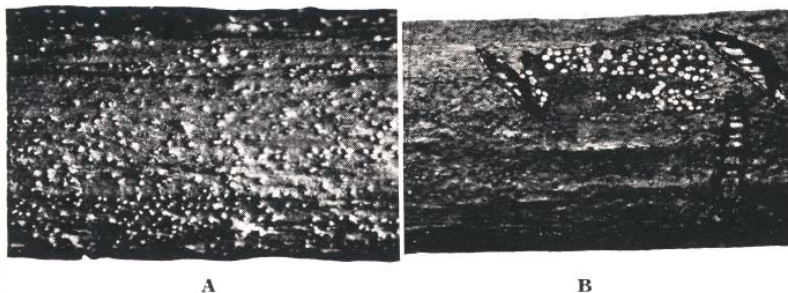
Slender twigs which were green when frozen are generally free from dothiorella but some patches are found. Passing down the frozen green stems, dothiorella increases with increase in size of the stems to where brown or gray bark appears, when no more has been found. Frozen green shoots which were very thick and succulent may have some dothiorella to the tip.

Field observations suggest that the development of dothiorella has been favored by an increased retention of moisture in and on the frozen twigs. However, the fungus usually appears in patches, with much surface free, indicating that all surfaces have not been abundantly and uniformly covered with spores.

Significance of the situation described above may well be considered:

1. When water falls on the trees as from dripping fog, rain or overhead irrigation, dothiorella spores will be released and spread over the tree so that the infection will be built up in all dead or weakened parts such as tipburned leaves.
2. Healthy living parts of the tree will not be injured.
3. It would apparently be desirable to remove the dead wood now but growers report they cannot work in the trees without injuring the tender new shoots. Also, some of the stems with moderate injury—the border-line areas—are still dying back.
4. Severely frozen trees have no fruit and dothiorella will not do them harm until the next crop is ready to be infected, when fruit is about 1½ inches in diameter, for the main crop of Fuertes about August 1.

Accordingly, it appears that, so far as dothiorella is concerned, dead wood may be removed at convenience up to the time when the next crop is liable to infection. Early removal will presumably be desirable, especially before the emergence of next spring's crop of new leaves.



FIGURES

Green avocado twig with spore containing bodies or perithecia of dothiorella. **A**, spore-bearing bodies, shown as pustules or pimples, rather widely scattered. Photographed to give them prominence. In lower part of **B**, surface of the bark has been shaved off to show the perithecia in section. Many fungi from perithecia like these but the very white center with the black outline is striking in dothiorella. Enlarged photographs kindly made for us by Dr. Ira Ayer, Carlsbad, California.