

Southern Oak Wilt Linked to Fungus



A healthy oak.



Oak with root damage from road construction.

by Jim Crowley

A microscopic fungus is slowly destroying oaks in southern United States. Often confused with natural decline, the fungus causes a slow thinning and eventual death of oaks and other tree varieties.

Texas A&M University Professor of Plant Sciences, Dr. Eugene Van Arsdel, is experimenting with a systemic fungicide to stop oak

Oak in advanced stage of decline (left) and second one showing characteristic resprouting from main trunk and branches midway in decline.

decline on the university campus. The fungus, *Cephalosporium*, can kill a full-grown tree within 10 to 20 years.

The fungus also causes persimmon wilt and has infected varieties of elm, soapberry, pecan, hackberry, and mulberry. Because the fungus thrives in the summer heat of the South, oak decline is more serious in the southern United States than the faster killing oak-wilt fungus, which has trouble surviving the heat.

The wilt is difficult for the layman to spot, but trained personnel can get a general idea of a tree's condition by observing. Oak decline is usually suspected when there is a thinning of the oak's crown. As the fungus grows, the vessels are blocked preventing water transport within the tree. The leaves die back leaving exposed limbs in the crown. This "fingering" of the crown is often the first and only visual symptom of oak decline. Occasionally, the leaves of an infected tree are smaller than normal leaves. The only positive identification of



the fungus is its cultivation in the laboratory from a wood sample.

The prognosis is usually death of the tree within 20 years.

"There's no good answer concerning the time before an infected tree will die. Often it's only four years for a fungi-infected sycamore, while some oaks may survive for 20 years. Sometimes the host can hold out, while nearby oaks may die rapidly," said Van Arsdel. "Usually the tree will die so slowly that most people don't notice it. They think it's natural."

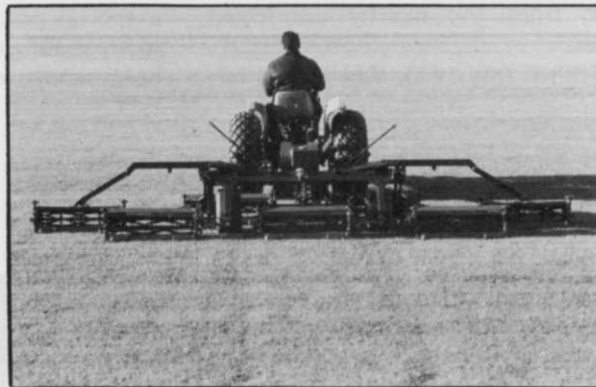
The disease is as difficult to control as it is to diagnose. Because the fungus spreads throughout the tree one must use systemic fungicides to treat the disease.

Since the fungus can travel from one tree to another through the often-present common root networks that are under stands of oak, the disease can rapidly spread from one tree to others in the same area. Two methods are suggested by Van Arsdel to slow or eliminate the disease's spread. First, when planting a

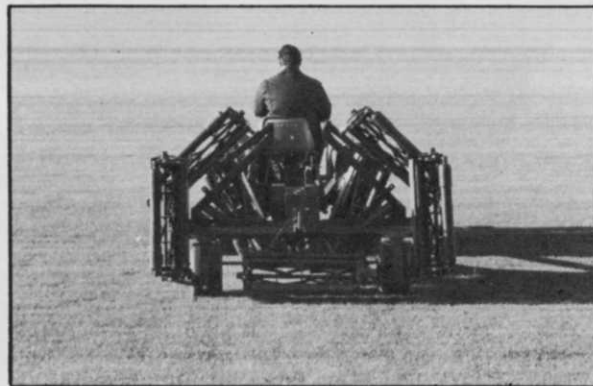
An infected live oak in less advanced state of decline with fingering in crown.



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Oak Wilt

large number of trees, such as a golf course, mix species of trees. This diminishes the chance of natural root grafting and the spread of the disease. Second, when treating an individual tree, cut the root grafts by ditching. This separates the infected tree from the nearby uninfected trees.

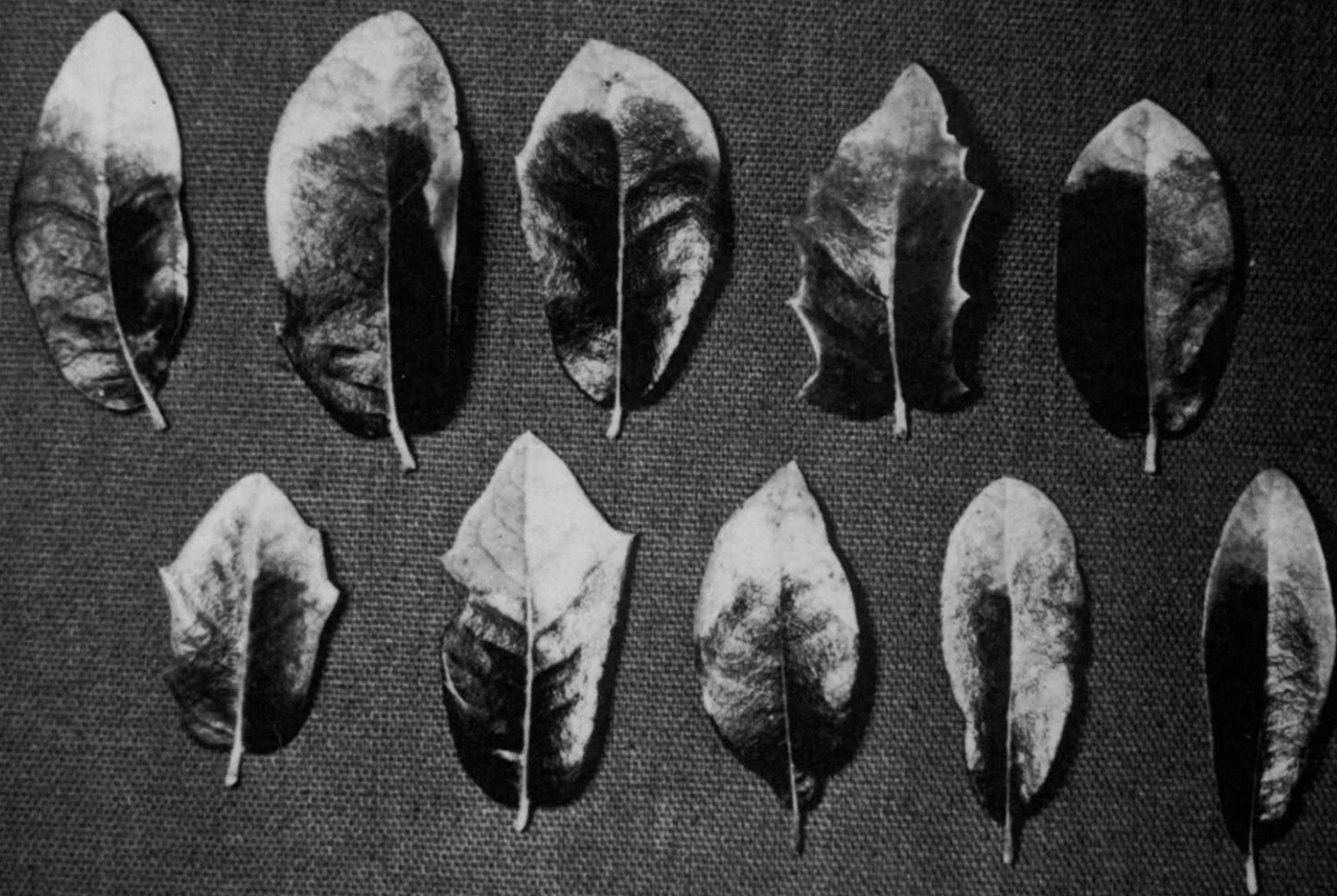
Since July 1970, Van Arsdel has

been treating many of the Texas A&M campus oaks for oak decline. Treatment has been centered around the experimental application of two benzimidazole compounds to the base and foliage of the infected trees. This research has shown that a systemic fungicide, benomyl, is relatively effective against the fungus.

Currently, the use of benomyl in a special penetrating agent (DMF) to treat fungal oak decline has not been approved by the Environ-

mental Protection Agency (EPA) although the chemical has been approved for treating other tree diseases. The EPA has yet to allow the listing of benomyl in DMF as an effective treatment, but Van Arsdel is slowly working toward full EPA acceptance. He hopes for at least a listing of the benomyl in the penetrating agent as an approved treatment in the near future.

The Texas A&M researcher has established through clinical tests



Small leaf size is a symptom of decline. Leaves on bottom were taken from untreated infected tree. Top leaves, slightly larger came from treated tree.

that the benomyl-DMF combination has a very low toxicity. In fact, much lower than many currently used insecticides. But he believes the reason for slow acceptance is connected to the possibility that an applicator would mix a highly toxic insecticide, such as parathion, with the benomyl-DMF combo. Since the fungicide treatment requires the penetrating agent, any contact with the operator would produce poisoning and possibly death if a toxic insecticide were mixed in. Benomyl and the penetrating agent alone are relatively safe to use, according to Van Arsdel.

Using the campus trees, Van Arsdel has established two methods of treatment for diseased trees. The drenching of the tree base every few years produces good results. The other method of treatment is the application of a foliage spray to the tree's crown. While the foliage spray will not cause a complete remission it does slow the progress of the disease. A combination of both treatments provides the best results. Van Arsdel judges the success of his



Decline spreads through intertwined root systems as in this clump of post oaks.

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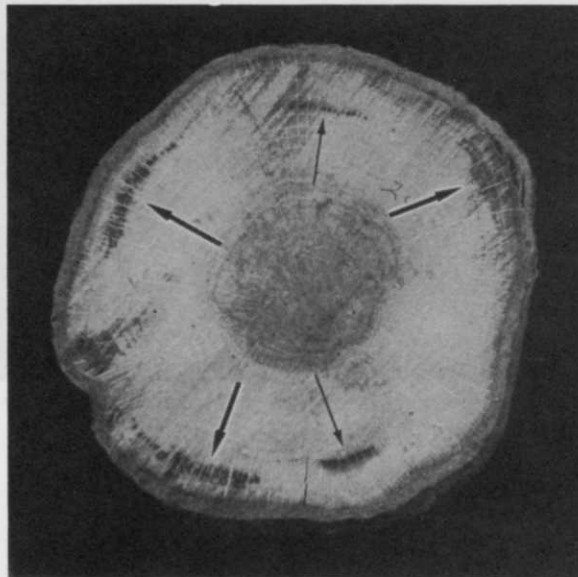


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Oak Wilt

treatments by the increased leaf size the following spring. The increase in leaf size is the first sign of successful treatment. The treatments are applied during the summer which has

Crosssection of tree shows streaks caused by fungus (heavy arrows). Light arrows indicate streaks caused by ambrosia beetle.



been found the ideal time to apply the systemic fungicides.

Approximately 200 oaks are being treated and observed on the College Station campus. Many of the trees display small signs stapled to their bases indicating the research project. Van Arsdel placed the signs to discourage any human-

caused damage to the trees. Unfortunately the past few years have seen a large number of construction programs on the campus. While most trees survived the contractor damage, several could not be saved.

These construction-damaged trees display another form of decline. Damage caused by contractors cutting the roots produce a similar appearance in the crown growth and adds to the chance of fungal infection. Van Arsdel has discovered that several varieties of wood-boring insects attack the damaged parts of the tree. These insects then infect the tree with the *Cephalosporium* fungus which they serve as vectors.

"A live oak is mainly of value as an ornamental tree and I think that's actually a much higher value than lumber because the oak is in someone's front yard who loves it," said Van Arsdel, referring to the economic and sentimental damage caused by oak decline. While a 24-inch diameter oak may be worth several thousand dollars, a tree's beauty and grandeur are priceless.



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