Victory Over Vectors

When Lynn Davis became superintendent of Brookfield Country Club in 1961, there was a lot of pressure from his Greens Committee to save the remaining elms not yet infected by Dutch Elm Disease (DED). Planners of the fifty-year-old course, located just outside Baffalo, had used nearly 2,000 of the fast and large growing American Elms to form doglegs on the fairways, shade the clubhouse area and in general add to the natural beauty of the western New York state course.

But, like many other areas of the country, Brookfield's elms were being infected with a DED plague. Davis quickly found that hundreds of the stately elms were showing signs of the disease.

"Being a superintendent means that you are an expert on turf grass production and management," says Davis. "I knew something about general shade tree care, but really nothing about a complicated disorder like Dutch Elm Disease."

However, in the nearly fifteen years that have elapsed, Davis has become quite knowledgeable about Dutch Elm Disease. While there aren't the vast numbers of elms on the course today as there were before, the remaining elms are healthy, vigorous and free of disease.

Tests made in June by Dr. Alex Shigo, plant pathologist, Northeastern Forest Experiment Station, U.S. Forest Service, indicate that Davis' program to save elms has caused little internal damage to the trees.

Using an unusual instrument called a Shigometer — which detects decay by the patterns of electrical resistance measurements — Dr. Shigo gave the Brookfield elms an exam comparable to that given to doctoral candidates at a medical school. He probed the locked-in history of the elms to "see" what has happened since Davis began his preventive program. Without cutting any tree down, Dr. Shigo determined whether decay was present.

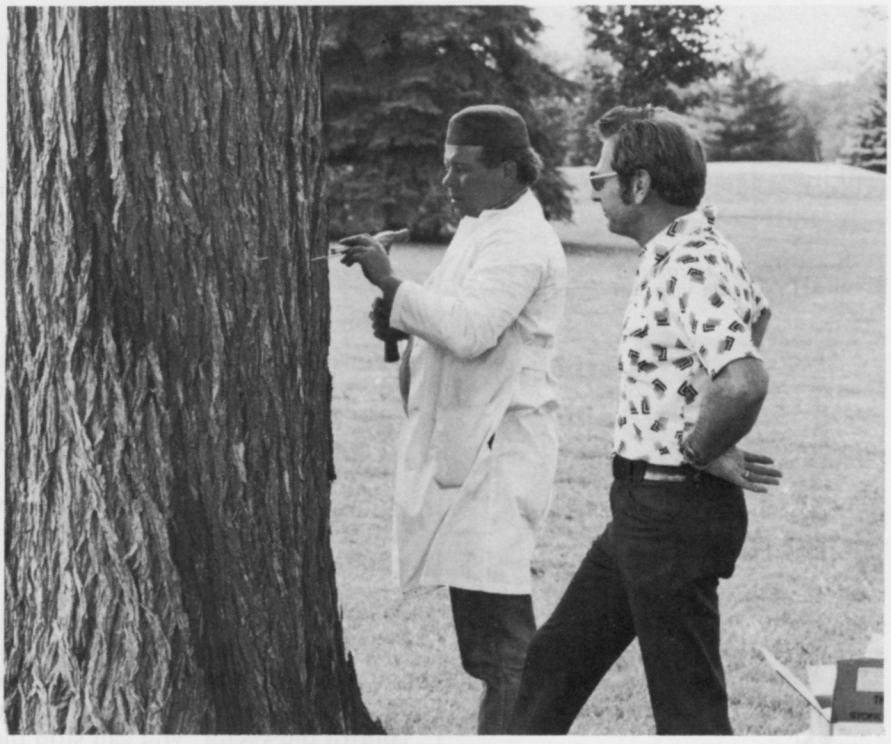
"I was like and expectant father at the hospital for the first time," recalls Davis. "I had worked on this program to save our elms for twelve years, yet I didn't know if what I had been doing was the right thing.

"When Dr. Shigo slipped his probe into the first big elm next to the clubhouse, I literally held my breath."

Dr. Shigo first drilled a hole perpendicular to the trunk about eight inches deep with a 3/32-inch bit. Then, slowly slipping the probe into the hole, he carefully watched the Shigometer.

"The needle on the meter jumped right away — and so did I," says Davis. "However, Dr. Shigo said not to be concerned as the probe was passing through the cambium layer, and the lower the relative resistance value, the better the score."

"Then the needle didn't respond for another 3½ inches," he continued. "Dr. Shigo said that there was no decay present. When the Shigometer started showing response, the plant pathologist said that he thought the elm might have a wetwood condition, a bacterial condition present in many elm trees. He said it was something I didn't have to worry about." Three more probes



Mauget feeder tubes are placed into the xylem tissues of this elm with an insertion tool and a hammer.

Victory

All eyes are on the Shigometer as Dr. Shigo probes this stately elm. The Shigometer was developed by Dr. Shigo as a means to detect decay in wood.

on this elm confirmed the finding that the wood was sound. It was the same with other elms on the course.

Lynn Davis has reason to be enthusiastic about Dr. Shigo's report. Twelve years is a long time, especially when you have to report progress to an exacting Greens Committee.

"I have followed a plan that includes strict sanitation and chemical injections to control Elm Bark Beetle. My theory is that if you can control the vector, you can stop the disease."

Davis developed this plan after spending countless hours in conference with university specialists and local county extension agents. His first step was to sanitize the course of diseased trees.

"I secured the records of diseased trees from former Brookfield superintendents and updated them," he says. "In the eight year period from 1956 until 1964, 1,748 elms were lost to DED. We went throughout the course and removed any elms that were showing signs of disease."

Then he began his research program in tree injection. His first injection was on May 14, 1965, with Bidrin. The chemical was packaged in plastic capsules for direct tree injection. He figured that Bidrin would control the American Elm Bark Beetle *(Scolytus multistriatus)* and the European Elm Bark Beetle *(Hylurgopinus rufipes)* which feed on the elm twigs.

"That first spring there were only 47 elms remaining on the 18-hole course," Davis recalls. "As far as I could determine, only one of the treated trees was infected at that time with the *Ceratocystis ulmi* fungus." The single host tree contacted the disease through a root graft and was removed later that same year.

The superintendent continued his treatment procedures and record keeping. By injecting the insecticide each spring just before the beetle enters its final life cycle and begins feeding on the elm twig, Davis was able to stop the fungus from entering the tree's vascular system.

The recorded life cycle of the Elm Bark Beetle from larvae through the feeding stage and into the egg laying stage lasts about 30 days. Davis discovered that by injecting one milliliter of insecticide per capsule into the tree's sap system, he could completely control all insect feeding for the first 30 days and keep the feeding to a minimum for up to 45 days after injection.

During the resulting twelve years of experimentation and record-keeping, Davis theorized that he had reduced the threat of DED to his remaining elms.

Environmentally, this method of chemical tree injection is totally safe. A feeder tube is inserted into the xylem tissue of the tree at about chest height with an insertion tool. The capsule is then pressurized (about 10 psi) by hand and placed on the end of the feeder tube. Capsules are used at approximately six-inch intervals around the trunk.

"I had very little problem convincing the Greens Committee to back me with this type of research program of chemical control to stop Dutch Elm Disease," Davis says. "I described to them the safety advantages of having the chemical systemically moving throughout the tree in a 'closed' system. They were convinced."

Where does Davis go from here? "We plan to continue with the research program as in the past," says Davis. "Dr. Shigo proved that what we had been doing resulted in no decay. Trees were alive and healthy."

"But," he also pointed out "any wound on a tree can be an opening for infection, so we plan to be careful about damaging trees. I have one elm that has had over 450 injections. We will be careful about where we place our feeder tubes so as not to cause undue stress on any part of the tree after many years of injection. And, of course, we plan to be top-notch policemen when it comes to sanitation." □