

Elm trees fight back in Eau Claire, Wis.



Tees, equally spaced along the elm's root flare, are connected with short lengths of tubing.

There's no cheer in the bright orange markers on the tall gracious American elm trees in Eau Claire, Wis. They tell a grim tale: the continued deaths of irreplaceable elms to Dutch elm disease (DED).

The numbers have been devastating since 1980: between 1,280 and 2,150 elms have been lost each year. In 1960, about 40,000 elms graced Eau Claire, according to city forester Rod Schmidt. He estimates that surviving elms number approximately 12,000. Across the northern U.S., more than half the elms have succumbed since the late 1950s, according to industry experts.

In Owen Park, an Eau Claire centerpiece, the number of elms has dwindled from approximately 200 in 1976 to approximately 100 today. In this one-of-a-kind park, the fungus' spread has been effectively halted with an intensive sanitation and fungicide treatment program.

In the past three years, the program has reduced losses to only three elms.

The whole city began experiencing extremely heavy losses with a 1980 windstorm—"a terrible disaster" Schmidt says. Fresh wounds in the elms attracted elm bark beetles which spread the fungus that causes DED. The beetles breed in elms that are weakened, dying or dead and in cut elm wood with firmly attached bark.

Clean-up after the storm took 2¹/₂ years. Meanwhile, losses of elms city-

wide skyrocketed from approximately 500 in 1980 to 1,450 in 1981.

High priorities

Control of DED in Owen Park became a priority for the Eau Claire City Council. The scenic 50-acre park covers a two-by-six-block stretch along the picturesque Chippewa River near downtown Eau Claire.

The 60-year-old, 50-foot elms shade the annual art fair, "Sawdust City Days" activities, picnickers and joggers. They form a scenic backdrop for parades, weekly band shelter concerts and film features.

"You don't see a stand of elms like that any more. Nice...leafy...mature. They make the park and community special. And we'll go the extra mile to take care of them," explains city council president Wallace Rogers.

In 1984, the city council approved the first treatment of the park's elms with Arbotect (thiabendazole) fungicide. In 1987, when the treatment needed to be repeated, cost was not a concern. The city council allocated \$5,000 more than the budgeted

\$12,000 so each of the park's elms could be treated.

"The value of the trees was never questioned," says Schmidt. "The council just said: 'Let's do it.'"

A local firm that delivered the lowest bid received the contract. The city forester's office supervised the job. Schmidt supported contract treatment of the trees. Even though his staff could have done the job, they would have been stretched too thin, he says. "In the summer, we have four permanent people and two temporaries for tree and shrub inspections and evaluations, consultations with property owners and tree removals. That takes most of our time."

Expertise was another factor. "Handling the treatment ourselves would have required training our staff and buying equipment...and the next time the trees need treatment, we may not have the same staff," explains Schmidt.

The program

The trees were treated in July, when the beetle is active and the fungus is



Rod Schmidt, Eau Claire, Wis. city forester, checks the injection equipment pressure before injecting Arbotect into an elm.

growing. Sod and soil were carefully removed from the tree's base, so as not to scrape or injure the elm. The fungicide was injected into the tree's root flares. It flows evenly through the xylem throughout the tree's crown and branches.

The amount of Arbotect injected varies with each tree's diameter at breast height, 4½ feet from the ground. The diameter determines the number of injection sites—1½ to 2, each one inch deep for each inch in diameter.

Shortly after the injection sites are

drilled, tees are inserted and connected with short lengths of tubing. This "harness" is attached to a supply hose that is connected to a container of Arbotect and water. After trapped air is removed from the lines, the fungicide is injected under 5 to 15 lbs. of pressure.

Following injection, the tees are removed and the excavation is refilled. Equipment is cleaned and sanitized between trees.

Two elm bark beetles—the smaller European elm bark beetle and the native elm bark beetle—spread DED.

Spores stick to hatching beetles and are carried to new trees as beetles emerge in May and June and begin feeding.

The European beetle feeds in the crotches of living elm twigs; the native beetle feeds in bark of two- to four-inch branches. They usually feed within 1,000 to 1,500 feet of where they hatch. However, beetles may rise to altitudes of several hundred feet and be carried by air currents for many miles.

Infected trees first show wilting, curling and leaf yellowing on one or more branches in the upper portion of the tree. Large trees may show symptoms of DED for one or more years before dying. Ideally, newly-infected trees should be removed within two weeks of disease identification.

The fungus also spreads through the adjoining roots of elm trees within 40 feet of each other. According to experts, the likelihood of root graft increases with delays in removal of infected elms.

Once a tree is removed, unremoved roots will continue to live and send up new shoots. "As long as the roots are alive, the fungus is alive," says D.W. French, Ph.D., plant pathologist at the University of Minnesota. Trees infected through root graft wilt and die rapidly, he says. Ideally, roots of infected trees should be severed mechanically 36 to 48 inches below ground.

Lines of defense

Sanitation is the first line of defense against DED, according to French. "Eliminate all dead and dying elms where beetles reproduce and the fungus resides."

Pruning may be the next line of defense if the main stem isn't infected, according to Dr. French, but pruning may not be popular. "My experience in Eau Claire," Schmidt says, "is the more cuts on a tree, the more likely you'll lose it. We sanitize as fast as we can and encourage treatment with Arbotect to protect against infection."

"We're really limited in our selection of replacement trees for the elms because of the zone 3 climate, soil and urban setting here," he says.

Because American elms are no longer available at nurseries, city residents settle for Marshall seedless ash, summit green seedless ash, Norway maple, linden and a few honey locust, flowering crabs and Canada red cherry trees. French recommends native oak trees, but not the pin oak.

"But, there's nothing close to the remaining elms, especially those in Owen Park," says Schmidt. **LM**



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