



Dead Elms In Michigan.

## DUTCH ELM DISEASE

*One Step Closer To A Cure*

**D**ISCLOSURE in mid-January by Secretary of Agriculture Earl L. Butz of a research breakthrough in the control of vascular wilt diseases of trees has brought scientists closer to finding a cure for Dutch Elm Disease.

The disease that for more than 40 years has plagued the stately giants of America's historic past is now being conquered. The chance for complete eradication is still far off, but organizations, concerned citizens and scientists are now working with renewed interest to combat this disease that annually takes many thousands of elm trees in its toll.

The breakthrough described by Secretary Butz is a technique of making an essentially insoluble

**EDITOR'S NOTE:**

The Environmental Protection Agency has just Federally registered Benlate benomyl fungicide as an aid in the control of Dutch Elm Disease. The Du Pont Company, manufacturers of the product, said Benlate is recommended for use on elm trees as a foliar spray or trunk injection treatment.

Du Pont cautions that the label says that Benlate is to be used by trained arborists in conjunction with sanitation and insect control programs. Consult with local and state authorities for additional information concerning the use of Benlate.

chemical soluble and rapidly injecting it directly into the elm tree, rather than through the soil. The chemical—benomyl—has been under intensive investigation by plant pathologists at the USDA Plant Science Research Division's Shade Tree and Ornamental Plants Laboratory at Delaware, Ohio. The situation confronting these scientists initially was that while benomyl fungicide exhibited local systemic properties, i.e. xylem movement from the point of entry upward to twigs and leaf tips, not enough of the chemical could be economically applied in other than a laboratory situation to effectively combat Dutch Elm Disease. Now with the

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ability to solublize benomyl and finding a method of injection application, the problem becomes less complex.

WEEDS TREES and TURF asked Dr. Winand K. Hock, plant pathologist at the Shade Tree and Ornamental Plants Laboratory if this breakthrough means the end to the Dutch Elm Disease plague.

"We're still too premature to make a recommendation. We don't have all the data yet," he said. "I believe we are on the right track as far as benomyl is concerned. Certainly the material has the ability to prevent Dutch Elm Disease if we can get the fungicide into the vascular system of the tree.

"The use of benomyl and other systemic fungicides have increased the prospects of DED control. However, as with any new material there will be problems and benomyl is no exception. I believe our biggest problem is the development of a suitable and economical application technique. We must also take into account the possibility of adverse effects on the tree by the chemical," he said.

Dr. Hock's conservatism on this breakthrough is not to discredit the scientific work already accomplished. Rather, it shows that scientific success is still "in the embryonic stage." While the technique that has been developed holds promise, much testing both in the laboratory and in the field still remains.

Some of the initial studies of pressure injection were accomplished by Canadian scientists. Their data, along with information collected by the Shade Tree and Ornamental Plants Laboratory, has been carefully analyzed and forms the basis for Secretary Butz's announcement.

Plans for this year call for testing a number of application techniques in diseased trees in cities across the country. Some of these methods include Medicaps "cartridges manufactured by Creative Sales, Inc. of Fremont, Neb. and the Mauguet Injector sold by CLM National, Sedalia, Mo. When this data is thoroughly analyzed, plant pathologists such as Dr. Hock and others will be better able to recommend proper application techniques.

The concern to save the American elm from destruction has been foremost in the mind of John P. Hansel, executive director of the Elm Research Institute, a non-profit organization located in Waldwick, N. J. Hansel has explored virtually

every avenue in the Elm Research Institute's crusade to save the American elm. Through donations by individuals, organizations and municipalities the Institute has made grants to many major universities to conduct research on the ultimate control of the disease.

"We've been thinking monetarily when we should have been thinking sentimentally," Hansel told WEEDS TREES and TURF when asked about saving American elms. "What we have achieved in the past few months is just one more good step—not a breakthrough. The breakthrough comes when the private owner opens his pocket."

Hansel recognizes that the dark gloom that has shrouded elms for many years is now changing to dawn. "This is the first daylight," he says. "There's more work to be done. Spraying in the past has been hampered. People lacked the appreciation of the value of the elm and the cost of care. Too few arborists were confident enough to be elm experts.

"Then along comes Benlate (benomyl). Now we have a foolproof chemical." There's other steps that must be accomplished, however. "I think we've made the tools more foolproof," adds this crusader.

Hansel's concept of tools is detailed in what he calls "Specialized Elm Care." It includes prevention and therapy and as he points out "represents the collective experience of leading arborists, combined with the latest developments in the control of this dread disease."

Prevention or how to protect a healthy tree includes such items as dormant sprays, leaf sprays, feeding and pruning.

Scientists and others have known for some time that DED is often spread by the smaller European Elm Bark Beetle which feeds on healthy elms. As adult bark beetles leave diseased elm trees, fungus spores of DED (*Ceratocystis ulmi*) are likely to cling to their bodies. These spores enter healthy trees through the feeding wounds made by the beetles.

Insecticides, namely chlorinated hydrocarbons, have been used to combat the problem. However, while they were effective in controlling the beetle, residues were found to be harmful to other wildlife. Within the past three to four years scientists at universities and the U.S. Forest Service have been testing methoxychlor for beetle control. Although this compound is still a chlorinated hydrocarbon, its action

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on wildlife is considerably less severe than other members of this chemical family.

Hansel's prevention program calls for a dormant spray of two percent concentration of methoxychlor prior to leaf emergence. This would be followed with a leaf spray of methoxychlor and Benlate benomyl fungicide applied as a foliar spray one week after leaves reach full size. He believes that "should the fungus be introduced by bark beetle feeding, the absorption of the fungicide through the leaves and young bark will help prevent growth of the fungus and restrict its spread into the system of the tree."

As another part of the prevention program, Hansel recommends feeding the elm tree to maintain a healthy state and pruning as needed, but not during the period when beetles are active.

Treating a diseased tree is what Hansel terms therapy. The first step involves surveillance — a visual sighting of the tree daily during June, July and August for signs of wilt or leaf chlorosis. Injecting a fungicide into the tree's vascular system comprises step two. Pruning of limbs that show flagging (wilt) follows next. Lastly, laboratory identification of DED should be accomplished.

Hansel's record of success looks good. Over a 13 year period, one elm specialist who practiced "Specialized Elm Care" averaged less than 1 tree in 100 lost to DED.

What does "Specialized Elm Care" cost? Hansel says it varies from community to community, but costs range from \$50 to \$100 per year for an average 2-foot diameter elm. Contrast this to as much as \$400 to \$500 to remove a diseased elm in some cities and the cost of "Care" is quickly justified. "This cost is no more than a 'service contract' charge for many appliances with a life expectancy of only 10 to 15 years," notes Hansel.

What other avenues are available in Dutch Elm Disease control?

Plant breeders continue their search in hybridizing the American elm with a more disease-resistant elm species. Their goal is an elm that retains the beauty of the American elm yet exhibits resistance to DED.

Scientists have also discovered that some American elms appear to be naturally resistant to DED. Why? No one knows at this time, but re-

searchers are working on this mystery.

Another glimmer of hope lies in the introduction of a non-stinging wasp, *Dendrosoter Protuberans*, imported from Europe to act as a parasite of the smaller European Elm Bark Beetle. The wasp would lay eggs in the larvae of the beetle. When the eggs hatch, the larvae of the wasp feed on the beetle larvae and kill them. If the wasp spreads throughout the country, it eventually could be an important factor in stopping the spread of DED.

Dr. James Butcher, Michigan State University entomologist says, "As yet we don't know the extent of



This small, non-stinging wasp pushes through elm bark to lay its eggs in the larvae of the elm bark beetle. The wasp larvae become parasites of the beetle larvae, eventually killing them.

its spread, how high its populations are or the significance it will have in the future. We are working closely with the U. S. Forest Service to determine the significance of these developments.

The work that the Shade Tree and Ornamental Plants Laboratory, the Elm Research Institute, the U.S. Forest Service and others has stirred the fire of hope into a raging inferno. Interest is at an all time high and individuals, organizations and municipalities are anxious to try the new discoveries and techniques that scientists have developed.

Optimistically, John Hansel sums it up this way. "I believe we are going to save many thousands of trees this year."