

Lab Seeks Solutions To Tree Problems

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Dutch elm disease has been the main concern at the Agricultural Research Service Shade Tree and Ornamental Plants Lab in Delaware, Ohio, for a number of years. After 40 years of research we appear to be near a solution to this menacing problem.

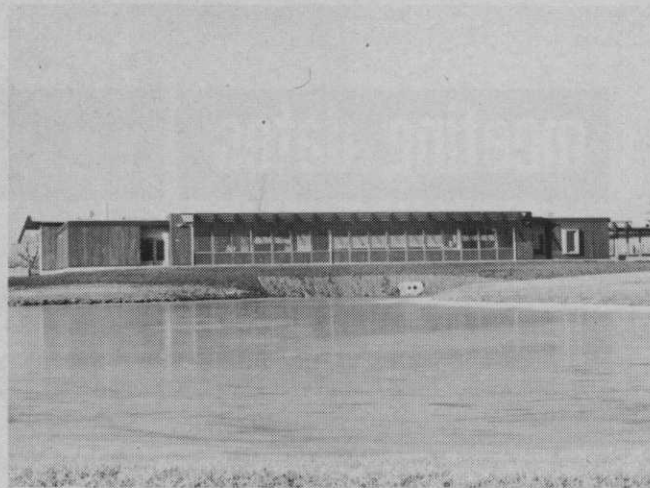
The first hybrid elms developed in this country that are resistant to Dutch elm disease will be tested and increased this year. American elms that are resistant to Dutch elm disease have also been found and will be increased after further testing. A systemic fungicide has been shown to be highly toxic to the Dutch elm disease fungus. If the problems concerning the application of this chemical can be worked out, arborists will have a way of protecting trees from Dutch elm disease. There is even the possibility that trees can be "cured" if they are treated in the early stages of the disease.

Because of the severity of Dutch elm disease, another killing disease, elm phloem necrosis, has been overlooked. Scientists at the Delaware laboratory have recently discovered that elm phloem necrosis is apparently caused by a mycoplasma rather than a virus.

Mycoplasmas are the smallest living cells that are known. Unlike viruses they are killed by certain antibiotics. Preliminary findings indicate that elm phloem necrosis may be amenable to control by tetracycline antibiotics. The Delaware team is also looking for trees resistant to elm phloem necrosis.

An extensive breeding and selection program has been initiated at Delaware to develop trees that are better adapted for urban areas. In addition to a large collection of elms resistant to Dutch elm disease, this program includes an extensive collection of red maples from throughout their natural range, a green ash that is apparently resistant to borer attack, mimosas resistant to *Fusarium* wilt, and a number of cold-hardy shade tree selections.

Many of these trees are also being selected and bred for resistance to air pollution and other environmental stresses. Red maples are being screened for resistance to *Verticillium* wilt, moisture stress, air pollution, and high and low temperature extremes, and for such horticulturally desirable traits as rapid growth, symmetrical shape, and brilliant fall coloration.



The Shade Tree and Ornamental Plants Laboratory at Delaware, Ohio has a staff of three plant pathologists, a plant physiologist and a plant geneticist.

Claims are constantly being made concerning the ability of trees to purify the air. Yet we find very little scientific evidence to support these claims. Delaware scientists have initiated research to determine the impact that urban trees are having on our air quality. Preliminary findings are exciting in that they indicate that trees may take up and recycle certain pollutants.

Scientists are also studying the effects of pollutants on the cells of trees. It has been found that the main damage that sulfur dioxide causes to the cell is destruction of chloroplasts where photosynthesis occurs. It is hoped that through these studies, diagnosis of the type and extent of pollution damage can be made by examining affected cells.

Are tree wound dressings beneficial? It is interesting to note that we really don't know. The main reason that we treat wounds is to protect the tree against invasion by rot fungi. Yet we have not looked behind tree wounds after they are treated to see what has happened.

A cooperative study with the U.S. Forest Service has been initiated to increase the level of knowledge on this subject. Trees have been artificially wounded and the wounds treated with various wound dressings. Over a five year period these trees will be analyzed and the extent of decay and discoloration behind the wound studied.

The Delaware group has also initiated a study to see whether different types of mulches around trees might protect them from salt damage.

With the removal of certain pesticides from the market we need new materials for such diseases as sycamore anthracnose and crown gall. Screening is going on at the Delaware lab for compounds to control these two diseases and some very effective compounds have been found.

The nursery industry and arborists are encouraged to become familiar with the work of the Shade Tree and Ornamental Plants Laboratory at Delaware, Ohio. The scientific team including three plant pathologists, a plant physiologist and a plant geneticist are determined to stay tuned into the needs of nurserymen and arborists. You are encouraged to bring particular problems on trees and woody ornamentals to our attention.