HOW NATIONAL CAPITAL PARKS CONTROL DUTCH ELM DISEASE

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Despite the constant threat from Dutch elm disease (DED), the elm continues to play the dominant role in the landscape of the Federal Enclave of our nation's capital. Over twenty-five hundred elms lend a graceful and majestic flavor to the streets, parks, monuments and buildings of one of the world's most significant park areas.

The successful perpetuation of our national elms has not been without a tremendous investment of time and effort. At a time when elms throughout the northeast and midwest were being devastated by DED, the National Capital Parks (NCP) took immediate action to maintain and preserve this elm resource. Successful elm management has been achieved through the conscientious implementation of an expanding, comprehensive, integrated control program. The purpose of this article is to outline the various facets of our current DED program which are being used to sustain one of our country's few remaining elm populations.

American elms lining 14th Street near the Washington Monument.

American elms surrounding the Tidal Basin and the Jefferson Memorial.

Within the Washington, D.C. area, the European elm bark beetle is the common vector of the fungus *Ceratocystic ulmi* (Buism.) C. Moreau, the causal agent of DED. The beetle vector has always been considered the most readily controlled factor in the disease cycle. In the early years of the DED control program, NCP like many other municipalities, applied DDT in late winter or early spring to protect twig crotches from bark beetle feeding and the concurrent inoculation with the disease organism. The publishing of Rachel Carson's Silent Spring and the revelation of the persistent and hazardous nature of DDT resulted in the introduction of methoxychlor, another insecticide which is less persistent and therefore less hazardous to the environment. Thus NCP, as well as most other organizations involved in DED control, relies extensively on the thorough application of a dormant methoxychlor/xylene spray for bark beetle control.

Although a dormant spray may effectively minimize bark beetle feeding, the key to long-term beetle control is a thorough sanitation program. The European elm bark beetle seeks weakened or dying elm wood to breed in. Sanitation involves efficient detection, rapid removal, and destruction of these diseased or dying limbs and trees to eliminate the favored beetle breeding sites. By limiting beetle reproduction, spread of the fungus to other trees is lessened.

Recently the Forest Service and the State University of New York College of Environmental Science and Forestry have made advances in the biological control of bark beetles through pheromone (attractant) trapping thereby offering a new prospect for beetle suppression. The Ecological Services Laboratory

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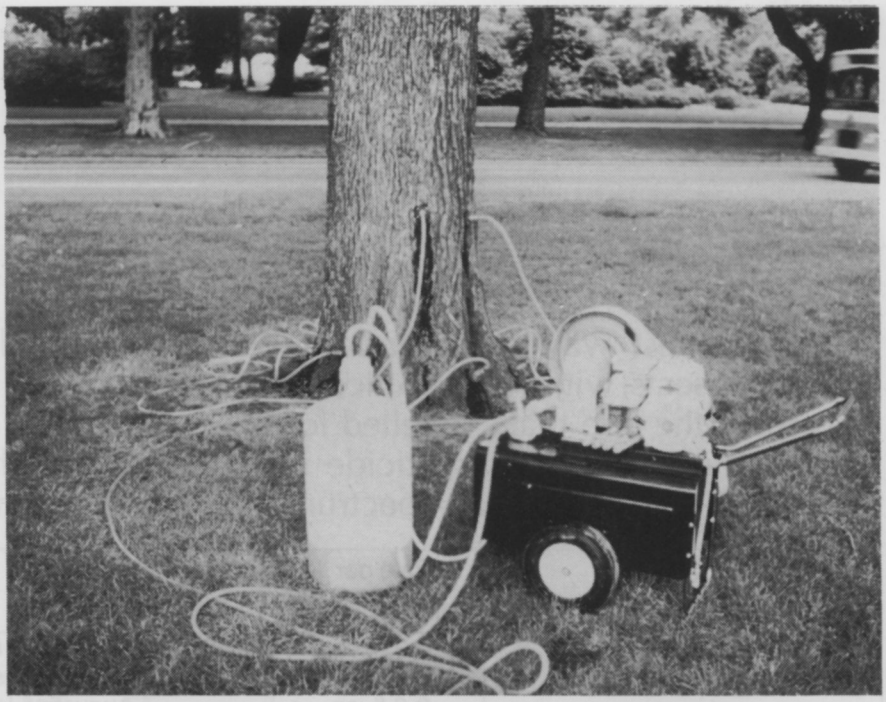
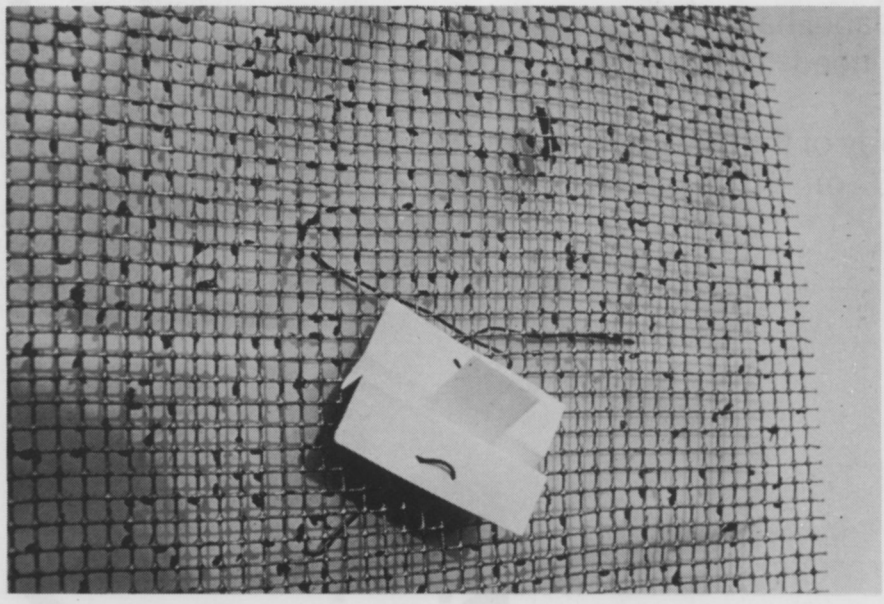


Power sprayer injection apparatus for treatment.

(ESL) and the USDA Northeastern Forest Experiment Station, Delaware, Ohio, are currently using pheromone traps in NCP. A number of traps consisting of hardware cloth coated with Stikem Special® and baited with dispensers containing the synthetic pheromone combination, Multilure, have been installed throughout the Park to survey the beetle population. Such widely spaced survey traps have been helpful in indicating areas of high beetle density. Emergence periods, which usually occur twice throughout the summer, can also be accurately monitored through weekly beetle counts of survey traps. Emergence monitoring may be useful for timing cover sprays to the beginning of emergence periods. Ultimately mass beetle trapping may prove to be an effective procedure for reducing DED.

The earlier diseased elms can be detected the more effective will be the control program. In early spring, shortly after bud break, trained scouts begin a thorough examination of each tree for DED symptoms. When detected, symptomatic trees are numbered and twig samples collected for culture diagnosis at the NCP, ESL. Although most cases of DED are detected in June and early July, surveillance is continued throughout the summer.

Examination of individual trees by trained scouts is generally successful in achieving thorough diagnosis. However, when large numbers of trees grow in an extensive area, such as the Federal Enclave, this procedure becomes time consuming thereby making early detection throughout the region difficult. In addition, scouting may miss crown symptoms not visible from the ground. These scouting problems have elicited a cooperative remote sensing program between NASA at Wallops Island, Virginia, and the ESL. Remote sensing coupled with imagery enhancement is currently being evaluated as a system for early detection of DED in NCP. It is hoped that a film/filter combination will be found that will allow efficient detection of diseased or stressed trees before they are noticeable with the naked eye. Early diagnosis presents a greater opportunity for successful treatment of diseased trees.



European elm bark beetle trap infested with beetles. The trap consists of hardware cloth coated and baited.

In spite of thorough spray and sanitation programs, control is never absolute. Each year several large, stately elms are lost. These trees, because of their size and location, are often prominent components of our Capital's landscape and their loss is severely felt. Recently, the Ecological Services Laboratory of NCP in cooperation with USDA Northeastern Forest Experiment Station, initiated an experimental program to save diseased elms by utilizing high pressure trunk and limb injections with the systemic fungicide MBC.HCl (methy 2-benzimidazole carbamate hydrochloride). As soon as detected

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diseased trees exhibiting less than 30 percent infection, are given a therapeutic trunk injection. (It is felt that trees exhibiting greater than 30 percent symptomology are well beyond the stage where systemic fungicide treatment would be effective and are therefore removed.) Injections are made at 70 psi with the tree injection apparatus developed by G. F. Gregory and T. W. Jones of the USDA Forest Service or with a conventional Spartan power sprayer, equipped with 13-gallon polyethylene carboys calibrated in liters per trunk diameter inch.

Injector heads are nailed to the trunk at six-inch intervals and connected to the pressure injectors with PVC nylon reinforced hose equipped with quick coupler connectors. With the aid of a skylift truck and a long delivery hose, diseased limbs are also injected near the main trunk. By injecting the diseased limb an effort is made to purge any infection at the limb's union with the main trunk. Diseased limbs are removed shortly after injection. For expediency, if DED is evident in several limbs, only the trunk is injected, and the diseased limbs removed promptly thereafter. Elms that are within 50 feet of diseased trees are given prophylactic trunk injections in an attempt to protect against root graft and beetle transmission of DED.

During the summer of 1975, 60 elms contracted DED in the Federal Enclave which encompasses such notable areas as the White House, the Ellipse, Lafayette Park, the Jefferson and Lincoln Memorials, the Mall, West Potomac park and sections of Constitution and Independence Avenues. In the past, since little hope could be offered for a tree with DED, most diseased trees were removed. However, in 1975 half of the diseased trees were considered worthy of treatment and allowed to remain standing. The effectiveness of this injection and pruning program can only be evaluated as time goes on. It is hoped, however, that many of the treated trees will overcome the disease and continue to contribute to the Park landscape for many years.

Another vital aspect of our integrated program has been a continuing search for DED tolerant elms. Several European and American clones which exhibit high tolerance to DED have been selected from the diverse NCP elm population. These selections are currently being evaluated by the ESL for future use in the Park. ESL researchers are constantly searching for other plant materials from European, Asian, and American sources that might also be of use. Monoculture of the American elm has lead to the demise of many urban plantings. Incorporation of a diversity of elms tolerant to DED may reduce the possibility of extensive elm losses. Diversity may also prevent extensive losses from other elm problems such as phloem necrosis which, fortunately, has yet to be found in the Washington, D.C. area. □