



FORESTRY NO. 10

J. G. HERMANN, D. W. FRENCH, L. T. HENDRICKS*

Use of diseased elm and oak trees

As the need for wood and wood products increases, it becomes necessary to explore new sources of supply. One such possibility, a fiber source overlooked in the past because of economic restraints, is that obtained from shade trees. Elm and oak trees that have been or are likely to be killed by Dutch elm disease and oak wilt are of particular interest. Wood from these trees can be processed into useful wood products.

The use of diseased elm and oak trees received very little attention until recently. In the past, dead elms and oaks were burned or buried at considerable expense. Today such an approach is expensive and objectionable because of air quality concern. Also, it is increasingly difficult to find places where logs can be buried. And yet these trees must be disposed of because sanitation is the primary means of controlling Dutch elm disease and, to a lesser degree, is a part of controlling oak wilt.

Dutch elm disease

Sanitation or eradication of all dead and dying elm that could serve as places for the bark beetles to breed is basic to any Dutch elm disease control program. Without reduction of bark beetle populations, there is very little chance to contain this disease. Dutch elm disease is already well established in Minnesota and has caused considerable losses in southern Minnesota, especially along the rivers where elms are a major component of the vegetation. In such areas it may be feasible to harvest the elms, or at least a major portion of them, before the fungus kills them. Using these wild elms would be profitable, and their removal could be a factor in reducing the rate of spread and severity in villages, towns, and cities. Like other species, elms are more easily handled when felled as living trees than when cut after they have been killed by the fungus.

Even in cities, it is advisable to thin out elms rather than wait for the fungus to take its toll. In every city there are elms in poor condition or in inappropriate places that should be removed ahead of the disease. In old neighborhoods, the trees were planted too close together, and many of these large elms are already overmature and ready to be removed. Systematic removal of overcrowded and unhealthy elms has made it more difficult for the fungus and beetles to operate. There are few, if any, cities in the world that relied so totally on the elm as Minneapolis and St. Paul. These cities have enjoyed the elms for many decades but now are in trouble because elms are 90 percent or more of the total tree population. It's not reasonable to change this picture overnight, but wherever elms are not in the right place or in good health, they should be harvested.

In the seven county metropolitan area there may be as many as 5,000,000 elms, considering only those that are at



Figure 1: Temporary storage of diseased wood at a landfill area. The absence of trees in the immediate area helps reduce the possibility of spreading disease.

least 4 inches in diameter. In the state, there are supposedly 140,000,000 elms, and they are a major source of raw material that should be used rather than conceded to the fungus.

Whenever possible these trees should be used for products that will provide maximum return. Therefore, consideration should be given first to the use of elms in solid wood products such as lumber and railroad ties. If the log quality doesn't permit such products, the logs can be chipped. Elm logs may bring prices from \$125-\$175 per thousand board feet, while chips are worth from \$6-\$10 a ton, depending on type of chip and amount of bark included.

One of the problems in using so-called city trees is that they can contain metal and occasionally cement. Logs containing metal are hazardous to saws, and one such object can cause as much as \$100 damage, not counting time lost for repairs. Metal detectors are available and can be used to avoid such problems. Bark removal will eliminate some of these problems and also aid in detecting the presence of metal objects.

Chips have a wide range of uses from wood fiber products to mulch for plants and bedding for animals. Some wood fiber products require bark-free chips and thus debarking, while others, including a backing for roof shingles, can use chips with bark. Certainly for uses such as nature trails or mulch around plants, the bark is not a problem.

Once elm trees are converted to chips, they are no longer hazardous. The small size and greatly altered condition of the chips contrasted to whole trees make them unsuitable for beetle survival. No matter what use is made of the main stem, chips

*Forest Products Research Associate, Professor of Plant Pathology and Forest Products Extension Specialist, Respectively



Figure 2: A common sight in Minnesota. These trees have been improperly disposed of and may serve as breeding sites for fungus-carrying bark beetles.

Figure 3: Material of larger diameter must be split before being passed through the Metro-chiparvester, a machine designed for chipping whole trees. The splitting process also helps to locate hidden metal objects.

will be one major product because much of the elm tree is made up of branches and branch axils, which are not suited for sawing. In any utilization program, be very certain that no sites for the beetles are left. Thus, even branches little more than an inch in diameter need to be chipped or burned.

so only the summer wilting red oaks need to be treated to prevent spore production. The above-ground parts of trees dead for more than a year are not sources of inoculum. Because of these differences, oak wilt is easier to deal with than Dutch elm disease. There is no reason to consider harvesting healthy red oaks as their elimination has little, if any, effect on the development of the disease.

There are many chippers on the market, and there may be need for two types: one to produce chips from the logs and a second unit to handle the branches or so-called brush. Some of the fairly large chippers are portable but take time to move, and others are fixed units. Small chippers that handle material up to four inches in diameter are easily portable but are entirely inadequate for handling large volumes of brush efficiently. Thus, some combination of chippers would be necessary. Because elm is difficult to split, it would be better to combine a saw with the chipper so that logs larger than the capacity of the chipper could be cut to manageable size. Wherever possible, large diameter logs should be used for lumber rather than chips.

Although oaks as shade trees are considered more valuable than elms, this does not mean that oaks will yield more valuable wood products. Oak trees in metropolitan areas tend to be full crowned and have a low percentage of stem wood. Generally speaking, these oaks are of low quality. Certainly, some could produce high quality lumber, but such trees constitute only a small portion of the total population. The major market for oak is probably as firewood, an item currently very much in demand. It splits well, which is not the case with elm. Oak also burns well after it has been seasoned, and it produces more heat per given volume than most tree species.

Temporary storage of elm logs

If elm logs cannot be debarked immediately (within 10-20 days) or cut into products, they should be sprayed with 1 percent pentachlorophenol in fuel oil. A thorough coverage of the logs with the "penta" will prevent colonization by beetles, and if already present, will result in their elimination. The penta does not penetrate the wood and should not interfere in any subsequent use made of it. Penta is a commonly used wood preservative, readily available and low in price. As with many chemicals, protective gloves are advisable. Occasionally a person has a low tolerance to such compounds. These individuals should not come in contact with penta. Once treated, the logs should be safe until used no matter how long they are stored. Debarking the logs also prevents beetle colonization.

Oak wilt

Oak wilt is different from Dutch elm disease in that only a portion of the infected trees are sources of inoculum, and thus only these trees need to be handled in some special manner. In Minnesota, spores are formed primarily on the red oaks, infrequently on the bur oaks, and not on the white oaks. Therefore the bur oaks and certainly the white oaks need not be destroyed. Only those red oaks that wilt in July and August of one year will have spores produced on them the following spring. Infection from spores carried by insects can occur only in the spring

Firewood appears to be the best use for oak, but if trees are of high quality and sawmills are available, then these good (or quality) trees should be veneered or sawn into more valuable products. If mills are handling elm logs, there is no reason why they can't handle oak.

It is necessary to separate the diseased red oak trees into two categories, hazardous and nonhazardous. Those on which spores might be produced the following spring need special attention. After harvesting, the main stems of these trees can be wrapped in 4 mil plastic for April, May, and June, after which time they can be uncovered and used. Oak wilt fungus will not survive under the plastic. Another way of dealing with these hazardous trees is to use them prior to April, but this does not include cutting the logs into fireplace lengths. The fungus can still produce spores on such material. It is very unlikely that spores will be formed on logs sawn into lumber. The tops of these red oaks are not a problem because they dry out before the fungus can produce many spores. Wherever possible, though, these tops should be chipped to totally prevent spore production.

Issued in furtherance of cooperative extension work in agriculture and home economics, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture. Roland H. Abraham, Director of Agricultural Extension Service, University of Minnesota, St. Paul, Minnesota 55101. We offer our programs and facilities to all people without regard to race, creed, color, sex, or national origin.