RECENT WORK WITH SOLUBLE BENLATE IN CANADA[1]

by Geoffrey Munro

Abstract. This article describes the latest method of injecting a form of soluble benlate into elm trees to control Dutch elm disease. This work has originated and is for public use only in Canada at this writing. Lignisan-P, the name of this chemical, is injected into trees directly through the roots or alternately into the root-flares. A discussion of the selection of trees for injection is included.

The purpose of this article is to inform the interested members of ISA of the current use of soluble benomyl as a control for Dutch elm disease (DED). It is important to note that this work is being done in Canada and therefore falls under the Canadian and provincial chemical control authorities. A comparable chemical is being released in the USA at this writing but this article deals strictly with the Canadian work.

The chemical, Lignisan-P, is injected into elm trees in two ways (Kondo et al. 1974b). Both root injection and lower trunk or flare injection have shown promising results for arresting and preventing DED in mature elm trees (Kondo et al., 1972).

The Chemical

Lignisan-P, the commercial name for one form of soluble benomyl, can be injected in large quantities into both diseased and healthy elms. Being in a water-soluble form, the fungicide can reach all parts of the tree. The characteristic symptoms of DED are brought about by the presence of a toxin in the tree. This substance is released by the causal fungus, *Ceratocystis ulmi.* The soluble benomyl is injected at a fungistatic concentration. It does not kill the fungus but stops it from multiplying. The injected tree may then live with the fungus still in it. Both prevention and therapy of DED are possible by injection. In the case of therapy, the visual DED symptoms are later removed.

Tree Selection

An important question to be considered is how extensively infected a tree can be and still be successfully injected. Some disease-free trees are injected as a prevention against DED (Fig. 1).

Figure 1. A mature healthy elm injected in 1975 to prevent Dutch elm disease.

When infected a tree must be assessed as to the possibilities of successful treatment. Each tree is given a disease index, based on the visual symptoms and the percentage of the crown that is affected (Kondo et al. 1974a).

When this index is between 0 and 50, the tree is considered treatable. Beyond this range it is considered seriously diseased, and any portion that might be saved would no longer be esthetically pleasing. Also, the chances of success are very slim (Kondo et al. 1973). In addition to the

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disease index, the general health of the tree should be considered. A healthy, vigorously growing tree will absorb Lignisan more readily and is more likely to ward off DED. For this reason a feeding program is recommended along with the injection.

Another factor to be considered is tree location and injectability. It is difficult to excavate a curb-side or road-side tree and this sometimes makes root injection impossible. A tree in a soil with a high water table may also not lend itself to root injection. Then flare injection must be used. This method has not proved as successful as root injection (C.F.S., 1975).

Fig. 2. The soil must be excavated to expose roots with considerable care.

Injection Methods

The primary method of injection involves the excavation of soil to expose one root from each main root flare around the base of the tree. The roots are followed from the tree, always taking the largest root at each junction. The excavation must be done with considerable care as a cut or scarred root will permit loss of the chemical and will not send the dosage up the tree. The normal tool used for this is hand trowels when in close proximity to the root (Fig. 2).

When the root has been followed out from the tree to the appropriate size, 1-1½ inch in diameter, it is cut and a conical-shaped root-nipple placed over it (Fig. 3).

Fig. 3. The roots are cut and a conical root-nipple put over the end.

The flare injection involves drilling 5/16 inch diameter holes into the tree as low to the ground as possible, every 6 inches around the tree. These holes penetrate only to the cambium where the uptake of chemical is accomplished. A 3/8 inch hollow wooden dowel is then inserted and a 3/8 inch I.D. plastic tube is placed over the dowel and clamped (Fig. 4).

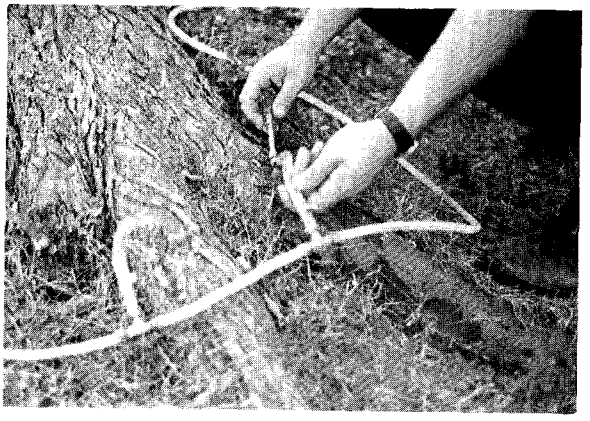

Fig. 4. Hoses are placed over hollow 3/8 inch dowels in the root flares of a tree.

In both methods, once the actual sites of injection are prepared, they are connected to a reservoir of chemical that is under 10 psi pressure from a nitrogen bottle (Fig. 5). The Lignisan in the reservoir is prepared at from 250 parts per million (ppm) up to 1000 ppm in concentration. The lower the concentration, the larger the volume required as a dosage. Similarly the larger the diameter of the tree, the larger the dosage required. The larger the volume injected the better distribution that is attained throughout the crown.

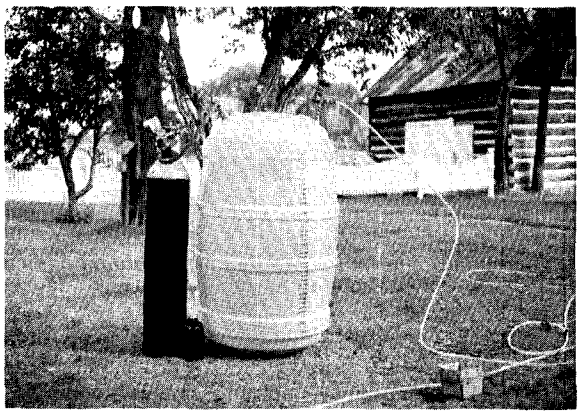

Fig. 5. All injection points are connected to a reservoir of Lignisan-P and the system is pressurized with 10 psi of nitrogen.

Practical experience has shown that starting with 500 ppm and increasing the concentration if and when required provides an adequate trade-off between chemical distribution and injection time. The maximum time for any injection of this type is 48 hours, so the only time when the concentration of the dosage must be increased is when the required volume of chemical will not be taken up in this time period. Using 500 ppm, however, usually an injection can be completed in one day (i.e. 12-24 hours). With this time allotment, a tree that is started one day can be stopped the next, so the injectors need never lie idle. A concentration higher than 1000 ppm is not used for fear of phytotoxic effects brought on by the chemical.

Summary

Lignisan-P can be injected into healthy, or partially diseased trees, in an effort to control DED. Injection is possible through two methods which can be used in conjunction on a single tree. Injection has shown itself to be of value for two growing seasons.

The wood laid down the third year does not contain enough Lignisan to affect control. A tree in a condition or a location that suggests possible reinfection with DED, should be injected after two seasons.

The use of this chemical for injection has been released to the commercial arborists in the province of Ontario under the control of the Ontario Shade Tree Council (OSTC). They are responsible for training and licensing those interested in injecting commercially. OSTC offers a one-week course of instruction each year, usually in June or July, in Ottawa. This course is open to all interested people from Canada or the USA. The course is carried out in conjunction with the Canadian Forestry Service and the National Capital Commission and insures the student of a complete grounding in this new procedure.

Literature Cited

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