How to Save Dutch Elm Infected Trees by Tracing

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Tracing Dutch Elm disease and saving elms is not a difficult process. In fact, it can easily save many elms that are infected well into the trunk. However, it can be tricky and the arborist performing the tracing must have a basic understanding of how Dutch Elm disease grows in the tree as well as an elms vascular physiology. If the disease has entered the root system of the elm, this process will not work and the tree needs to be removed.

The Goal of Tracing

This process will only work if *all* the disease fungus is isolated from the rest of the tree. This sounds much harder than it actually is. If you clearly understand the essential points as stated below, with a little practice you will easily be able to perform this operation. You will readily be able to predict where the disease is growing inside the tree and be able to put walls between it and the healthy portion of the tree. Many trees are saved every year. The disease is so predictable that seldom are trees lost after isolating the infected part.

Basic Information about Dutch Elm Disease, Elm Physiology and Tracing

Dutch Elm disease is a fungus. It usually enters an elm through a 2-4 year old twig, on the back of the European elm bark beetle. Once inside the tree, the disease starts to grow downwards at a rate anywhere between one inch to one foot per day. It is important to note that the Dutch Elm fungus moves downward much faster than it spreads laterally. In addition, it *only* grows in the current year's water conducting tissue — never deeper. The disease causes the tree to produce a dark brown stain in the xylem. These brownish "tyloses" are not the disease, but the tree's reaction to the disease are what the arborist will use to follow the disease.

The architecture of a branch/trunk junction only allows the disease to grow down. This is because the vascular tissue connection is only at the bottom of a branch. This is different than a co-dominate stem junction where the vascular tissue is connected on all sides. The reason you need to know this is that when tracing an infected branch, the disease will only grow out the bottom of the branch into the trunk or stem. Thus, it is often unnecessary to remove that whole limb, as the disease is often isolated to growing below that branch.

Once this information is clearly understood, the tracing process should be within reach of most anyone who has the patience and care to thoroughly finish the process.

The Steps of Tracing Dutch Elm Disease

The tools needed for tracing are a chainsaw, a hammer, a sharp chisel and a sharp-pointed pick.

Step 1

The first step of tracing DED is to pick your candidate wisely. Because the symptoms of this disease are often behind the growth of the fungus, symptoms alone cannot be your guide. To determine if a tree can be saved, "exploratory surgery" must be done. This involves finding the point of the infection and then opening small windows progressively down the tree looking for the characteristic brown staining. When doing this, notice how the width of the fungus growth gets narrower the further down you go. For a tree to be saveable, the disease discoloration must end at least 10 feet above the root system. One exception to this scenario exists, that is if the disease has grown into the center of a co-dominant stem. If this happens, the disease may grow upward into the rest of the tree quickly and the tree may not be saveable. Note: In some cases, there are multiple disease infection sites; each one needs to be traced.

Step 2

Once the tree has been determined to be a viable candidate, the tracing process can begin. The first step is to remove the infected branch or branches that are less than 6 inches in diameter. Once you reach infected limbs over this size and the disease stain comprises less than a third of the circumference of the branch, you can begin the tracing process. If the disease comprises more than 1/3 of the branch circumference, it is advisable to remove this limb back to the collar.

Step 3

Begin tracing at the point where the diseased branch was removed. The first step is to cut a window to get an idea of the size of the disease and the direction it is growing. Using a chainsaw, cut a 1-1½ inch deep groove 1-2 inches on each side of your estimated disease stain. Since the bark is in the way, you will need to interpolate the path the fungus is growing. This first section should go 6 inches down. Then cut across and connect the two cuts. Take the hammer and pound on the bark. It should pop off revealing the disease stain and the direction it is going. If the disease stain goes wider than estimated, be sure to increase the

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width of the isolated area. Also, be sure you create a buffer zone of clear unstained wood of 1-2 inches to the outside of the growing disease.

Step 4

Keep repoeating the above process all the way down the limb and into the trunk. This will take practice and patience at first; as you get experience, you will be able to go much faster. In many cases the disease will not go exactly straight, but will follow the twists and turns of the xylem. The pattern of the bark can be a useful tool to help predict these turns. However, the staining must be your guide.

Step 5

Eventually the disease stain will become very thin and then disappear. Because the tyloses stain is a symptomatic reaction to the disease, the tracing must continue for a minimum of 10 and a maximum of 15 additional feet to insure all the disease is compartmentalized. This is the trickiest part of the process, but by using a sharp pick or nail you will be able to "light up" the xylem and continue tracing. At this point, stick the pick into the xylem — you will notice that the xylem in both directions will turn a lighter color. This will be your guide to making sure you are isolating the infected xylem and not going off course. Once you have gone at least 1-15 feet past the last visible stain, you are finished. If you have isolated all the disease from the rest of the tree, it will be saved.

Step 6

The final step is optional: injection of Thiabendizole (Arbotect 20-S) using the University of Minnesota technique and dosage. While this will not cure infected tissue that may have been missed, it will very effectively protect the tree from future infection for 2½-3 years.

Important Notes

- Because this tracing process leaves a wound on the tree, it is important not to cut too deep. Deeper than one inch below the bark and two inches outside the stain is usually unnecessary.
- Early season disease signs often reflect an infection from the year before. In these cases, the symptoms can be very far behind the disease in the tree and some disease will be located in last year's xylem hidden underneath this year's tissue. A chisel can be used to scrape away this year's xylem to make sure the disease is not in last year's vessels.
- Wet springs often result in larger xylem tubes and a faster moving disease. Conversely a dry spring will result in smaller xylem tubes and much slower moving disease.
- Because there is an element of risk, other elms in root graft distance need to have these root grafts physically or chemically disrupted in case the procedure fails.

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Editor's Note: This procedure was developed by Tom Prosser of Rainbow Treecare in Minneapolis and has been successfully used to save hundreds of infected elms.