Dutch elm disease is caused by the vascular wilt fungus, *Ophiostoma ulmi* (formerly, *Ceratocystis ulmi*). This fungus is vectored (i.e. carried from diseased trees to healthy trees) via two species of elm bark beetles: the smaller European elm bark beetle and the native elm bark beetle. It is also spread from plant to plant through root grafts between adjacent trees.

**Symptoms**
Dutch elm disease results in a wilting and yellowing of the foliage. This is followed by leaf death, defoliation and death of the affected branches. Affected trees develop a brown discoloration in the water conducting vessels (xylem) of the wood. This may be seen as a ring of discoloration when a diseased branch is cut or as dark streaks when the bark is peeled back from infected branches. As the disease progresses, major limbs die and eventually the entire tree is killed.

**Disease Management**
The task of disease control can be very difficult unless community-wide surveys, sanitation and removal programs are used. Nevertheless, there are some steps that a homeowner can consider to try to save a valuable elm from destruction by Dutch elm disease. Key factors to keep in mind when considering measures for disease control are: How valuable is the tree? What is the probability of preventing or curing the disease?

**Sanitation**
The chances of a valuable elm being kept...
free of the disease are improved if all nearby
dead and dying elm trees are removed
and buried or burned as soon as possible.
Eliminate, if possible, all potential elm bark
beetle breeding material within 1,000 feet
of the trees to be protected. This material
will include elm branches that are infected,
weak, dead, or recently cut. This will also
mean destroying or debarking stumps and
elm logs which are being kept for firewood.
Sanitation reduces the fungus population
as well as that of the bark beetles which
vector the disease. Good sanitation is most
important within and immediately adjacent
to trees that are to be protected. Without
sanitation, the other measures suggested
here are of little use.

Root Graft Breakage
Roots of adjacent trees frequently become
grafted to one another. The Dutch elm
disease fungus can spread from a diseased
tree to an adjacent healthy tree via these
root grafts. Potential root grafts can be
severed by digging a narrow trench 18 to 24
inches deep midway between the infected
and healthy trees. Injecting Vapam into the
soil will accomplish the same thing. Apply
Vapam to the soil in 3/4" X 18" holes, 6
inches apart midway between the diseased
and healthy trees. Use a rate of 1/4 cup
of dilute solution (1 part Vapam to 3 parts
water) per linear foot. Seal by tamping. Read
and follow the instructions on the Vapam
label very carefully!

Therapeutic Pruning
In some cases the disease can be pruned
out of the tree if there are only a few
infections and they are detected early. At
the first sign of a symptomatic twig, the
infected branch should be removed and
destroyed. Prune back at least 10 feet into
healthy wood, usually to a major limb. If
internal discoloration or streaking is noticed
in the pruned wood, cut back another 10
feet. Trees that are showing dead leaves
and branches in more than 10-20% of the
crown are probably so thoroughly infected
that the entire tree should be removed and
destroyed.

Insect Control
Control of elm bark beetles
is important
in preventing
the spread of
the fungus to
healthy trees.
N o r m a l l y
this is done in the spring as the leaves are
expanding because that is the time when
high numbers of the fungus-carrying beetles
emerge, although these insects can emerge
almost any time during the growing season.
Good coverage of the insecticide over
the entire tree is important to achieve effective
insect control. Methoxychlor can be applied
in early spring (March or April) for bark
beetle control.

Fungicide Injections
Injecting elm trees with fungicides for Dutch
elm disease control can be a waste of money
in many locations in Kentucky because we do
not have urban areas with community-wide
Dutch elm disease control programs.
Injections usually fail where sanitation,
pruning and insect control are not practiced.
In addition, injection is physically damaging
to the tree, because it results in wounds where discoloration and decay can occur. The major fungicide products available for injection are Alamo, Arbotec 20-S, Lignasan, Fungisol and Phyton 27. Injection should be done at the base of the tree on the root flares or into excavated root flares. Summer is the best time to make injections since the chemical will be taken up more efficiently at that time. Retreatment of already infected trees may be necessary. Homeowners should enlist the aid of an arborist who has been trained to inject for Dutch elm disease control.

**TREE REPLACEMENT**

When this disease is not detected early enough or when the above control measures fail, for whatever reason, the best advice we can give is to begin replanting substitutes for threatened American elms. In general, native elms are susceptible to Dutch elm disease; elms of European origin vary in their susceptibility; elms of Asiatic origin are resistant.


*Photo credit:*  
*Xylem discoloration under the bark, pg. 2*
  by R. Scott Cameron, International Paper, courtesy of www.forestryimages.org

---

*Revised 12-04*