NIGHTMARE on ELM-lined STREETS

Photo courtesy: Edward L. Barnard, Florida Department of Agriculture and Consumer Services, Bugwood.org

by Diana Olszowy

Once a dominant fixture on many tree-lined streets across the U.S., the American elm was dealt a blow in the 1930s that still impacts this stately species today. The first colonists in New England took notice of this native hardwood tree's qualities and brought it forth from the woods to grace their streets and towns. That idea caught on, and American elms became an integral part of many a Main Street, USA. But this popular shade tree fell on hard times when an exotic fungus entered the U.S. from Europe and devastated over three-quarters of our wild and urban elms over the last 70 years. The fungus, called Dutch Elm Disease (DED), is spread by elm bark beetles and root grafting by adjacent trees. The trees react with defense mechanisms that further constrict the flow of water and nutrients, weakening the tree and often resulting in death.

European elm bark beetle

Photo courtesy: Pest and Diseases Image Library, Bugwood.org

Our American elms were particularly susceptible to DED because of our own actions from decades ago of lining our streets with all one type of tree species. This monocultural practice contributed to the downfall of the American elm. DED, it turns out, can spread underground from the roots of one American elm tree to the roots of another. Since these trees often root graft, the fungus can pass from one tree to another in a chain reaction that would decimate a whole row along a street. But the planting of American elm trees en masse was not the sole culprit. The microscopic spores of the fungus are also transmitted from diseased trees to healthy trees by two kinds of beetles that tunnel under the bark. One is a European bark beetle, an import that preceded DED itself, and the other is our native elm bark beetle – see photos to right.

Native elm bark beetle

Photo courtesy: J.R. Baker & S.B. Bambara, North Carolina State University, Bugwood.org

Though DED caused significant casualties in its 70+ year tenure, many resistant specimens still remain in our rural and urban areas, and these elms have taken on the responsibility of repopulating their species. American elms are tremendous seed producers of wind- or water-disseminated seed, referred to as "samaras." The seed matures in the spring and is ready to germinate within only a couple of weeks and wastes no time in getting established on a site. The seedlings can easily grow 3-4 feet or more in height in the first growing season and will establish on a variety of sites, but they prefer moist, bottomland sites in partial to full sunlight.

Even though these seedlings are from DED-resistant parents, they are not 100% immune to the disease and can still succumb to the disease over a long period of time. About the time that DED arrived in the U.S. it had already devastated populations of European elm species, and geneticists were working on creating disease-resistant elm varieties that shared the American elm growth habit and the disease resistance of Asian elms. This "breeding" proved to be difficult. The results were less than desirable until "breeders" from the Elm Research Institute and the U.S. National Arboretum came up with several DED-resistant varieties with Asian elm disease resistance and more of the American elm growth characteristics.

Some of these varieties, including "Liberty," "Valley Forge," "Jefferson" and" Princeton" elms, are beginning to be produced in enough quantities that they are available for private landscapes.

Please note that DED is a continually evolving wilting disease that has no cure. Though we may not be able to completely stop it from spreading, we can slow its progress by introducing disease-resistant varieties into the mix and not allowing pure elm plantings to occur. American elm is a tenacious species, but it is in a fight for its life.

A vascular wilt fungus causes Dutch Elm Disease. This fungus is transported from diseased to healthy trees by elm bark beetles or root grafts from nearby trees. Diseased trees have wilted foliage (left image) that will lead to defoliation and eventually death of the affected branches (center image). A look under the bark of affected trees (right image) will reveal a brown discoloration of the water conducting part of the tree. For more information about Dutch Elm Disease visit www.ca.uky.edu/agcollege/plantpathology/ext_files/PPFShtml/PPFS-OR-W-2.pdf.

Photos courtesy: Right: Minnesota Department of Natural Resources Archive, Minnesota Department of Natural Resources, Bugwood.org Center: Left: Roland J. Stipes, Virginia Polytechnic Institute and State University, Bugwood.org

Tenacious American elm – 1
DED – 0

Common Diseases of Elm Trees

Elm trees are subject to several common diseases. Knowing which disease is impacting your elm tree is the first step in addressing it. The following table comes from the US Forest Service publication *How to Identify and Manage Dutch Elm Disease*; it provides an excellent symptoms comparison of three elm diseases.

Comparison of symptoms of three elm diseases.		
Dutch Elm Disease	**Elm Yellows**	**Bacterial Leaf Scorch**
Initially affects individual branches OR Affects lower crown nearest root graft	Affects the entire crown.	Damage initially observed on single branches, and spreads to entire crown; oldest leaves affected first.
Leaves wilt and turn yellow, then brown.	Leaves turn yellow and may drop early.	Leaves brown along margin, with a yellow halo.
Symptoms often observed in early summer, but may be exhibited any time of the growing season.	Symptoms visible from July to September.	Symptoms appear in summer and early fall.
Visit www.na.fs.fed.us/spfo/pubs/howtos/ht_ded/ht_ded.htm for a complete copy of How to Identify and Manage Dutch Elm Disease produced by the US Forest Service.		

About the Author:
Diana Olszowy *is Stewardship and Education Branch Manager with the Kentucky Division of Forestry. She is also an editor of the Kentucky Woodlands Magazine. Kentucky Division of Forestry, 627 Comanche Trail, Frankfort, KY 40601; Phone: 502.564.4496; Fax: 502.564.6553; E-mail: diana.olszowy@ky.gov*