



## Elm Diseases

Informational table showing disease name, symptoms, pathogen/cause, and management of Elm diseases.

 ARTICLES | UPDATED: JULY 31, 2016



Disease	Symptoms	Pathogen/Cause	Management
Black leaf spot	Small, black, slightly raised, rough spots form on leaves. Leaves yellow and fall prematurely.	<i>Stegophora ulmea</i> (formerly <i>Gnomonia ulmea</i> )	No control is recommended for trees in the landscape.
Botryodiplodia canker	Cankers form on twigs and branches. The junction of cankered and healthy wood is sharply defined under the bark where reddish-brown, infected	<i>Botryodiplodia</i>	Irrigate to prevent drought stress. Prune infected

	wood meets white, healthy wood. Leaves on infected branches turn bright yellow and fall without wilting. (Compare to Dutch elm disease and phloem necrosis below.) In the autumn, fungal fruiting structures roughen the bark of infected twigs.		branches well below the canker. Disinfest pruning tools frequently.
Dutch elm disease	Leaves on one or more branches wilt, yellow, and fall prematurely. Progressively more branches exhibit symptoms. Outer layers of sapwood of affected branches have brown streaks.	<i>Ophiostoma ulmi</i>	See details below. Grow resistant cultivars.

**Management of Dutch elm disease: Remove severely infected trees promptly. Peel the bark off the stump to below the soil line. Promptly burn or bury all wood greater than 1/2" in diameter or larger because bark beetle larvae can live there.**

**If less than 5 percent of the crown of a tree exhibits symptoms, find the lowest point of vascular streaking and prune the branch at least 12 feet below that point. Inject a fungicide. Maintain good elm bark beetle control.**

**Treating unwanted elms with cacodylic acid (an herbicide; by a licensed professional arborist) has been found to kill elms and make them very attractive to elm bark beetles, which carry the fungus, but brood production in those trees is greatly suppressed. Thus, the number of infested elm bark beetles is reduced in the area.**

**Dutch elm disease-resistant cultivars: Accolade, Cathedral, Discovery, Dynasty, Frontier, Homestead, Independence, Jefferson, Morton Glossy, Morton Plainsman, Morton Stalwart, New Harmony, New Horizon, Ohio, Pathfinder, Patriot, Pioneer, Princeton, Prospector, Regal, Sapporo Autumn Gold, Urban, and Valley Forge.**

Disease	Symptoms	Pathogen/Cause	Management
Ganoderma root rot	Very distinctive shelf-like fruiting structures form annually on the wood singly or in overlapping clusters. They	<i>Ganoderma lucidum</i>	A tree with fungal fruiting

	<p>are brown to reddish brown on top with a cream to white margin. Shelves may become 14 inches across. The upper surface may appear to have been varnished. Branches and eventually the entire tree die as the root rotting progresses.</p>		<p>structures on the trunk, butt, or roots should be removed promptly if it is in a location where property damage may occur or where people or pets could be struck by falling limbs or the falling tree.</p>
<p>Inonotus root rot</p>	<p>Root and butt rot may cause trees to topple before any obvious symptoms are noted. Infected trees often have branch dieback and fewer than normal leaves that are yellowed. Although the root rot begins well out on the root system, the fungus eventually reaches the butt of the tree where it forms large, tough, irregularly shaped, light-brown to dark-brown shelves at or just above the soil line. With age, these become very rough and dark brown to black. Cutting the shelf reveals a reddish-brown center. The underside of the shelf is brown with millions of tiny pores in which the spores are formed.</p>	<p><i>Inonotus dryadeus</i> (formerly <i>Polyporus dryadeus</i>)</p>	<p>A sure sign of severe damage to the tree is the presence of the fruiting structures. Infected trees should be removed immediately.</p>
<p>Laetiporus</p>	<p>Massive clusters of bright sulfur-</p>	<p><i>Laetiporus</i></p>	<p>Fruiting</p>

<p>root rot</p>	<p>yellow to salmon to bright-orange, shelf-like fruiting structures that turn white with age initially form in the summer or autumn on the wood of the tree but fall off during the winter. The underside of the fruiting structure has tiny pores in which the spores are formed. New shelves form on the wood the following summer and autumn. The bark where the fruiting structure forms is slightly depressed and cracked.</p>	<p><i>sulfureus</i> (formerly <i>Polyporus sulfureus</i>)</p>	<p>structures form long after most of the damage has been done. Infected trees are very prone to wind breakage even before the fungus begins to form fruiting structures and should be removed at the first sign of infection.</p>
<p>Leaf scorch</p>	<p>Early to midsummer, leaves on a few branches have a marginal leaf burn or scorch. Symptoms increase on the leaves later in the summer. The line marking the boundary between dead and living tissue is wavy and has a definite yellow halo. Leaves usually fall prematurely. More branches become involved in following years.</p>	<p><i>Xylella fastidiosa</i></p>	<p>Leafhoppers and spittle bugs carry the bacteria from tree to tree. Infected trees are very attractive to elm bark beetles, which may be carrying the Dutch elm disease fungus.</p>

Wetwood	Foul smelling liquid oozing from branch stubs, pruning cuts, or cracks in the bark runs down the trunk and leaves gray streaks. Bark and turf where the ooze lands may be killed. Affected wood within the tree has a water-soaked appearance but is rarely rotted.	Many bacteria	Wetwood does no apparent damage to the tree unless the tree comes under some other severe stress. Protect the tree from stresses such as soil compaction, excavation, or drought. Avoid wounding the tree in any way. Do not insert pipes to relieve pressure.
Elm yellows (Phloem necrosis)	Leaves yellow and wilt over the entire crown of the tree and fall prematurely in summer. Trees may die within 1 year. Roots are killed early in disease development. The inner bark (phloem) and the outer most layer of xylem (water-conducting tissue) is yellow or butterscotch in color and has a definite oil of wintergreen odor if held close to the nose immediately after cutting. If a piece of the discolored bark is placed in a tightly sealed jar, the wintergreen smell will	<i>Phytoplasmas</i>	Leafhoppers and spittlebugs feeding on the phloem of elms move the phytoplasmas from tree to tree. Remove infected trees. Infected trees

intensify. The dead phloem becomes very dark brown.

are very attractive to elm bark beetles, which may be carrying the Dutch elm disease fungus.



Elm bark beetle and galleries associated with Dutch elm disease.



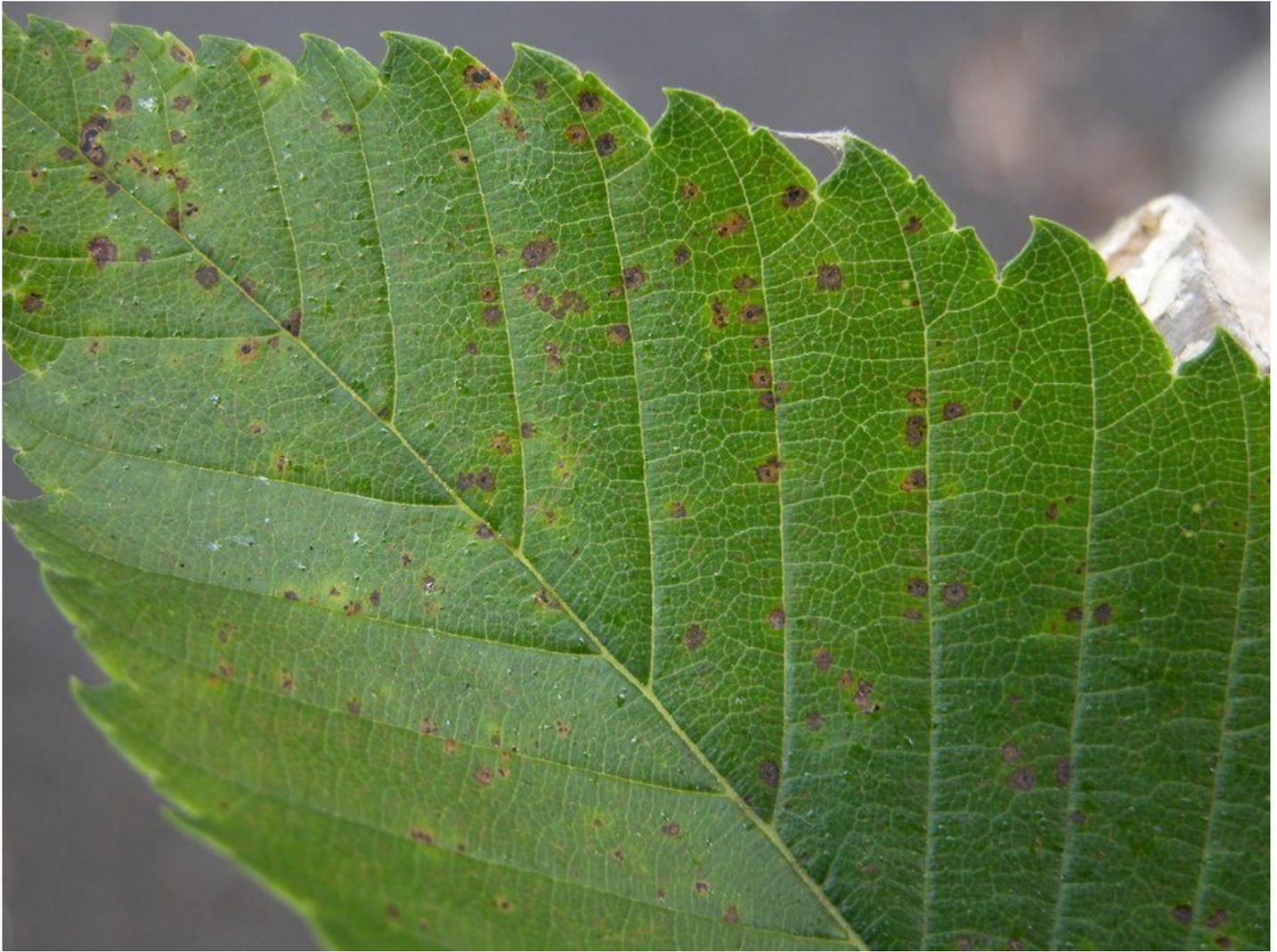
Dutch elm disease.



Dutch elm disease symptoms in xylem.



Wetwood ooze on trunk.



Black leaf spot.



Elm yellows - most leaves of canopy turn yellow at once.



Elm yellows sometimes causes butterscotch yellowing of phloem.

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