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# oak wilt

## in Virginia



**Oak Wilt — Mid-Season Symptoms**

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Circular 621

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Agricultural Extension Service  
Virginia Polytechnic Institute  
Blacksburg, Virginia

# Oak Wilt in Virginia

by

*The Department of Plant Pathology and Physiology*

Oak wilt is a destructive fungus disease of oak trees. It was first recognized as an important disease in Wisconsin about 1940 and was described by plant pathologists in 1942. The exact time, place, and manner of its origin is unknown. Since 1940, oak wilt has been found in 18 states east of the great plains and is continuing to spread.

All native species of oak are susceptible to oak wilt and American and Chinese chestnuts and chinquapin may also be attacked. Trees of the red-oak group are more frequently infected than those of the white-oak group and are killed more quickly. In some cases white oaks may appear to recover, but such trees serve as symptomless reservoirs of the disease.

Oak wilt spreads more slowly than chestnut blight. However, new infection centers are frequently found which are thought to be initiated by insects carrying the pathogen from distant infected trees. Oak wilt in Virginia at present has caused only minor losses, but the

Tab

**Oak Wilt Infection Centers**  
(On private land unless

County	1951	1952	1953	1954	19
Rockingham.....					
Frederick.....					
Shenandoah.....					
Washington.....				1	
Bath.....			8	3	
Highland.....			3	3	
Augusta.....	1				
Scott.....					
Warren.....			1		
Page.....					
Botetourt.....					
Lee.....					
Wise.....			1		
Allegheny.....					
Smyth.....					
Rockbridge.....					
<b>Total</b>					
(16 Counties) ...	1 <sup>1</sup>	0	13 <sup>2</sup>	7	1

Note:

<sup>1</sup>On U. S. Forest Service land west of Churchville, Va.

<sup>2</sup>1 on Shenandoah National Park (Warren Co.); 2 on George Washington National Forest (Bath and Highland Counties).

<sup>3</sup>3 on George Washington National Forest (1 Frederick Co.; 1 Rockingham Co.; 1 Highland County). National Forest crews also treated 2 spots on adjacent private lands.

destructive nature of the disease and a knowledge of severe losses which have occurred in other areas justifies its being considered the number one disease threat to our hardwood forests. Since the discovery of the disease in Augusta County in 1951, oak wilt has spread to 15 additional counties. (See Table 1).

**When to Look for Oak Wilt** — Oak wilt foliage symptoms are most conspicuous from mid-June to mid-July, but some trees may develop symptoms as early as May. Diseased trees can usually be spotted readily until the normal autumn foliage colors begin to develop.

### SYMPTOMS

**Red Oaks** — In species belonging to the red-oak and black-oak groups, foliage symptoms appear first in the upper part of the tree and at the ends of the lateral branches, progressing rapidly downward and inward over the entire crown within a few weeks. The leaves first become dull or pale green, curl upward, and usually become yellow to bronze before falling from the tree (See cover page and Figure 1). Defoliation may be slight, with dead leaves remaining on the tree for some time, or nearly complete, in which case the trees are conspicuous

e 1

ers in Virginia 1951-1960  
indicated by footnote)

55	1956	1957	1958	1959	1960	Total
4	13	5	14	9	49	94
8	5	5	12	5	7	42
2	8	4	6	8	13	41
1	...	...	11	2	2	17
1	1	1	...	...	9	23
3	2	1	...	...	...	12
	2	2	2	1	68	76
	...	1	2	1	1	5
	...	2	...	...	2	5
	1	...	1	1	0	3
	...	...	...	2	2	4
	...	...	1	1	0	2
	...	...	...	1	0	2
	...	...	1	...	11	12
	...	...	...	1	0	1
	...	...	...	...	2	2
9 <sup>3</sup>	92 <sup>4</sup>	21 <sup>5</sup>	50	32 <sup>6</sup>	166 <sup>7</sup>	341

<sup>4</sup> 1 on George Washington National Forest (Benson Run, Highland Co.).

<sup>5</sup> 1 on George Washington National Forest (Zepp, Shenandoah Co.); 1 on George Washington National Forest (Williamsville, Bath Co.).

<sup>6</sup> 1 on Jefferson National Forest (Big Stone Gap, Wise Co.); 1 on George Washington National Forest (Zepp, Shenandoah Co.).

<sup>7</sup> 106 on George Washington National Forest; 64 in Augusta Co.; 23 in Rockingham Co.; 9 in Alleghany Co.; 9 in Bath Co.; 1 in Shenandoah Co.



**Figure 1.—Oak wilt — early spring no leaf symptoms.**

because of the scarcity of foliage. In some cases, as the original set of leaves die, sucker growth in the form of dense clusters of large leaves form on the trunk and larger branches. This new growth, however, soon withers and dies.

Often one or more branches on a diseased tree remain green for some time after the leaves on the other branches are completely discolored. This progressive development of symptoms helps to distinguish wilt-diseased trees from most of those struck by lightning or damaged from some cause other than oak wilt. Some trees infected late in the season may produce leaves the following spring only to develop symptoms and die later.

**White Oaks** — Leaf symptoms often are localized and confined to individual branches on trees of the white-oak group. Some branches may remain uninfected and normal in appearance throughout the season. The leaves on diseased branches wither and die and tend to remain attached, resulting in minor leaf fall. The killing of individual branches over a period of several years may result in stag-heading.

**Internal Symptoms** — A brown to black streaking in the outer sap wood just beneath the bark is often present in twigs and branches of trees infected with oak wilt. This discoloration in the sap wood is readily seen in cut sections of diseased stems (See Figure 2).

**Other Diseases May be Confused with Oak Wilt** — There are a number of other causes of wilting, browning, and death of oak leaves and streaking in the wood.



**Figure 2.—Oak wilt infected twigs showing sapwood streaking often found associated with the disease.**

Usually, however, these troubles do not develop as rapidly as oak wilt and do not often affect the entire crown. Diagnosis of oak wilt in localities from which the disease has not previously been recorded should be verified by laboratory tests.

**How to Collect Specimens for Laboratory Diagnosis —** Specimens from suspected trees should be collected from wilting or recently wilted parts of the tree and sent immediately to the laboratory. Branch samples should consist of six or more sticks, each about six inches long and from  $\frac{1}{2}$  to  $\frac{3}{4}$  inches in diameter. As far as possible, the sample sticks should be taken from different affected areas in the crown of the tree to increase the chances of finding the causal fungus. The wood should still be green or just recently killed and not dry. It is usually impossible to obtain the oak wilt fungus from dead or dry wood. Do not send leaves, small dead twigs, dead branches, or decayed wood or bark to the laboratory. In cases where suspected trees are almost dead, slab samples may be taken from the trunks at a convenient height. Such samples should be at least 4 inches wide, 6 inches long, and about 1 inch thick to give the best chance for successful isolation of the fungus. All samples should be wrapped in plastic or wax paper and mailed immediately to the Division of Forest Insect and Disease Investigations, Virginia Forest Service, Box 3347, Charlottesville, Virginia or to the Plant Disease Clinic, V.P.I., Blacksburg, Virginia.

## CONTROL

Satisfactory control measures for oak wilt have not yet been worked out. Certain measures, however, can be taken that will delay the local spread of the disease and which might eliminate the wilt fungus from the area for the time being. If a control program is to be successful, it must be started immediately on finding a wilt affected tree. The control measures consist of destroying or rendering non-infectious the fungus in the diseased tree and those trees that may have been exposed to infection.

In some states it has been found very effective to kill diseased trees and surrounding trees by girdling the trunk to the heartwood (deep girdling) (Fig. 3) and then allowing them to stand and dry out rapidly. This method has been found most effective when used in June, July, and early August, especially if the trees can be found and treated soon after they begin to show symptoms. If this treatment is delayed until after the middle of August, some of the benefit of the girdle is lost and a large percentage of such trees may produce fungus mats and thus serve as a source of infection. The deep girdling procedure is simple, relatively inexpensive, promptly applicable and well adapted to most areas. This new method appears to be as effective as the more complicated practice of cutting and destroying the trees. Virginia recommendations call for a girdle at stump height with



Figure 3.—An oak wilt tree girdled to the heart wood with the bark removed below the girdle.

a power saw and a shallow hack girdle at the ground line without peeling.

The oak wilt fungus may be transmitted by sap beetles and other insects that frequent freshly wounded trees. For this reason woodland owners should conduct their felling and skidding operations in such a way as to avoid bruising and barking the remaining trees. Any opening in the bark may render the tree liable to infection. Shade trees should not be pruned during the spring and early summer when the sap flow is heavy. All pruning wounds should be treated with a suitable tree paint.



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Pictures on the cover page and Figures 1 and 2 were provided by the National Oak Flooring Manufacturers Association, and Figure 3 by the University of West Virginia.

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