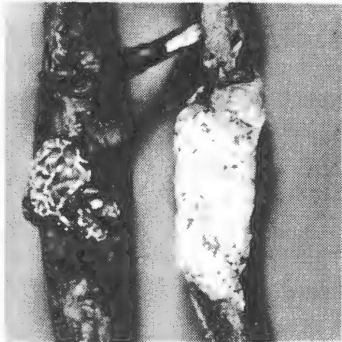


# Forest Tree Diseases of Virginia

January 1972

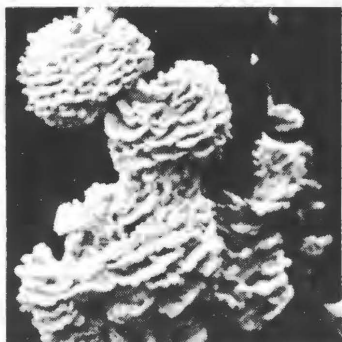
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**RUST**



**DECLINE**



**DECAY**



**CANKER**

## Oak Decline

by

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Oak is the most important hardwood species found on the North American continent. In Virginia, 53.2 percent of the growing stock is oak and the red oak species (red, black, scarlet, pin, cherrybark, and shumard) comprise about 44 percent of the oak population.

During the past few decades oaks throughout the mountainous sections of the eastern United States have been declining and dying at alarming rates. This loss of oaks has been termed oak decline, oak dieback, or oak mortality. Some confusion has developed over these various descriptive terms but all define the same problem.



Figure 1. Initial stages of oak decline--thin foliage, and twig dieback.

The overall impact of this disease of oak on our forests is undetermined, however, some specific facts are available concerning the areas affected:

1. The mortality problem is defined as involving 5 percent (more commonly 20-50 percent) of the oaks in a unit area in a given year.
2. Heavy losses within the red oak group have occurred on nearly 200,000 acres in one northeastern state since 1953.
3. Losses of saw timber in severely affected stands have ranged from 3,000 to 7,000 board feet per acre.
4. Many pole sized stands have been severely affected with 300 or more oaks dying per acre.
5. Mortality areas range from 30 to 15,000 acres.

Recent surveys in Virginia suggested that oak decline is to be considered the most devastating disease since the days of the chestnut blight epidemic. Extensive mortality is present in varying degrees of intensity over approximately 104,000 acres on the George Washington National Forest and at least 5,900 acres of scarlet oaks are affected on the Jefferson National Forest.

Areas of mortality on the George Washington National Forest range in size from 150 to 6,000 acres. Decline areas on the Jefferson National Forest ranged in size from 280-1,200 acres.



Figure 2. Intermediate stages of oak decline--stagheading or death of large branches, water sprouts on main stem, and premature fall coloration.

Range:

Declining oaks can be found in hardwood forests from New York to southwestern Virginia. Although the disease is evident on all sites, severe mortality of scarlet oak (Quercus coccinea) is usually confined to poor ridge sites or areas of shale-derived soil where extreme soil moisture deficits are prolonged.

Suspects:

Oak decline affects species of the red oak group (scarlet, pin, red and black oak) more so than those of the white oak group (white, chestnut, swamp white oak). Nearly three-fourths of the trees affected have been in the red oak group although reports of mortality of white oak have recently been recorded.

Symptoms:

Oak decline is characterized by a slow progression of symptoms involving decline or loss of vigor, dieback and mortality. Affected trees may exhibit thin, chlorotic foliage, reduced growth, and twig dieback during the early stages of decline (Figure 1). Trees in intermediate stages of decline exhibit branch dieback, production of a few water sprouts on the main stem, leaf wilt, browning, and premature leaf coloration in the fall (Figure 2). Advanced stages of decline involve the prolific production of water sprouts, the wilt and death of these, death of the cambium and roots, and eventual mortality of the entire tree (Figure 3). The declining trees are rapidly attacked by various decay fungi and fruiting bodies of these fungi are quite common on the basal portions of dying trees. All stages of oak decline are



Figure 3. Advanced stages of oak decline--affected trees have dead crowns, a few water sprouts persist, and the weakened tree is susceptible to attack by beetles and decay fungi.

usually found in any specific area and older trees appear to be more severely affected than younger, more vigorous individuals. Affected trees show a marked reduction in annual growth during all stages of the decline.

Cause:

Decline of oak is caused by several factors that lead to the depletion of food reserves (carbohydrates). Any agent causing a decrease in the production of starch (i.e. destruction of photosynthetic or food making capacity) will lead to decline and death of affected trees. Affected trees usually re-leaf after initial defoliation by frost or insects and this in turn causes a further depletion of food reserves. Annual recurrence of contributing factors eventually will place the tree in such a weakened condition that secondary agents can readily attack the tree and result in further deterioration. If these processes continue, death of the entire tree follows.

The primary agents responsible for this depletion of carbohydrate reserves are insect defoliation, late spring frost, and/or mid- to late-summer droughts accompanied by unfavorable soil conditions. Trees weakened by these agents are then subject to attack by wood borers and root rot fungi.

Control:

Since oak decline is caused by many factors of the environment no specific control recommendations can be made. In areas where severe insect defoliation was the leading causal factor, aerial spraying with insecticides has alleviated the decline. However, spraying is costly and should be done where oak quantity and quality is high. Before aerial spraying is conducted, contact must be made with the local County Extension or District Forest office to obtain the necessary state and federal regulations.

In areas where oak decline is severe, the red oak group should not be favored in timber management programs. This is particularly true in areas with high scarlet oak populations.

Prompt clear cut and/or salvage operations are recommended in severe decline areas as affected trees soon deteriorate beyond the worth of good fireplace wood.

#### KEYS TO PROPER USE OF PESTICIDES

1. Read the label on each pesticide container before each use. Follow instructions to the letter; heed all cautions and warnings, and note precautions about residues.
2. Keep pesticides in the containers in which you bought them. Put them where children or animals cannot get to them, preferably under lock and away from food, feed, seed, or other material that may become harmful if contaminated.
3. Dispose of empty containers in the manner specified on the label. If disposal instructions are not printed on the label, burn the containers where smoke will not be a hazard, or bury them at least 18" deep in a place where water supplies will not be contaminated.

SEE YOUR DOCTOR IF SYMPTOMS OF ILLNESS OCCUR DURING OR AFTER USE OF PESTICIDES.