Eutypella Canker of Maple

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Eutypella canker was first discovered in the Lake States on sugar and red maples in 1935. In 1938, a fungus, *Eutypella parasitica* Davidson and Lorenz, was found to be the causal agent of the canker. Information on the prevalence, distribution, and description of the cankers was also published at that time.

Hosts and Distribution

Except for one report on fire cherry in Quebec, Canada, Eutypella cankers have been observed only on maples. The disease affects sugar maple more than other maple species, but cankers have been found on red, Norway, silver, black, and sycamore maple and boxelder.

The disease is distributed throughout the northern half of the range of sugar maple. It is commonly found from Minnesota eastward to Maine and Pennsylvania and throughout the Canadian Provinces of Ontario and Quebec.

Symptoms and Signs

The first indication that a maple may be infected by *E. parasitica* is a callus around an infection point, usually a branch stub but sometimes a wound. Killing of tissue by the fungus produces a sunken area in the center of the callus. As the fungus grows the sunken area expands outward, usually to a greater extent vertically. Broad, slightly raised rings of callus tissue may cause a wavy or convoluted appearance on portions of the canker face. In subsequent years cankers assume a characteristic hump shape resulting from the tree's growth response to invasion by the fungus (fig. 1). Viewed from the back, cankered areas commonly resemble the expanded hood of a cobra about to strike. Cankers generally follow the outline of the original wound. Ten-foot-long cankers have been associated with 10-foot-long frost cracks.

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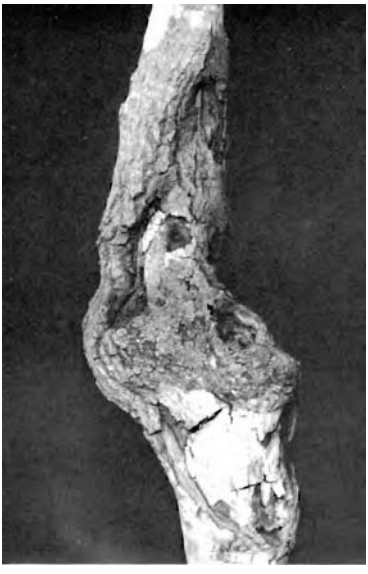

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Figure 1.—Eutypella canker on sapling sugar maple showing distorted tree growth. Notice how bark remains attached to dead canker face.

Because of extensive mycelial development throughout the bark, dead bark remains firmly attached to the canker face for many years. This is unlike many other fungus-caused cankers. The bark covering canker faces is generally dry and flinty. Cutting into the callus at the canker margin reveals characteristic white to yellowish mycelial fans (fig. 2). As the dead bark cracks and sloughs off, dark outlines of old mycelial fans may be seen.

In addition to the slowly developing, hump-shaped cankers, a rapidly developing, diffuse type of canker may occur on young maples less than 1 inch in diameter. These cankers generally girdle the stems within a year or two. The presence of mycelial fans under the bark may be the only indication that such cankers were caused by *E. parasitica.*

Water sprouts frequently grow below the cankers on trees that have been almost or completely girdled.

On many older cankers, fungal fruiting bodies erupt from the bark giving it a blackened, sooty

Figure 2.—The outer bark has been removed from a canker to show the mycelial fans (arrows) present at the canker margin. (Photo courtesy of J. T. Kliejunas and R. F. Patton, Department of Plant Pathology, University of Wisconsin.)

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Figure 3.—Fruiting bodies that have erupted through the bark. At left center, the outer bark has been removed to show a number of locules containing Eutypella ascospores.

appearance (fig. 3). Generally, these fruiting bodies do not develop nearer than the fourth callus ring from the canker margin. On many cankers they are confined to only a small central portion of the canker. The perithecial fruiting bodies and their protruding black necks can readily be seen though a hand lens.

Infection and Development

Eutypella parasitica generally enters a tree through a branch stub (or possibly a dead branch). However, bark-penetrating wounds caused by logging, wind and ice damage, sunscald, frost cracks, and rodent feeding may also be infected. Many cankers occur in maple stands a few years after the stands have been heavily thinned, suggesting epicormic sprouts may be an infection court. Some Norway maples planted along streets become infected through mechanical injuries to the lower stem or improperly pruned branches.

Branch stubs or wounds become infected by spores produced in the flask-shaped perithecial fruiting bodies in the bark (fig. 4). The spores are ejected from the perithecia into the air during and immediately following rainstorms. A moist branch stub (or possibly a dead branch) or wound

Figure 4.—A cross-section of bark showing the location of the perithecial fruiting bodies. Notice the prominent upper portions of the perithecia that protrude from the bark. The arrows show two of the channels that connect subsurface spore cavities to the surface. (Photo courtesy of J. T. Kliejunas and R. F. Patton, Department of Plant Pathology, University of Wisconsin.)

is required for infection. Spores that land on a suitable infection court germinate and begin producing mycelia within 10 hours at 28° C. (82° F.). After the fungus becomes established, it grows primarily in the bark but also to a limited extent in the wood. Growth of the fungus advances faster vertically than laterally in the stem and may extend one-half inch or more annually. *E. parasitica* continues to grow during the fall and winter when the tree is dormant but is checked by formation of host callus tissue during the growing season.

Damage

The incidence of Eutypella canker in maple stands generally is low. Usually the disease is restricted to 2 to 4 percent of the sugar maples in a stand.

The disease primarily affects small trees ranging from sapling size to small sawtimber (fig. 5). Occasionally, cankers are found on large trees. Many trees 3 inches in diameter or smaller are killed, but larger trees, bearing gigantic cankers reaching 5 feet or more in length, may live for years (fig. 6). Most trees have only one trunk canker but occasional ones may have branch cankers or two trunk cankers.

Cankers usually occur within 16 feet of the ground—the most valuable portion of the stem. A dark brown discoloration occurs in the wood above and below the canker. Decay organisms commonly enter the wood through the cankers. Trees that have old cankers may eventually break at the canker.

Control

There is no effective method known for control of Eutypella canker. Because cankered trees that bear fruiting bodies are easily identifiable, they can be marked and removed during forest stand improvement operations. Removing such trees will reduce the supply of spores and should ultimately reduce the incidence of this disease. Killing cankered trees by felling or me-

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Figure 5.—Small sugar maple killed by a Eutypella infection. Notice how canker has developed at the point where a lateral branch originated.

chanical or chemical girdling will not prevent spore discharge. Fruiting bodies on cankers on such dead trees can produce viable spores for 2 or more years if allowed to remain in the forest.

On high-value ornamental and shade tree maples, it is possible to cut the fungus from the tree, particularly in the early stages of infection and if the tree is small. This is done by mechanically removing the bark 1 to 2 inches back from the canker margin and covering the exposed wood with a tree wound dressing.

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Figure 6.—A canker on a sawtimber-sized sugar maple.

References

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