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Sweetgum Blight

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Sweetgum blight is a major disorder of one of our most important timber and shade trees (*Liquidambar styraciflua* L.). It was first observed in 1948 in Maryland; by 1951 many shade, ornamental, and forest trees were dead or severely affected. Within the next few years the decline was observed throughout the range of sweetgum. A survey in 1954 of the coastal States from Delaware to Louisiana showed that 36 percent of the trees sampled had the disease, with 40 percent of the total board-foot volume affected. The disease was found on a wide variety of sites, but was twice as prevalent on upland as on bottom-land sites.

Extensive studies in bottom-land forests of Mississippi, where sweetgum is one of the major timber species, showed that between 1952 and 1957 the number of blighted trees increased 4 to 5 percent each year; 1 to 13 percent of the trees under observation died annually. A survey of Louisiana in 1953 and 1954 showed that 5 percent of the sweetgum trees 5 inches d.b.h. and larger had serious blight.

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Blight has been most severe in trees of pole or saw-log size—in some stands it has virtually eliminated merchantable sweetgum (fig. 1).

Symptoms

The first visible indication of blight appears in late summer, when the leaves on some branches or twigs develop fall coloration much earlier than usual. The following year portions of the crown may be dead or may show a thinning of the foliage as some buds fail to open and others produce dwarfed, yellowish leaves. The ends of the affected branches gradually die, often retaining the dead leaves for some time. Declining branches may show up in any part of the crown, but are most common toward the top (fig. 2). Occasionally, a tree with only a few branches affected one year dies the next. Usually, however, the upper branches and leaders die back gradually—a branch or two a year. Sometimes dieback is arrested and the tree appears healthy except for the dead top.

A cut into the wood of diseased branches often reveals irregular tan or dark brown streaks in the white sapwood. On diseased trees an abnormally high percentage of the fine feeder roots are dead, although the larger roots appear normal (fig. 3).

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Figure 1.—A badly diseased sweetgum stand.

Cause

The dying of the tops probably results from the death of the fine feeder roots. What causes the roots to die is less apparent. Thousands of isolations have been attempted from roots of blighted sweetgum in Maryland and Mississippi, but no fungus, bacterium, or nematode has been found consistently associated with root dying. Bark-patch grafting experiments, started in 1952, gave no indication of a transmissible virus.

Since no living organism or infective principle could be found as the cause of blight, a search was made for some environmental cause. In studies in the Mississippi River floodplain, blight was found to be most prevalent on the poorly drained slack-water soils; it was least troublesome on the better-drained natural levees, where sweetgum reaches its best develop-

ment as a timber tree. The soils on which blight was most severe have high imbibitional water capacity and high contents of potassium and sodium—properties that tend to limit the amount of water available to tree roots. Until similar studies are made in other areas, however, it is not certain that the same soil properties are associated with blight outside the Mississippi River floodplain.

During the period of destructive blight, i.e., since 1950, wide areas in the South underwent a serious and prolonged drought. During the drought similar dieback and mortality occurred in other hardwood species—particularly in elm, cottonwood, and willow—over large areas of eastern United States. This strengthens the assumption that moisture shortages are the primary cause of sweetgum blight. Moreover, extensive drainage of swampy land and other such activities of man, in conjunction with rainfall deficiency, have tremendously lowered water tables in many areas where sweetgum blight occurs.

It seems probable that the factors reducing available water result in important root dying in sweetgum only during serious droughts, or when lesser droughts are aggravated by excessive soil drainage by artificial means. In years when weather is favorable, sweetgum can grow on many kinds of soils, including upland pine sites; during droughts it apparently recedes from less favorable sites more quickly than do many other tree species.

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Figure 2.—Sweetgum in a 30-year-old stand. Compare the sparse, dwarfed upper crown of the diseased tree on the right with that of the adjacent healthy tree.

Control

No control is known. In managed forests, sweetgum trees with 10 percent or more of the fine branches dead or gone should be considered for salvage cutting unless there is good evidence that dieback has stopped.

Sweetgum should not be favored for sawtimber on heavy, slack-water, bottom-land soils and on most rolling upland soils (except on the Loessial Bluffs). It can be grown on such soils for pulpwood, posts, and similar small products.

Eventually, methods may be devised for managing forests so as to conserve moisture during droughts—as by changes in cutting methods, control of ground cover, or other practices. This would permit growing sweetgum on a wider variety of sites with greater assurance that it will reach saw-log size.

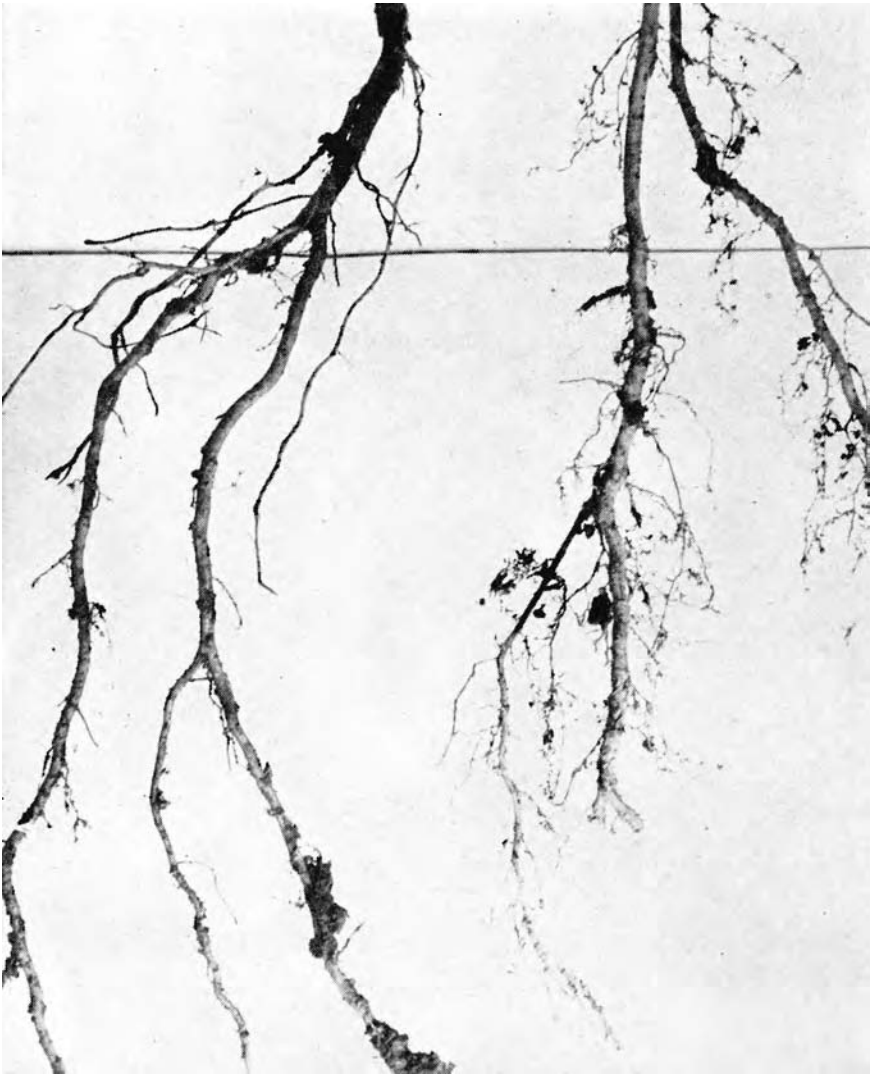

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Figure 3.—The roots on the left are from a blighted sweetgum; those on the right are from a healthy one. Note the lack of fine roots on the sample from the diseased gum.

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