Needle Cast of Southern Pines

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"Needle cast" is the collective name given to diseases caused by several fungi. These diseases result in dieback of pine needles, often followed by premature shedding or "casting." The causal fungi are always confined to the needles, but trees of any size may be infected. Needle cast is more abundant in some years than in others, depending upon predisposing weather conditions, chiefly precipitation. Needle cast of southern pines is economically important because, although the trees recover between attacks and the effects on growth appear to be slight, the infected trees are weakened and are therefore more susceptible to other diseases. Diseased trees frequently occur intermingled with healthy ones of the same species.

Needle diseases caused by rust fungi and the brown-spot disease as it affects longleaf pine are not discussed in this leaflet.

Hosts

Eastern white, loblolly, longleaf, pitch, pond, shortleaf, slash, Table-Mountain, and Virginia pines are subject to infection by one or more fungi that cause needle blights or needle casts.

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Symptoms

Affected trees have a scorched appearance because the infected needles usually turn brown from the tip toward the base. The partly dead needles are shed earlier than normal, or, if they remain attached to the twigs, their tips weather and break off. The foliage of infected pines sometimes presents a tufted appearance because only current needles remain attached. New foliage emerging on new shoot tissue in the spring gives such trees a normal appearance again.

Cause

Needle cast fungi have small, black, elongate to elliptical, fruiting bodies known as hysterothecia. They are best seen with a hand magnifier. Mature hysterothecia open during moist weather to discharge spores by means of a central lengthwise slit. The spores are carried by wind and rain and infect other needles.

Much of the needle browning that is prevalent on southern hard pines in the spring is caused by *Hypoderma lethale*; longleaf pine, however, does not appear to be susceptible to this fungus. Current needles are infected early in the summer. Late in the following winter and early spring before new needle growth begins, the infected needles turn brown starting from their tips.

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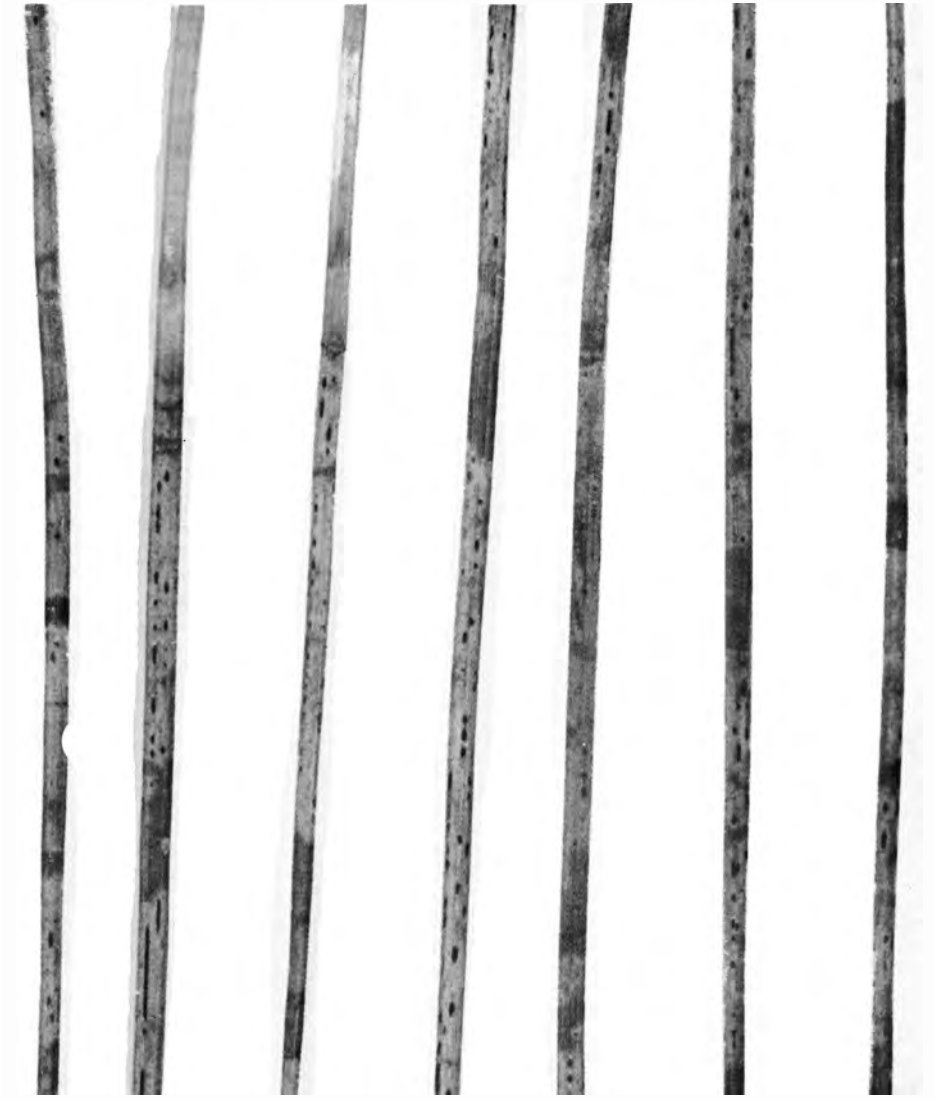

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Figure 1.—Needles of slash pine infected by *Hypoderma lethale*. Notice the mottled appearance and the fungus hysterothecia in the zones of infection.

The dying needle or needle tip has a mottled appearance because the tissue at the scattered points of infection dies first (fig. 1). Needles in various stages of dieback are often shed prematurely. The fruiting bodies of *H. lethale* are shiny black, long, and narrow (fig. 2, *A*).

The habits of a similar fungus, *Hypoderma hedgcockii*, are strikingly different in that the hysterothecia occur on green needles which turn yellowish throughout their lengths and are shed prematurely. Southern hard pines, especially slash, are attacked, but this disease

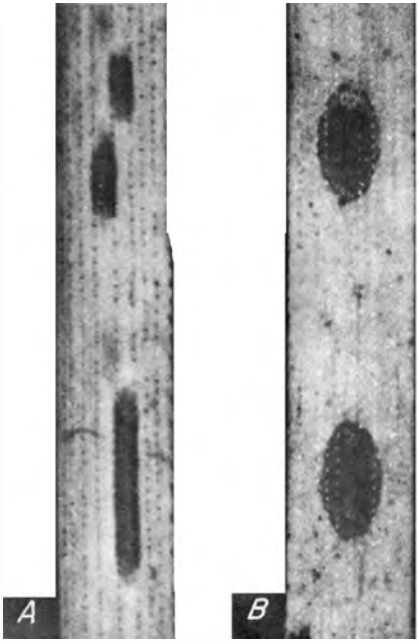

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Figure 2.—Fungus fruiting on pine needles: *A*, Hysterothecia of *Hypoderma lethale*; *B*, Hysterothecia of *Lophodermium pinastri*.

is much less commonly observed than the needle dieback caused by *H. lethale*. *H. hedgcockii* fruiting bodies are shiny black and elliptical.

Lophodermium pinastri is commonly found on dead needles and dead tips of living needles of all pine species growing in the South. It is, at the most, a weak pathogen, developing either on senescent or dead pine foliage. Its hysterothecia are black and elliptical (fig. 2, *B*).

Bifusella linearis attacks only eastern white pine. Commonly only the 2- and 3-year-old needles—seldom those of the current season—exhibit symptoms. This fungus causes needle dieback and defoliation, but the effects are usually confined to seedlings and saplings and the lower crowns of larger trees. The black fruiting bodies vary in length up to one-fourth inch or more. They, in turn, are embedded in a very conspicuous black, crusty material that may extend the length of the needle.

Scirrhia acicola, which causes the well-known brown-spot disease on needles of longleaf pine seedlings, also attacks the foliage of loblolly pines of all sizes, causing needle dieback. Strictly speaking, *S. acicola* is not one of the needle cast fungi. It is included here because of the similarity of needles infected by it to those infected by *Hypoderma lethale* in the early stages of dieback. There is one important difference, however. Current needles infected by *S. acicola* may die back in the fall and early winter as well as in the spring, whereas needles infected by *H. lethale* first show tip browning in late winter and early spring. It is not uncommon to find infections by both fungi on the same loblolly pine. The gray to black fruiting bodies of *S. acicola* discharge spores through lengthwise slits at the edges, rather than by a well-defined, central slit typical of the true needle cast fungi.

Damage

The amount of foliage dieback caused by needle cast fungi varies from year to year on individual trees. Except in the case of the brown-spot disease on longleaf pine seedlings, tree mortality directly attributable to these needle fungi has not been observed. It is probable that some reduction in rate of growth results from severe attacks, particularly in the case of seedlings and smaller trees, and heavy attacks could predispose trees to bark beetle attack.

Since pines seldom turn brown before late winter as a result of needle cast, and since they put out new foliage the following spring, severe damage as a direct result of needle cast seldom results.

Control

Experimental control with fungicidal sprays has been reported for

some of the needle casts of southern pines. However, these control measures are too expensive to justify in forest stands and are not recommended. Control is usually not necessary.

References

FOREST PATHOLOGY. JOHN SHAW BOYCE. Ed., 2, 550 p., illus., New York. 1948.

LOPHODERMIUM PINASTRI AND NEEDLE BROWNING OF SOUTHERN PINES. JOHN S. BOYCE, JR. J. Forest. 49: 20–24. 1951.

HYPODERMA NEEDLE BLIGHT OF SOUTHERN PINES. JOHN S. BOYCE, JR. J. Forest. 52: 496–498. 1954.

THE HYPODERMATACEAE OF CONIFERS. GRANT DOOKS DARKER. Arnold Arboretum Contrib. I: 131 p., illus. 1932.

CHEMICAL CONTROL OF HYPODERMA LETHALE ON PITCH PINE. C. L. MORRIS. Plant Dis. Rptr. 37: 368–370. 1953.

THE BROWN SPOT NEEDLE BLIGHT OF PINE SEEDLINGS. PAUL V. SIGGERS. U.S. Dep. Agr. Tech. Bull. 870, 36 p. 1944.

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