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Canker-Rots in Southern Hardwoods

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Canker-rot fungi cause serious degrade and cull in southern hardwoods, especially the red oaks. Heartwood decay is the most serious form of damage, but the fungi also kill the cambium and decay the sapwood for as much as 3 feet (.91 m) above and below the entrance point into the tree. The ability of these fungi to kill the cambium and cause cankers distinguishes them from fungi that are restricted to the heartwood. Two fungus species in the family Polyporaceae and one in the Hydnaceae are primarily responsible for canker-rots. The diseases are commonly called hispidus canker, spiculosa canker, or Irpex canker, depending on the causal fungus. They occur throughout the South.

Canker-rots are most important on the red oaks, but also occur on hickory, honeylocust, some white oaks, and other hardwoods. Hispidus canker, caused by *Polyporus hispidus,* appears most frequently on willow oak and water oak in bottomlands and occasionally on Nuttal oak, white oak, and hickory. Spiculosa canker, caused by *Poria spiculosa,* is most common on willow oak, water oak, and honeylocust in bottomlands, and on hickory in uplands. A similar canker caused by *Poria laevigata* is found on bottomland red oaks. Irpex canker, caused by *Irpex mollis,* most often attacks red oaks in both bottomland and upland areas.

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The incidence of these canker diseases varies by locale. In the Piedmont hardwood areas of North Carolina, South Carolina, and Georgia, hispidus cankers were found on 3.4 percent of the red oaks and on 0.4 percent of the white oaks. In 2,000 acres (809.7 h) of Mississippi bottom land, 13 percent of the willow oaks and 3 percent of the Nuttall oaks had hispidus cankers. The total loss from cankers and rot was 4 percent of the cubic volume. The cankers lengthened 0.5 foot (15.2 cm) per year, and the length of visible heart rot exceeded canker length by an average of 2.4 feet (.73 m).

Spiculosa cankers are less common than hispidus cankers. In some areas, however, up to 10 percent of the bottomland red oaks are infected. In the Piedmont area spiculosa cankers were found on 8.1 percent of the hickories and 7.7 percent of the red oaks. The rot associated with spiculosa cankers increases in length at about 10 inches (25.4 cm) per year.

The decay under Irpex cankers extends up and down from some cankers as much as 8 feet (2.4 m); however, the rate of decay is unknown.

Life History and Habits

Like most wood-rotting fungi, those causing canker diseases reproduce from microscopic spores. Spores, produced and released by conks (sporophores), are distributed by the wind. Those that lodge on wounds of susceptible hosts may germinate and start new infections. Canker-rot fungi generally enter through branch stubs and grow down these stubs into the heartwood. They also spread out from the point of entry, killing the cambium and forming progressively large cankers.

Hispidus cankers are usually elongate, large, and conspicuous. When the cambium dies, a callus fold forms around it; but the callus tissue is killed in 2 to 3 years by the spreading fungus. As additional callus folds are formed and killed, the tree frequently develops a spindle-shaped swelling that continues to increase in size (fig. 1). The central part of the infected region is sunken and covered with bark. The remnant of an old branch stub, usually less than 1 inch (2.5 cm) in diameter, can frequently be found near the center of the canker. On young cankers the branch stub itself is often present.

Hispidus conks are 2 to 12

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Figure 1.—Hispidus canker and conk on a Nuttall oak.

inches (5 to 30.5 cm) or more wide. They are spongy, hairy, stalkless, and yellowish brown to rusty red. The lower surface has small round pores. The conks form from July to October and produce large quantities of spores daily for up to 21 days. Spores are dispersed in all directions from the conks; most travel no more than about 140 yards (128 m) and movement is usually horizontal and downward. After a few months the conks dry to a black mass and fall to the ground. Behind the cankers the entire heartwood is decayed. The decay is called a white rot because the wood is delignified and becomes soft and straw-colored to pale yellow (see cover).

Spiculosa cankers appear as rough, circular swellings on the bole, usually with depressed centers (fig. 2). Evidence of an old branch stub generally can be found in the center of the canker, where branch wood has been replaced by brown, sterile fungus material. Although cankers are small, infected branch traces are much more swollen than uninfected ones. Conks ordinarily do not grow on living infected trees; they develop on well-decayed logs or snags. They grow flat under the bark of the dead tree and, as they develop, push off the bark to expose the brown fruiting surface. Doubtful spiculosa infections can be identified by chopping into the center of the suspected branch trace. If infection is well established, the brown fungus material will be revealed by the ax-cut. The entire heartwood behind the canker always shows white rot (fig. 3).

Irpex cankers are more irregular in shape than the other two kinds. They usually have a branch stub at or near the center and a number of sunken areas on the swollen margins. Conks

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Figure 2.—Spiculosa canker on a young willow oak.

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Figure 3.—A cross-section of willow oak shows the rotten heartwood caused by a spiculosa canker.

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Figure 4.—Irpex canker and conks on willow oak.

and white fungus material often occur on or near the base of the sunken areas (fig. 4). The conks are small and creamy white with short, jagged teeth on the lower surface. Large numbers of spores are produced mostly at night for 10 days or longer during the summer. Irpex cankers are usually smaller than hispidus cankers, but some are up to 2 feet (.6 m) long. There is always white rot in the heartwood behind these cankers (fig. 5).

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Figure 5.—A cross-section of a willow oak showing rotten heartwood caused by Irpex canker.

Control

Canker-rot fungi infections develop rapidly and quickly convert trees into rotten culls. Cankered trees should be cut as soon as possible to salvage usable material and to provide growing space for sound trees. These fungi can produce spores on dead standing trees for several years. Felling culls limits spore discharge and dissemination, thus lessening the danger of infecting adjacent trees.

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