

Residual Naval Stores Stumps as Reservoirs of Inoculum for Infection of Slash Pines by *Phaeolus schweinitzii*

G. M. BLAKESLEE, Assistant Professor of Forest Pathology, School of Forest Resources and Conservation and Department of Plant Pathology, and S. W. OAK, Biologist, School of Forest Resources and Conservation, University of Florida, Gainesville 32611

ABSTRACT

BLAKESLEE, G. M., and S. W. OAK. 1980. Residual naval stores stumps as reservoirs of inoculum for infection of slash pines by *Phaeolus schweinitzii*. Plant Disease 64:167.

Signs and symptoms of *Phaeolus schweinitzii* infection, including root and butt rot, wind-thrown living trees, and dead standing trees, were observed in plantations of 10- to 22-yr-old slash pines in north-central Florida. The likely source of the pathogen is believed to be resin-impregnated ("lightered") stumps remaining from naval stores operations.

Phaeolus schweinitzii (Fr.) Pat. (formerly *Polyporus schweinitzii* Fr.) has long been recognized as a cause of brown cubical root and butt rot in numerous species of conifers. In general, the disease has been a problem only on mature or overmature trees, especially those with basal wounds such as fire scars (1,2,5,6). Damage has been reported, however, on young (20- to 25-yr-old) eastern white pines (*Pinus strobus*) on unfavorable sites (3,8), on 28-yr-old Douglas-firs (*Pseudotsuga menziesii*) in the eastern United States (4), and on intermediate-aged (40- to 45-yr-old) eastern white pines in stands subjected to multiple thinnings (7).

This paper reports the occurrence of root rot centers in unthinned, unwounded 10- to 22-yr-old plantations of slash pine (*P. elliotii* var. *elliotii*) in north-central Florida. Resin-impregnated stumps from past naval stores operations are considered the likely source of the pathogen.

During the past several years, we have frequently observed sporocarps of *P. schweinitzii* in young (10- to 15-yr-old) and pole-sized (20- to 22-yr-old) plantations of slash pines in the flatwoods region of north-central Florida. These sites formerly supported low-density stands of large, old-growth longleaf (*P. palustris*) and slash pines that had been worked for naval stores. When these

naval stores, or "turpentine" trees, were harvested, the resin-soaked ("lightered") stumps were left, and the present slash pine stands were planted around them. Sporophores of *P. schweinitzii* were commonly observed near the bases of symptomatic trees but were most frequent near the lightered stumps. Examination of the taproot of many stumps revealed extensive colonization by *P. schweinitzii*. At the time of examination, the stumps were at least 10-22 yr old, yet most of the tissues of the larger roots were firm. Activity of the fungus was verified by isolation and by fresh, yellowish-white mycelial felts between the brown cubical portions of the decayed wood.

Sporophores of *P. schweinitzii* were observed in numerous infection centers in six unthinned slash pine plantations. The centers showed classical root and butt rot symptoms: wind-thrown living trees, often with sporophores at the base; declining trees with off-color, low-density foliage; stems broken at 0.25-2 m above the ground, exposing extensive butt rot; brown cubical rot in lateral roots; and dead standing trees. One center contained about 45 symptomatic trees; others contained 5-15. Old lightered stumps were located within or adjacent to the diseased areas; the largest infection center contained several stumps. Some plantations had been prescribe-burned earlier in the rotation, but basal wounds or scars were not evident on the standing diseased trees or on the surrounding asymptomatic portions of the stands. Mechanical wounding was not evident. Slash pine plantations of similar ages and on similar

sites without lightered stumps appeared free from symptoms and/or signs.

Our observations indicate that *P. schweinitzii* causes losses in relatively young, undisturbed slash pine plantations and remains viable in infected lightered stumps. These stumps serve as reservoirs of inoculum from which the pathogen may spread through the soil or through root contacts to adjacent trees. At present, damage by *P. schweinitzii* appears relatively minor, being restricted to the scattered locations with infected lightered stumps. As the plantations approach the projected rotation age of 28-30 yr, additional losses may occur; salvage harvesting of heavily infected areas would help minimize such losses.

Because an active market for lightered stumps exists in the silva-chemicals industry, removal of the stumps before plantations are established should be economically feasible and should reduce losses due to *P. schweinitzii*. How long the pathogen persists in the root systems of infected plantation trees is not known. If the pathogen retains its viability for a long time and the stumps are not removed, increased incidence of infection in subsequent rotations may be anticipated.

LITERATURE CITED

1. BAXTER, D. V. 1952. Pathology in Forest Practice. John Wiley & Sons, Inc., New York. 601 pp.
2. BOYCE, J. L. 1961. Forest Pathology. McGraw-Hill Book Co., Inc., New York. 572 pp.
3. CHILDS, T. W. 1937. Variability of *Polyporus schweinitzii* in culture. Phytopathology 27:29-50.
4. HEDGECOCK, G. G., G. F. GRAVATT, and R. P. MARSHALL. 1965. *Polyporus schweinitzii* Fr. on Douglas-fir in the eastern United States. Phytopathology 55:568-569.
5. HEPTING, G. H. 1971. Diseases of forest and shade trees of the United States. USDA-Forest Serv., Agric. Handb. 386. U.S. Government Printing Office, Washington, DC. 658 pp.
6. HEPTING, G. H., and A. D. CHAPMAN. 1938. Losses from heartrot in two shortleaf and loblolly pine stands. J. For. 36:1193-1201.
7. HEPTING, G. H., and A. A. DOWNS. 1944. Root and butt rot in planted white pine at Biltmore, North Carolina. J. For. 42:119-123.
8. YORK, H. E., P. F. WEAN, and T. W. CHILDS. 1936. Some results of investigations of *Polyporus schweinitzii*. Science 84:160-161.

Florida Agricultural Experiment Station Journal Series No. 1878.

Accepted for publication 3 October 1979.

00191-2917/80/000031\$03.00/0

©1980 American Phytopathological Society