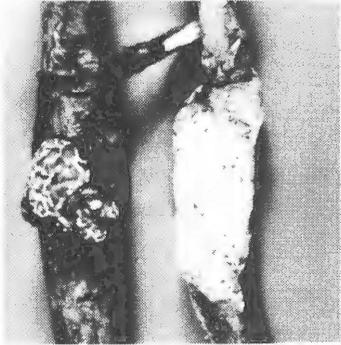


# Forest Tree Diseases of Virginia

November 1972

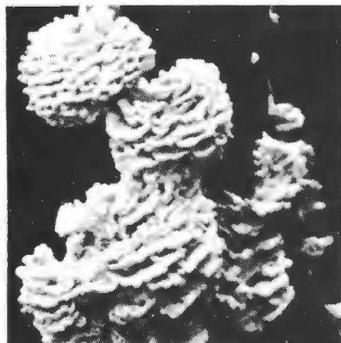
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**RUST**



**DECLINE**



**DECAY**



**CANKER**

## NEEDLE RUST OF CONIFERS

by

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Needle rust occurs quite commonly throughout the state of Virginia, but seldom induces severe losses. Loss of needles due to infection by the causal fungus will reduce growth rates when abundant needle drop occurs. Moist and cool weather conditions during the spring favor this disease. Several young loblolly pine plantations have been severely affected. Large trees are seldom attacked and only the needles on lower limbs are infected.



Figure 1. Aecial stage of the needle rust fungus on pine host with closeup of aecia on needle surface. These fruiting structures are bright orange and emit clouds of aeciospores that infect the alternate hosts.

Range: Needle rust occurs in most sections of the United States. The species of the causal fungi appear to have range limitations as well as host limitations.

Cause: Many different species of the genus Coleosporium cause needle rust. On jack, red, and pitch pines, it is C. solidaginis; on Virginia pine, it is C. pinicola; and on loblolly, the species are C. lacinariae and C. apocynaceum.

Suspects: Many conifers are susceptible to the attack of Coleosporium spp. In Virginia, the principal hosts are loblolly, Virginia, shortleaf, and scotch pines. Most recent reports of damage have been on loblolly pines. Most species of Coleosporium require two hosts to complete their life cycle. Some of the fungus life cycle occurs on species that include goldenrod, aster and other members of the family Compositae. The life cycle is completed on species of conifers such as pines, firs, hemlocks, spruces, larches, and cedars.

Although some variations occur in specific disease cycles, the following disease cycle is typical of the needlerusts in Virginia. Infection of the conifer needles usually occurs in the fall from spores produced on the alternate hosts. Subsequent growth of the fungus occurs throughout the needle and during mid-spring the fungus produced two spore stages. The first stage (Pycnial) is characterized by a shiny ooze and does not cause any additional infection of either host. The second spore stage (Aecial) erupts through the needle surface and clouds of spores are emitted to the air (Figure 1). These aeciospores cannot infect the conifer hosts and are carried by the wind to the alternate hosts (see above). The next spore stage (Uredial) develops on the alternate host and the spores produced during this stage can only infect the same host species on which it was produced. Thus, the fungus inoculum can multiply on the alternate host. During the late summer or fall the next spore stage (Telial) is produced and is characterized by dark brown, flattened pustules on the lower leaf surface. These spores germinate in place and give rise to the final spore stage (Sporidia) which is capable of infecting the conifer needles. Thus, the cycle is completed within one year.

Signs and Symptoms: On conifers, the presence of the causal fungus itself is the best diagnostic tool used in determining the cause of the disease. Orange to white-yellow fruiting bodies (Aecia) erupt through the needle surfaces. Infected trees are yellow-green in the spring of the year but rapidly turn brown in early summer. Trees remain brown throughout the entire season or in the case of severe infection, new growth may occur and once again the tree is green. Usually, infected needles are cast from the tree but mildly infected needles may remain attached.

The fungus produces reddish orange pustules (Uredia) and black crust-like fruiting bodies (Telia) on the lower leaf surface of the alternate hosts.

Control: No chemical control is warranted in forest stands. Infections are seldom severe enough to warrant control in nursery or Christmas tree plantings but destruction of alternate hosts in the immediate vicinity will reduce the number of infections. Infected trees recover rapidly, and fertilization and watering of individual trees will reduce the growth losses.