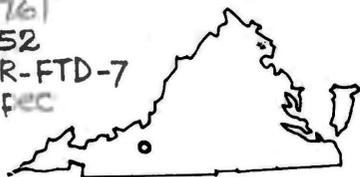


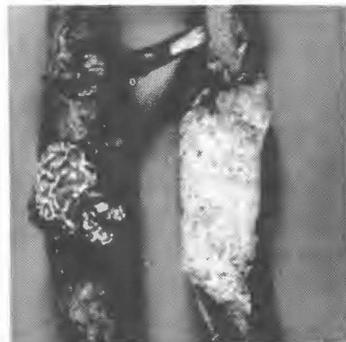
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Forest Tree Diseases of Virginia

July 1969

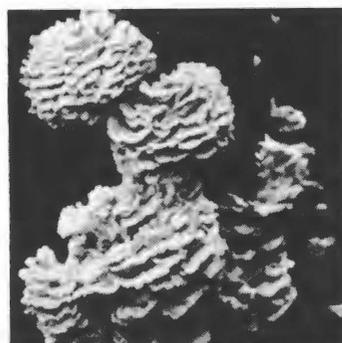
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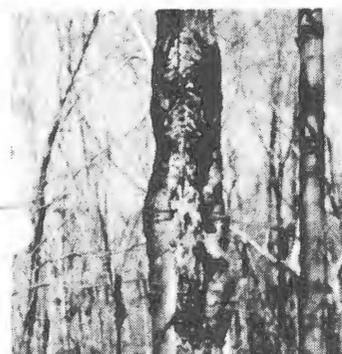
RUST



DECLINE



DECAY



CANKER

Eastern Gall Rust

by

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Approximately 26 per cent of the total volume of softwood growing stock on commercial forest land in Virginia is comprised of Virginia pine (*Pinus virginiana* Mill.). It is second only to the widely planted and naturally occurring loblolly pine (*Pinus taeda* L.) (41 per cent). Although grown and harvested mainly as a pulpwood crop, this species is currently being studied for its growth rate and sawtimber potential. The results of these initial studies appear favorable and Virginia pine may be widely planted throughout the mountainous sections of Virginia. In many localities, abandoned farm land is covered with pure stands



Figure 1. Branch gall of Eastern gall rust on Virginia pine. Gall would have bright orange color in spring.

Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the U. S. Department of Agriculture. W. E. Skelton, Dean, Extension Division, Cooperative Extension Service, Virginia Polytechnic Institute, Blacksburg, Virginia 24061.

of Virginia pine and a large part of this species' present value is in watershed management programs. The rust fungus, Cronartium quercuum may pose a serious threat to the long range use of Virginia pine as a sawtimber species. A similar disease that is very destructive in loblolly pine plantations is caused by the closely related fungus C. fusiforme. At present, Eastern gall rust, affects many trees in existing stands of Virginia pine. The destructive potential of this disease may increase with the planned increased use of Virginia pine.

Range: Eastern gall rust is found throughout the eastern section of the United States. It has been considered a serious problem in nurseries in the Lake States and many Jack pine plantations have been severely attacked and rendered useless for timber production. This disease is also of concern in southern Canada.

Suscepts and Disease Cycle: Many species of pine and oak are susceptible to infection by the various stages of this rust fungus. The pine hosts include Virginia and shortleaf pines which are of commercial value to the forest industry. Scotch pine is also severely attacked and this disease should be considered a threat to established Scotch pine Christmas tree plantations.

Red oak species (red, black, scarlet and pin) are considered to be the most susceptible group of oaks. Infection of white oak, chestnut, and chinquapin has been noted in the southeastern United States.

Like fusiform rust of loblolly pine, the causal fungus requires the presence of the two alternate hosts. During the early spring, bright orange spores (seeds) are produced on the surface of the pine galls. These spores are windblown to the oak leaves where infection takes place through the leaf surface. Within a short period of time another spore stage is produced which can only reinfect oak. Consequently a build-up of the fungus may occur on the oak. Later another spore stage is produced on the oak leaves, the spores of which are windblown back to the pine host. The pine-oak-pine cycle may occur in as little as 3-4 weeks. While on the oak species, C. quercuum is not discernible from C. fusiforme. Infection of the pine host occurs through the needles. The fungus grows through the twigs into the larger branches or main stem. A gall (swelling) is formed upon which another spore stage is produced one year after the initial gall formation. This stage is then followed the next spring by the orange-colored spore stage and the disease cycle is completed.

Symptoms: Eastern gall rust is characterized by cerebrum (brain-shaped) galls on the main stem of the pine hosts. Hundreds of galls have been observed on a single tree. Galls are usually quite distinct from the main branch and a collar of bark usually separates diseased from healthy tissue. Severe infection may lead to tree deformity, reduced growth rate, breakage at the point of gall formation and/or death. On larger stems, galls may serve as the entry point for decay fungi. During the spring, the bright orange spores of the fungus make the galls very conspicuous.

Oak leaves seldom exhibit symptoms of infection unless severely attacked. Brown, hair like projections of the fungus on the lower leaf surface are usually the only sign that infection has occurred.

Control:

Nurseries: Fungicides provide the best protection against infection. Ferbam, Ziram, or Zineb at rates of 2 lbs. per 75 gallons of water have proven effective. Sprays should only be applied where the disease is abundant in the immediate vicinity. Weekly application from seed germination until June is recommended; during periods of high infection conditions, these sprays should be applied twice a week. Infection potential is high if high humidity and temperatures of 54-76 F persist for periods of 18 hours or longer. In areas where rust is abundant, oaks within 1/2 mile of the nursery should be removed and sprouting of stumps must be curtailed as the new leaves are more susceptible to infection.

Plantation and Forest Stands: Persistent removal of severely infected trees or branches will aid in reducing the amount of infection. Intensive management of Christmas tree plantations assures early detection and removal of diseased trees or branches. A careful check of the pines in the area adjacent to Christmas tree plantings will also aid in disease reduction provided infected trees are destroyed.

Under forest conditions, control is not economically feasible. Infected trees should be removed during thinning operations.

As with fusiform rust, selection and breeding for natural resistance may be the ultimate solution to the problem. The planned increase use of Virginia pine as a timber species warrants study of the resistance mechanisms early in the reforestation program.

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KEYS TO PROPER USE OF PESTICIDES

1. Read the label on each pesticide container before each use. Follow instructions to the letter; heed all cautions and warnings, and note precautions about residues.
2. Keep pesticides in the containers in which you bought them. Put them where children or animals cannot get to them, preferably under lock and away from food, feed, seed, or other material that may become harmful if contaminated.
3. Dispose of empty containers in the manner specified on the label. If disposal instructions are not printed on the label, burn the containers where smoke will not be a hazard, or bury them at least 18" deep in a place where water supplies will not be contaminated.

SEE YOUR DOCTOR IF SYMPTOMS OF ILLNESS OCCUR DURING OR AFTER USE OF PESTICIDES.