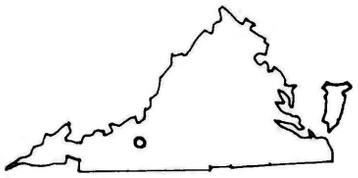

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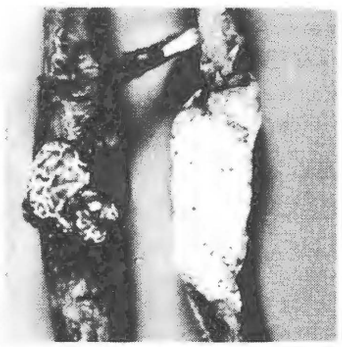
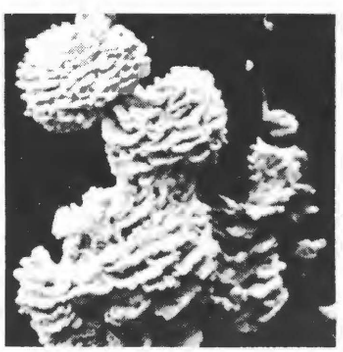
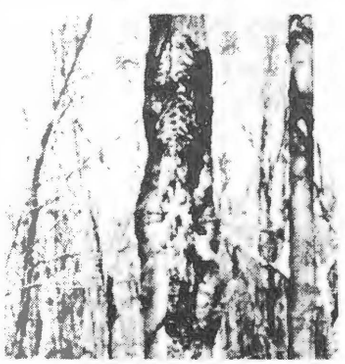


RUST

DECLINE



DECAY



CANKER

Chestnut Blight

by
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Chestnut blight, caused by the fungus Endothia parasitica, was first observed in 1904 in the New York Zoological Gardens. The native American chestnut (Castanea dentata) had no resistance to attack by this pathogen; the fungus spread rapidly and the disease destroy nearly 100 percent of the commercial

Figure 1. Dead snag of American chestnut that had been killed by Endothia parasitica many years ago. Fallen trees and stumps remain abundant in Virginia forests due to the high degree of resistance of the wood to decay.

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value of chestnut by 1940. The rapid spread was due in part to transmission of the fungus by migratory birds and the disease was found in Virginia just four years after its initial introduction into the United States.

Chestnut was one of the most valuable hardwood species in the United States. The wood of this species is highly resistant to decay and even today dead trees are being cut and tannin extracted for the tanning industries. It has been estimated that loss of American chestnut has caused a 50% reduction in the overall value of eastern hardwood timber stands.

RANGE:

Chestnut blight eventually encompassed the entire range of the American chestnut. Today the fungus may be found throughout this range due to the repeated infection of chestnut sprouts.

SUSCEPTS:

American chestnut and a few other lesser known chestnut species are very susceptible to attack. Several oriental species of chestnut are resistant but not immune to infection. Oak, chinkapin, red maple, hickory and sumac are also susceptible and thus provide a base on which the fungus may live as a weak parasite.

Figure 2. Stem of infected American chestnut exhibiting the fruiting bodies of the fungus. There are over 100 million spores in each single fruiting structure.

SYMPTOMS AND SIGNS:

The fungus induces a canker on the bark of the tree which eventually girdles the stem or branch with subsequent wilting and death (blight) of the portion beyond the canker. Callus development around cankers in response to infection may cause stems and branches to appear several times larger in diameter than normal. Cankers first appear as sunken areas; this is followed by a reddish-orange to yellow green coloration of affected bark. Later, cankers become swollen and deep fissures may develop. Cankers may be several inches to many feet long on larger stems or branches. The fungus produces several signs of its presence. Tan colored mycelial fans may be found under the bark of cankered areas. Two fruiting structures are produced by the fungus on the canker surface; both are burnt orange in color. During wet periods, one stage produces long filaments of spores. Each one of these fruiting bodies contain up to 100 million spores and there may be 50 per square inch of canker surface.

SPREAD:

The fungus may be spread by insects, birds, wind, rain splashed water, and practically any other agent that moves from diseased to healthy trees. The fungus enters wounds on healthy trees.

CONTROL:

Control of chestnut blight was virtually impossible due to 1) a lack of resistance of the American chestnut to the fungus; 2) the tremendous numbers of susceptible trees; 3) the many means of spread of the causal fungus; 4) its ability to infect through any wound; 5) the overwhelming amount of spores produced by the fungus on diseased trees and; 6) the ability of the fungus to live as a saprophyte or parasite on several other species of forest trees.

Present day efforts at control are aimed at the production of a resistant plant. However, with the killing of young stems which originate from roots of previously killed chestnuts before they flower and produce viable nuts, the chances for any genetically resistant variety of American chestnut developing are minimal. Furthermore, the large number of spores produced by the fungus and their own genetic recombination capability (that may give rise to new pathogenic strains of the fungus) also reduces the chance for American chestnut re-establishment. The production of hybrids by crossing American chestnut with various resistant Oriental species has been attempted with only slightly encouraging results. Such hybrids are not good timber producers and only develop well on the best sites without competition. The re-establishment of chestnut in the mountainous areas of Virginia or elsewhere remains virtually impossible. Further studies on resistance mechanisms are being conducted by the Virginia Division of Forestry, Charlottesville. Test plants are located in Lesesne State Forest in Nelson County. The forest has been dedicated to the development of a blight resistant strain of chestnut.