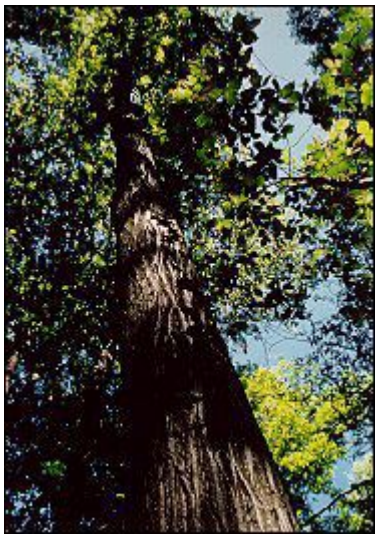
Identify Butternut Canker and Manage Butternut Trees



United States Department of Agriculture

PREPARED BY Forest Service

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Butternut (*Juglans cinerea*), also known as white walnut, commonly grows on rich loamy soils in mixed hardwood forests. It ranges from eastern Canada west to Minnesota and as far south as Arkansas, Alabama, Georgia, Louisiana, and Mississippi (fig. 1). The wood is valued for furniture, paneling, specialty products, and carving. Butternut produces nuts for wildlife and is important for commercial nut production. In addition, butternut contributes significantly to forest biodiversity, especially in the northern part of its range where the closely related black walnut (*J. nigra*) does not grow.

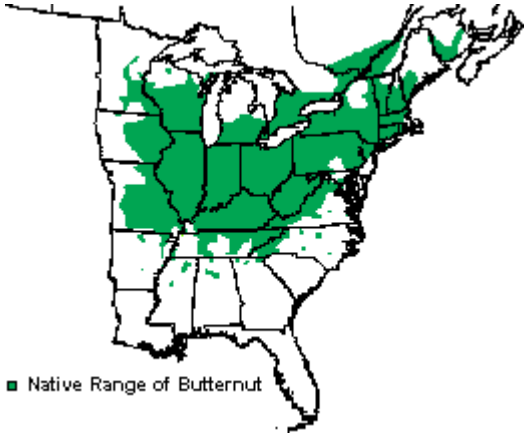

Figure 1. *Native range of butternut in North America.*

Butternut Canker

Butternut is being killed throughout its range by *Sirococcus clavigignenti-juglandacearum*, a fungus most likely introduced from outside of North America (fig. 2). The fungus initially infects trees through buds, leaf scars, and possibly insect wounds and other openings in the bark, rapidly killing small branches. Spores produced on branches are carried down the stem by rain, resulting in multiple, perennial stem cankers that eventually girdle and kill infected trees. Butternut canker was first reported from southwestern Wisconsin in 1967; however, it has probably been present much longer than that based on detailed examinations of killed trees in North and South Carolina. The disease has contributed to as much as an 80 percent decrease in living butternut in some States.

Figure 2 (right). *Butternut killed by butternut canker.*

Disease Description

Young, annual cankers are elongated, sunken areas commonly originating at leaf scars and buds (fig. 3), often with an inky black center and whitish margin (fig. 4). Under the bark, the fungus forms pegs that break through the outer bark surface, exposing the spores (fig. 5). Peeling the bark away reveals the brown to black elliptical areas of killed cambium (figs. 6&7). Older, perennial branch and stem cankers are often found in bark fissures (fig. 8), or covered by bark and bordered by successive callus layers (fig. 9). Cankers develop throughout a tree, but commonly occur on the main stem, at the base of trees and on exposed roots. Butternut is the only natural host known to be killed by the fungus. The fungus can survive on dead trees for at least 2 years. It is spread by rainsplashed spores, possibly by insects and birds, and perhaps by seeds.

Figure 3. (right) *Young canker with sunken bark and inky-black exudate.*

Figure 4. *Stem canker with black center and white margin.*

Figure 5. *Above canker with outer bark removed to expose fungus pegs.*

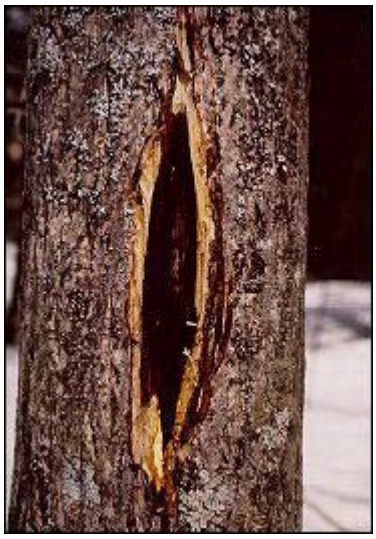

Figure 6 and 7. *Typical cankers with bark removed, revealing the elliptical areas of killed cambium.*

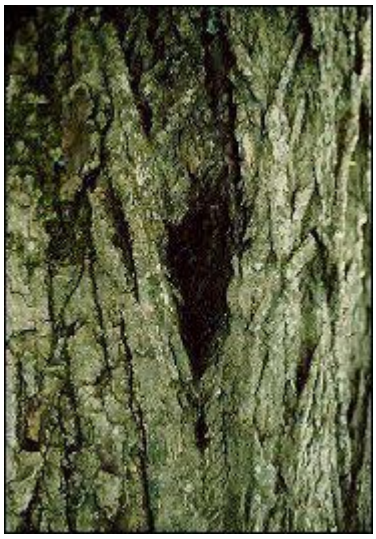

Figure 8. *Stem canker under bark revealed by black exudate.*

Figure 9. *Tree killed by multiple cankers*

Growing Butternut

Currently no butternut selections are available that have known canker resistance. A few healthy butternut trees have been found growing among diseased and dying trees and may be resistant to the disease. Seedlings planted in areas with diseased trees will probably become infected. Healthy seedlings planted where the disease is not present likely will survive.

Butternut is closely related to black walnut so many of the recommendations for seed collection and storage and for planting are similar for both species. Butternut is shade intolerant. Reproduction can only be sustained in stand openings or fields where shade cannot impede its development. Young trees may withstand competition from the side, but will not survive shade from above. The minimum size opening needed to establish and promote early development is about 2 to 3 times the height of the surrounding dominant trees. Competing vegetation must be controlled when planting seeds or seedlings to maintain vigorous growth.

Butternut trees begin to produce seeds at about 20 years, and seed production is optimal between 30 and 60 years of age. Good seed crops occur every 2 to 3 years, although some seed is produced every year. Seeds germinate in the spring after seedfall and a cold period (34-410 F) of 90 to 120 days to break dormancy. Squirrels and other rodents are

aggressive consumers of butternut seed, and frost, anthracnose leaf spot, insects, and lack of pollination can reduce yields of viable seeds.

Suggested Tree Retention Guidelines

Butternut is a relatively short-lived tree, and stress from old age and competition often leads to root diseases, decays, infection by other fungi, and invasion by wood-boring insects, resulting in tree death unrelated to butternut canker. If butternut canker is responsible for the loss of crown volume, there is almost always evidence of stem canker. If some other factor such as storm breakage caused the missing crown, then the grower must judge if the tree is likely to survive. Vigor of individual trees in managed woodlots, urban, or other high-value landscape settings may be increased by proper pruning and tree care.

If management objectives include conserving potentially resistant trees, the following guidelines will be helpful in retaining trees for seed and nut production and in selecting trees for breeding:

1. Retain trees with more than 70 percent live crown and with less than 20 percent of the combined circumference of the stem and root flares affected by cankers.

2. Harvest dead or declining trees to salvage the quality and value of the wood, or maintain the trees in the forest for their wildlife value.

3. Retain trees free of cankers with at least 50 percent live crown and growing among diseased trees. These trees may be resistant and have value for propagation by grafting or for future breeding. Efforts are underway to locate potentially resistant trees in native forest stands. Contact the USDA Forest Service North Central Forest Experiment Station in St. Paul, MN, for further information if you find a healthy butternut.

References

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