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Walnut Anthracnose

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Walnut anthracnose, or leaf blotch as it is sometimes called, is a widespread and destructive disease of walnut (*Juglans*) species, particularly the eastern black walnut (*Juglans nigra* L.). It is caused by a fungus, *Gnomonia leptostyla* (Fr.) Ces. and de N., the imperfect stage of which is *Marssonia juglandis* (Lib.) Magn. The disease may quickly become epidemic during wet weather in the growing season and cause many walnut trees to lose nearly all their leaves by late July or early August. This premature defoliation slows the trees' growth and weakens them. Where premature defoliation occurs year after year, the stressed trees may die.

Hosts and distribution

Eastern black walnut trees vary in susceptibility to walnut anthracnose. But even the less susceptible ones become severly infected and defoliated when weather favors development of the fungus. Butternut (*Juglans cinerea* L.), Persian (English) walnut (*J. regia* L.), and first-generation hybrids of Persian and black walnut also are attacked. Two species of walnut native to California, the Hinds walnut (*J. hindsii* Jeps.) and the California walnut (*J. californica* S. Wats.), are susceptible. Often, foliage of Persian and hybrid walnut trees is severely infected with anthracnose during wet seasons, but defoliation is less than on eastern black walnut.

Walnut anthracnose is worldwide in distribution. Besides affecting *Juglans* species in the United States, the disease has been reported in most of the countries of Europe and in Argentina, Canada, and South Africa.

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Symptoms

Leaves, nuts, and, occasionally, shoots of the current season's growth are likely to be attacked. Tiny dark-brown or black spots, circular to irregularly circular, appear on infected leaves (fig. 1). Gradually, these spots become more numerous, enlarge, and often merge to form still larger dead areas. Yellowish to golden leaf tissue usually borders these spots. Infected leaves and leaflets generally fall prematurely, but some infected leaflets usually remain attached to the tree for most of the season.

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Figure 1.–Anthracnose spots on a black walnut leaf.

Premature defoliation caused by the anthracnose fungus affects the quality and growth of nut meats. Nuts from diseased trees commonly have dark, unattractive, and shriveled meat. Sunken, necrotic spots, smaller than those on the leaves, appear on husks of infected nuts (fig. 2). Nuts that become diseased when immature do not develop normally and many drop prematurely.

Lesions also appear on current shoots, which are attacked on rare occasions, and form dead, sunken areas that are oval to irregularly circular, and light, grayish-brown with dark, reddish-brown margins.

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Figure 2.–Anthracnose spots on black walnut fruits.

Life History of the Fungus

Gnomonia leptostyla belongs to a group of fungi referred to as ascomycetes because they bear the spores—called ascospores—of the perfect or sexual stage in a club-shaped organ called an ascus. The fungus usually overwinters in fallen walnut leaves infected during the preceding summer. In rare instances, it overwinters in lesions on twigs of

infected trees and in infected nuts on the ground. Primary infection occurs in the spring from windborne ascospores that are discharged from the overwintered walnut leaves during rainy periods. If they lodge on a susceptible leaf under favorable conditions, the ascospores germinate, the germ tube penetrates and infects the leaf, and leaf spots appear in about 14 to 16 days.

Secondary spores, the conidia, are produced on the diseased leaflets in minute black fruiting bodies called acervuli. Acervuli are more abundant on the underside of leaflets than on the upperside. Conidia are colorless, usually crescent-shaped, and divided by a cross-wall into two approximately equal cells. They are borne in large numbers and are spread from leaf to leaf by wind and spattering rain. The rapid increase and spread of walnut anthracnose in the summer and fall usually is by means of repeated generations of conidia. Leaves are most likely to be infected and to fall off during wet weather.

Control

No practical control of anthracnose is known for walnut trees growing under forest conditions, though these trees often are severely infected.

For shade, ornamental, and nut-producing trees, one means of control is eliminating the overwintering fungus. Raking leaves reduces the amount of ascospore inoculum, which causes primary infection in the spring. This infected material should be destroyed by burning or other appropriate means. A fertilizer high in nitrogen that is broadcast in April on the soil surface at the rate of 250 lb actual N/acre (280 kg/ha) also reduces the severity of walnut anthracnose.

Anthracnose has been controlled effectively by fungicidal sprays in nurseries, seed orchards, and plantations. Dodine is the only fungicide now registered for use in controlling walnut anthracnose on nut-bearing trees. Dodine is applied at the rate of 1 lb/100 gal (0.45 kg/378 liters) of water for hydraulic sprayers. The first spray should be applied in the spring when the walnut leaves are about half their mature size; then, three additional spray treatments should be applied about every 2 weeks.

References

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Neely, Dan. Nitrogen fertilization reduces the severity of walnut anthracnose. Phytopathol. News. 12:90; 1978.

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