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Boxwood Blight: A New Ornamental Disease Threat

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Importance

Boxwood blight caused by two related fungi, *Calonectria pseudonaviculata*, (previously known as *Cylindrocladium pseudonaviculatum* or. *Cylindrocladium buxicola*) and *Calonectria henricotiae* (previously known as *Cylindrocladium buxicola*) is an important disease of Boxwood (Boxus). Boxwood blight was first described in the United Kingdom in the mid-1990s and in New Zealand in 2002. Since these initial reports, the disease has become widespread throughout the United Kingdom, New Zealand, Europe and Asia. In the United States, Boxwood blight was reported for the first time in 2011 in North Carolina and Connecticut. By 2018, twenty-five states had confirmed the disease, and it was first identified in Arkansas in Pulaski county in 2019.

Symptoms and Signs

The fungus can infect all above-ground portions of boxwood, causing severe defoliation and twig dieback, but it does not appear to affect the roots. Dark or light brown leaf spots are the initial symptoms of infection. These spots often have dark borders and can coalesce, often with a concentric pattern or zonate lines (Figure 1). Infected leaves become brown or straw colored (Figure 2). Defoliation follows, often within a few days following the appearance of the leaf spot phase (Figure 2). Although the plant attempts to regrow, repeated infections and defoliation weaken it and can lead to plant death. Dark brown to black stem streak or cankers are also symptoms of infection (Figure 3). These lesions can be found occurring anywhere from the soil line to the twig tips. Under high humidity conditions, masses of white fruiting bodies are produced on the undersurface of infected leaves (Figure 4), containing the distinctive spores of the fungi (Figure 5). These white structures are readily visible with a hand lens and are useful in distinguishing boxwood blight from another boxwood disease, Volutella blight. The Volutella blight fungus (*Volutella buxi*) produces salmon colored fruiting bodies on leaf undersurfaces. Symptoms of Volutella blight and Phytophthora root rot are sometimes confused with boxwood blight. In addition, boxwood can be infected by more than one of these disease organisms at the same time.

Pathogen Dispersion

Calonectria pseudonaviculata produces microscopic spores on diseased tissues. Spores can be dispersed by wind or windblown rain over short distances. Rainfall and overhead irrigation practices play an important role in disease spread in commercial plant nurseries, where large quantities of plants are grown in close proximity to each other. Long distance spread is believed to occur by movement of infected plant

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material, contaminated equipment and clothing and animals. The fungus does not require a wound to infect, since it can enter directly through the leaf cuticle or stomata. Infection can occur very quickly in mild (64° to 77°F), humid conditions. High humidity or the presence of free water on plant surfaces is sufficient for infection to occur. Reports from the United Kingdom indicate that the fungus can survive at least five years on decomposing fallen leaves of infected American or Common boxwood (Buxus sempervirens) by producing long-lived structures known as microsclerotia.

Management

Once the diseases is detected in a location, sanitation is a vital component in the management of boxwood blight. Infected plants should be removed and destroyed immediately. Remove and bag any diseased plants and fallen leaves and dispose of them in municipal waste or bury them. Disinfect your pruners with a disinfectant when you finish pruning your diseased plants. Where permitted, you may burn infected plants. Do not compost infected plants or plant debris. It is important to realize that the fungus that causes this disease can persist in the soil for five years or more, which means any replacement boxwood planted in the same site is likely to become infected.

Fungicides are effective at protecting plants from boxwood blight infection. The goal of successful chemical applications is to prevent disease. You should apply fungicides when temperatures exceed 60°F and rainfall is expected. Effective products include a rotation of Daconil® (chlorothalonil) with Medallion® (fludioxonil). Other fungicides include Heritage® (azoxystrobin), Pageant® (pyraclostrobin and boscalid), Compass® (trifloxystrobin), Torque® (tebuconazole), and Cleary's 3336® (thiophanate methyl). You will need to apply fungicides every 7 to 14 days to protect susceptible boxwood. More resistant varieties (Table 1) require fewer applications.

If you decide to plant a boxwood in your garden, consider planting one the cultivars that have resistance to boxwood blight (Table1).

There are other members of the boxwood family that are susceptible to boxwood blight, some of them include: *Pachysandra terminalis* (Japanese spurge), *Pachysandra procumbens* (Allegheny spurge) and *Sarcococca* species (sweetbox).

If you suspect the presence of boxwood blight in your landscape or garden, please contact your county

Figure 1. Infected leaves of boxwood by the boxwood blight fungus, showing distinctive bordered, concentric-ringed lesions. *Photo Credit: Sherrie E. Smith, Division of Agriculture, University of Arkansas.*

Figure 2. Advanced defoliation of the boxwood caused by boxwood blight. *Photo Credit: Keiddy Urrea-Morawicki, Division of Agriculture, University of Arkansas.*

Figure 3. Black stem streak or cankers on the stems of boxwood caused by boxwood blight. *Photo Credit: Keiddy Urrea-Morawicki, Division of Agriculture, University of Arkansas.*

Figure 4. Masses of spores produced by *Calonectria pseudonaviculata*, on the undersurface of infected leaves. *Photo Credit: Sherrie E. Smith, Division of Agriculture, University of Arkansas.*

agent (*www.uaex.uada.edu*) and send a sample to the Arkansas Plant Health Clinic (*https://www.uaex.uada.edu/yard-garden/plant-health-clinic/default.aspx*) to confirm the presence of this pathogen.

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Figure 5. Spores of *Calonectria pseudonaviculata*. *Photo Credit: Sherrie E. Smith, Division of Agriculture, University of Arkansas.*

Table 1. Levels of resistance susceptibility of commercial cultivars of Boxwood suitable to grow in Arkansas.

Highly Susceptible	B. sempervirens 'Suffruticosa' B. sinica var. insularis 'Justin Brouwers'
Susceptible	B. microphylla var. japonica 'Morris Dwarf' B. microphylla var. japonica 'Morris Midget' B. sempervirens 'Jensen' B. sempervirens 'Marginata' Buxus X 'Glencoe' (Chicagoland Green) B. sempervirens 'American' Sempervirens 'Elegantissima'
Moderately Susceptible	Buxus X 'Green Mound' Buxus X 'Conroe' (Gordo) B. microphylla 'Green Pillow' B. microphylla 'Grace Hendrick Phillips' B. microphylla 'Jim Stauffer' Buxus X 'Green Mountain'
Moderately Resistant	B. microphylla 'Winter Gem' B. sempervirens 'Dee Runk' B. sempervirens 'Fastigiata' Buxus 'Green Gem' B. microphylla 'John Baldwin'
Most Resistant (Recommended for New Plantings)	B. microphylla 'Golden Dream' B. harlandii B. sinica var. insularis 'Nana' B. microphylla var. japonica 'Green Beauty'

Source: Susceptibility of Commercial Boxwood Cultivars to Boxwood Blight M. Ganci, K. Ivors, and D.M. Benson, Department of Plant Pathology, North Carolina State University.

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