

Boxwood Blight

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Introduction

Boxwood blight is a fungal disease caused by *Calonectria pseudonaviculata* (previously called *Cylindrocladium pseudonaviculatum* or *Cylindrocladium buxicola*).

This fungus is easily transported in the nursery industry and can be moved on infected plants that do not show any symptoms at the time of shipment as well as on shoots of infected boxwood greenery tucked into evergreen Christmas wreaths. Boxwood blight has become a serious threat to nursery production and to boxwoods in the landscape, which has prompted several states to take regulatory action.

This publication provides information about boxwood blight and management options.

Disease Distribution

Boxwood blight was first reported in the United Kingdom in the mid 1990s. It is now widespread throughout most of Europe and in the Republic of Georgia. The pathogen was also discovered in New Zealand in 1998.

Boxwood blight was confirmed for the first time in North America in October 2011 on samples collected in North Carolina and Connecticut. Since this first U.S. detection, boxwood blight has been reported in more than 20 states and three Canadian provinces.

Symptoms and Signs

The fungus that causes boxwood blight can infect all aboveground portions of the shrub. Symptoms begin as dark leaf spots that coalesce to form brown blotches (Figure 1). The undersides of infected leaves will show white sporulation of the boxwood blight fungus



Figure 1. The spots on these leaves are typical of early stage boxwood blight. Photo by M. Daughtrey, New York.



Figure 2. Note the white sporulation on the underside of infected leaves. The fungus that causes boxwood blight sporulates following high humidity. Photo by G. Ruhl, Indiana.



Figure 3. The boxwood plant on the left shows defoliation from boxwood blight that starts from the bottom and moves up. The neighboring plant exhibits spots on its lower leaves; however, it does not yet show any symptoms of defoliation. Photo by M. Daughtrey, New York.

following periods of high humidity (Figure 2). Boxwood blight causes rapid defoliation, which usually starts on the lower branches and moves upward in the canopy (Figure 3).

A key symptom that differentiates boxwood blight from other boxwood diseases is that narrow black streaks (cankers) develop on green stems (Figure 4). During periods of high humidity, white, fuzzy masses that consist of numerous clumps of spores will emerge from these black stem cankers (Figure 5). The spores can be observed on infected stems and leaves with a hand lens.

The pathogen does not attack roots, but repeated defoliation and dieback from stem cankers can kill young plants in nurseries. Larger plants lose ornamental value as defoliation becomes severe (Figure. 6).

Transmission and Disease Cycle

The fungus that causes boxwood blight can overwinter on infected plants and in infected leaf litter. The spores produced on infected leaves and stems during the growing season can be splash-dispersed through irrigation or rainfall. This can spread the disease within a plant or to nearby boxwood shrubs.

The disease can also be spread greater distances. This primarily involves moving infected plants through nursery trade and using contaminated tools and transport vehicles that contain fallen, infected leaves.

Hosts

Hosts of the fungus include plants in the Buxaceae family — including species in the genera *Buxus*, *Pachysandra* (Japanese spurge), and *Sarcococca* (sweetbox). American, English, and Korean boxwoods are all susceptible, although there have been reports of varying disease severity among cultivars (Ganci 2013; Shishkoff 2014).

Table 1 on page 3 shows the relative susceptibility of several boxwood cultivars to the boxwood blight fungus.

Disease Management

The best way to manage boxwood blight is to avoid introducing the disease into the nursery or landscape. There are a number of best management practices that have been developed for the nursery and landscape industry.



Figure 4. The black streaks on these stems are typical of boxwood blight. Photo by M. Daughtrey, New York.



Figure 5. When humidity is high, infected stems produce numerous spores. Photo by E. Bush, VPI, Bugwood.org.



Figure 6. Landscape plantings lose ornamental value when defoliation from boxwood blight becomes severe. Photo by D. Golon, New York.

Here are some best management practices to help prevent introducing the boxwood blight fungus:

- **Purchase boxwood plants from reputable nurseries that participate in a boxwood blight compliance agreement.** Ideally, plants should be separated from existing nursery stock and not sprayed with fungicides for one month before installation to watch for any typical symptom development. Be sure to also include pachysandra and sweetbox in your scouting program.
- **Do not shear boxwoods when they are wet to reduce the chance of spreading disease.** Clean and disinfect shearing tools (used on an infected planting) with bleach, ethanol, Lysol, or quaternary ammonia before moving to a new area.
- **Collect and remove debris from pruning or shearing operations that involve infected plants; do not compost debris close to boxwood plants.**

Table 1. Relative susceptibility of several boxwood cultivars to the boxwood blight fungus.

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

Table compiled from research by Ganci, Benson, and Ivors, North Carolina State University, 2012. The most recent cultivar trial results are available at plantpathology.ces.ncsu.edu/pp-ornamentals.

- **Avoid introducing new boxwood plants to landscapes that already have large, historically-important boxwoods.**

Once the disease is detected, sanitation is critical for management. Remove and bag any diseased plants and fallen leaves and dispose of them in municipal waste or bury them. 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, but *do not cure* plants with the disease. The goal of successful chemical applications is to prevent disease. You should apply fungicides when temperatures exceed 60°F and rainfall is expected.

For professional applicators in Indiana, effective products include a rotation of Daconil® (chlorothalonil) or 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 seven to 14 days to protect susceptible boxwood. More resistant varieties require fewer applications.

An accurate diagnosis is very important in managing this disease. If you suspect boxwood blight, send samples of the suspected plant to the Purdue Plant and Pest Diagnostic Laboratory (PPDL) for diagnosis. Nursery growers who suspect the disease is present should also contact an Indiana Department of Natural Resources Division of Entomology and Plant Pathology nursery inspector at 1-866-NOEXOTIC.

To submit a sample to the PPDL, wrap symptomatic leaves and stems in dry newspaper and seal them in two layers of plastic bags. Submission information can be found at ppdl.purdue.edu.

Find Out More

These websites provide additional information about boxwood blight.

Virginia Boxwood Blight Task Force

ext.vt.edu/agriculture/commercial-horticulture/boxwood-blight.html

Horticultural Research Institute

hiresearch.org/HRI/Research_Results/Outside_The_Boxwood.aspx

Connecticut Agricultural Experiment Station

www.ct.gov/caes/cwp/view.asp?a=3756&q=500388

References

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Shishkoff, N., M. Daughtrey, S. Aker, and R.T. Olsen. 2014. Evaluating boxwood susceptibility to *Calonectria pseudonaviculata* using cuttings from the National Boxwood Collection. Plant Health Prog. doi: 10.1094/PHP-RS-14-0033.

Suggested best management practices (BMP's) for boxwood blight Version 2.0 Revised September 2017. hortknowledgecenter.org/getattachment/7068c31f-fee0-4541-bf4a-ac89350be97b/BoxwoodBlightBMPs2017.pdf?lang=en-US.



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