

Prevention and Management of Boxwood Blight

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Common names of the disease: Boxwood blight, box blight, *Cylindrocladium* box blight, blight disease of boxwood, boxwood leaf drop.

Scientific name: Most literature refers to the fungus that causes box blight as *Cylindrocladium buxicola*. This is the Latin binomial given to this fungus in the United Kingdom where the disease was first observed. It is also sometimes referred to as *Cylindrocladium pseudonaviculatum* or *Calonectria pseudonaviculata*, but these names refer to the same fungus and are synonyms.

Symptoms: This disease can significantly impact the appearance and aesthetics of boxwood because the foliage typically becomes blighted and drops from the plant. Symptoms of box blight include: dark- or light-brown, circular leaf spots often with darker margins; dark stem cankers or 'streaks'; straw- to bronze-colored, blighted foliage; and leaf drop. Leaf spots may grow together to eventually cover the entire leaf (pictures on next page). In container boxwood, sometimes only the lower foliage and stems become infected, leaving the tops green and making the plant appear top-heavy. Blighting and defoliation can occur rapidly with complete leaf loss under warm (64 to 80°F) and humid conditions. Shady conditions favor disease development. Under high humidity, white fuzzy masses consisting of numerous spores may be observed on infected stems and leaves; a hand lens will help you see the actual spores. However, these fuzzy masses are often not observed if environmental conditions are not just right (i.e. if relative humidity or temperatures are too low). Most boxwood cuttings are initially propagated in humidity chambers or tents, and liners are often grown in shade; these conditions promote disease development. Therefore, **young boxwood plants are especially at risk if the pathogen is unintentionally introduced into the growing area**. Even after severe defoliation, root systems of box blight-infected plants remain healthy and intact, unlike roots infected with Phytophthora. The stems of infected boxwood typically remain green under the outer bark until a secondary invader or opportunistic pathogen attacks this tissue and eventually kills the plant. The box blight pathogen is often confused or associated with the secondary fungus *Volutella buxi*, known to cause Volutella blight. However, Volutella alone will not cause box blight.

Hosts: Plant species within the genera *Buxus*, *Pachysandra* and *Sarcococca* have been reported as hosts to this fungus. However, there is limited information about the role *Pachysandra* (spurge) and *Sarcococca* (sweetbox) species play as possible vectors for initiating the disease in boxwood. Although the full host-range of this fungus has not been finalized yet, it is believed that only plants within the family Buxaceae can be infected by the pathogen. Research conducted at NCSU in 2012 indicated a wide range in susceptibility of boxwood cultivars to box blight, however *B. sempervirens* types were more susceptible in general, with *Buxus sempervirens* 'Suffruticosa' (English boxwood) and *Buxus sempervirens* 'American' (common or American boxwood) especially susceptible. Refer to http://go.ncsu.edu/boxwood_blight_links for info. This is possibly due to plant genetics, as well as physical features of the plant such as a dense and compact leaf canopy.

Distribution: The pathogen was first discovered in the United Kingdom in the mid-1990's causing a severe blight disease on boxwood (*Buxus* species). It is now considered to be widespread throughout most of Europe, as well as in native boxwood stands in the Republic of Georgia. The pathogen was also discovered in New Zealand in 1998. In late October 2011, the fungus was confirmed for the first time in North America; it has since been found in Connecticut, Maryland, Massachusetts, New York, North Carolina, Ohio, Oregon, Pennsylvania, Rhode Island, Virginia, as well as the Canadian provinces British Columbia, Ontario and Quebec.

Transmission: The primary way this disease spread throughout Europe was the movement of infected plants, cuttings, and boxwood debris (especially fallen leaves). Another significant way this disease spreads is through contaminated tools and workers. Human activities such as pruning also contribute to spread. The sticky fungal spores are readily moved on contaminated tools and equipment, on workers and animals that come into contact with infected foliage, and in water (in splashing rain or overhead irrigation, flood water, runoff water or in

droplets carried by the wind). Spores are unlikely to travel long distances by wind alone. **The greatest potential for long-distance transport of box blight is the movement of infected plants, cuttings, people and tools.**

COMMON SYMPTOMS OF BOX BLIGHT



Circular leaf spots appear before leaf blighting; spots often have a darker (brown to purple) margin.



Dark brown to black stem lesions or 'streaks' are typical symptoms of box blight.

Controlling box blight: Identifying measures for preventing and managing box blight in commercial nursery and field settings is a work-in-progress; researchers are in the process of evaluating fungicides and sanitizers, as well as identifying resistant boxwood cultivars. **All plants infected with box blight should be destroyed, as the chance of further spreading this fungus is highly probable.** Once introduced, limiting movement of this sticky, contagious fungus is VERY difficult and will ONLY be accomplished by ALWAYS following good sanitation practices, including:

- disinfecting pruners and other tools frequently within and between different blocks of plants, especially between different field locations or landscapes in counties suspected to have box blight;
- never working in fields when the plants are wet;
- wearing clean disposable booties or washing off debris and dirt entirely from soles of shoes between different boxwood fields or landscapes, especially in counties suspected to have box blight;
- wearing clean tyveks or laundering clothes between different field locations in counties suspected to have box blight;
- burning or burying box-blight infected plants on-site (composting is not recommended); and
- NEVER discarding boxwood waste material where it could contaminate other boxwood plants.

The best way to sanitize tools is to dip them for **TEN SECONDS** into these products and then allowing the tools to dry: **ethyl or isopropyl alcohol** at 70-100% (most Lysol formulations, grain/rubbing alcohol), **sodium hypochlorite** (10% Clorox or other brands of household bleach- the same as 1 part bleach to 9 parts clean water- made fresh each day), **phenolics** at 0.4-5% (trade name Pheno-Cen), or **quaternary ammonium** at 0.5–1.5% (trade names Greenshield, Consan Triple Action 20, Physan 20).

Quick tips: *Train your staff to recognize symptoms of box blight and scout frequently during conducive weather in spring, summer, and fall; *Purchase incoming plants from certified, reputable growers and inspect new liners and plants upon delivery; *Never introduce suspicious looking or unhealthy plants into a commercial production area; *ALWAYS practice good sanitation measures when working with boxwood; *Apply fungicides **preventively** in commercial nurseries in counties suspected to have box blight during conducive weather in spring, summer, and fall. Refer to http://go.ncsu.edu/boxwood_blight_links; *Get an accurate diagnosis quickly if you start to notice anything odd or unhealthy about your boxwood plants.

Do you have box blight? It is to your benefit -- and to the benefit of the commercial nursery and landscape industry -- to know if you have box blight. If you do, you can take steps to prevent it from spreading to other plants, eliminate it from your grounds, and keep it from being shipped into other areas. The only way to confirm whether a plant has box blight is to submit samples to a professional plant disease diagnostic lab; almost every state has one (see the list below for diagnostic labs in the NE and Mid Central-Atlantic states). Cooperative extension agents should be able to assist you in the submission of samples if you need help. Affected branches, stems, and leaves make the best samples; don't forget to take some pictures.

Diagnostic labs in the NE and Mid Central-Atlantic states:

Connecticut Agricultural Experiment Station: <http://www.ct.gov/caes/site/default.asp>

New Jersey: Rutgers Plant Diagnostic Laboratory: <http://njaes.rutgers.edu/plantdiagnosticlab/>

New York: Cornell Plant Disease Diagnostic Clinic: <http://plantclinic.cornell.edu/>

North Carolina State University Plant Disease and Insect Clinic: <http://www.cals.ncsu.edu/plantpath/extension/clinic/>

Penn State Plant Disease Clinic: <http://plantpath.psu.edu/facilities/plant-disease-clinic>

South Carolina: Clemson Plant Problem Clinic: http://www.clemson.edu/public/regulatory/plant_industry/plant_prob_clinic/

UMass Extension Plant Diagnostic Lab: <http://extension.umass.edu/agriculture/index.php/services/plant-problem-diagnostics>

University of Delaware Plant Diagnostic Clinic: <http://extension.udel.edu/ag/plant-diseases/ud-plant-diagnostic-clinic/>

Univ. of Kentucky Plant Disease Diagnostic Lab: http://www.ca.uky.edu/agcollege/plantpathology/extension/pdd_lab.html

University of Maine Insect and Plant Diagnostic Lab: <http://extension.umaine.edu/ipm/ipddl/>

University of Maryland Plant Disease Diagnostic Lab: <http://www.plantclinic.umd.edu/>

University of New Hampshire Plant Diagnostic Lab: <http://extension.unh.edu/Agric/AGPDTS/PlantH.htm>

University of Rhode Island Plant Protection Clinic: <http://www.uri.edu/ce/ceec/plantclinic.html>

University of Tennessee Soil, Plant and Pest Center: <http://soilplantandpest.utk.edu/>

Virginia Tech Plant Disease Clinic: <http://www.ppws.vt.edu/~clinic/>

West Virginia University Pest Management Program: <http://anr.ext.wvu.edu/pests>

Additional on-line resources for box blight:

The Connecticut Agricultural Experiment Station: <http://www.ct.gov/caes/site/default.asp>

The ANLA boxwood blight website: www.boxwoodblight.org

The North Carolina State University boxwood blight links page: http://go.ncsu.edu/boxwood_blight_links