



Central New Jersey's
Largest Wholesale Nursery

What We Understand About Boxwood Blight Detailed Guide

A document we have created, and will update, to help inform our customers
This version created 11/2018.

Overview

Boxwood Blight is a serious fungal disease of boxwood that results in defoliation and decline of susceptible boxwood. The disease was first identified in New Jersey in 2013.

The fungus thrives in warm, moist conditions (over 68 degrees, consistently damp conditions from persistent rains, and/or high humidity), this is why the summer and fall of 2018 has proven to be such a bad year for susceptible varieties throughout New Jersey, New York, and Pennsylvania.

The disease can impact the landscape contractor in a number of ways, which we will detail throughout this document.

L.P. Statile - we are both growers and re-wholesalers of nursery stock including a wide variety of boxwoods. We know the plant well. We sell to landscape contractors and allied industries. We are at a unique crossroads in the nursery stock business and feel we can add to the practical understanding of this disease. We are seeking to explain to our customers and others interested what we know about the disease and how to manage it.

L.P. Statile has a Boxwood Blight management plan to look for the disease and aggressively seek to manage it. This document is a central part of that plan. We urge you to read it to understand the disease.

Contents

- 1) The Disease
- 2) Identifying Damage
- 3) How It Spreads
- 4) Can I Spray To Prevent Or Control It?
- 5) How To Carefully & Safely Remove Diseased Plants
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1) The Disease

Caused by the fungus *Calonectria pseudonaviculata* (<https://nt.ars-grin.gov/taxadescriptions/factsheets/index.cfm?thisapp=Cylindrocladiumbuxicola>). Common in England for 20 years it was first identified in the United States in 2011 and has now been found in 23 states. It affects boxwood, pachysandra and sarcococca varieties.

It is a fungus that requires warm moist weather to grow and infect plants. It lies dormant until temperatures reach 68 degrees or warmer, with high humidity, for several days. If these conditions are met it springs to life aggressively. Optimum growth occurs at 77 degrees. This disease becomes active in our area (Central New Jersey) in late May through late September if the right weather conditions are present.

The disease can advance very rapidly through a plant. If the proper conditions persist the plant can go from infection to defoliation in as little as 1 week.

The fungus starts slowing it's growth at 80+ degrees, and dies when temperatures hit 87+ degrees or higher. However, ample spores left behind survive and mean a new generation of the fungus can quickly spring to life. Eliminating the fungus in infected plants is not possible, control in the soil is extremely difficult. This is a persistent, destructive fungus that can quickly cause severe damage to one of the most common species of residential and commercial landscape plants.

2) Identifying Damage

Boxwood Blight Identification Guide

INITIAL SYMPTOMS



Dark leaf spots (left) and spores of the boxwood blight fungus (*Calonectria pseudonaviculata*) on lower leaf surfaces (right).

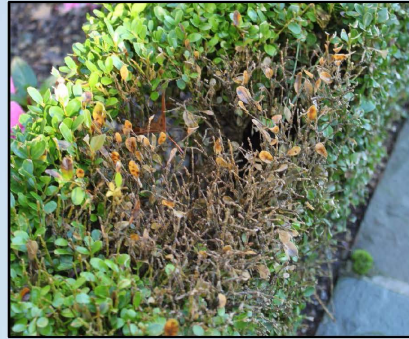


Zonate leaf lesions.



Black stem lesions.

LANDSCAPE AND NURSERY SYMPTOMS

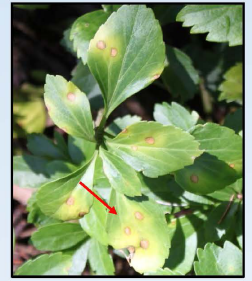


Foliar and stem symptoms result in severe defoliation leading to decline and death of boxwood plants. Boxwood blight affects all species of boxwood, pachysandra, and sarcococca.

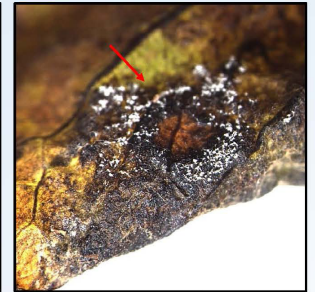
All photos from CAES.
Funding from FY2013 Farm Bill, USDA-APHIS.



Infected boxwood and pachysandra in the landscape (left) and leaf spots on pachysandra (right).



Stem lesions on pachysandra (left) and fungal spores on lower surface of pachysandra leaves (right).



For more information:
www.ct.gov/caes/boxwoodblight
Click To Link To Entire Document



Leaf spot may be the most obvious sign of infection



Underside of the leaves may show white patching



Typically starts at the bottom of the plant and moves up



Amount of defoliation and leaf drop varies. Some leaf retention seems to be more likely than total loss of leaves.



Damage may be patches in the middle of seemingly healthy plants, especially hedges. **Page 2**

- Damage typically starts at the base of the plant and moves upward.
- Leaf spot will be the most obvious clue.
- Once infected, if the weather remains conducive to growth, damage to the plant can occur very rapidly.
- Complete loss of leaves down to bare stem does not always happen. Dead leaves can stay on the plant..
- There is no treatment to rid the infected plant of the fungus.
- If you think you found an infected plants send a stem and foliar sample to a test lab ([NJ Test Lab Link](#)). Please do not bring samples to the nursery.

Click on any picture
to be linked to the
original source

3) How It Spreads

“Boxwood blight spores are splash-dispersed and can be carried by wind or wind-driven rain over short distances’. (*Water either from rain or irrigation hits a leaf that is infected, which catapults spores from one leaf to the next, or to other plants that are within a few inches. This is why hedge plantings/group plantings of Boxwood are particularly susceptible to quick and widespread damage*). Longer distance spread is thought to occur through the activities of humans (e.g., contaminated boots, clothing, and equipment), animals, and birds, since the spores are sticky”.

Source: University Of Connecticut Agricultural Extension Center Guide

http://www.ct.gov/caes/lib/caes/documents/publications/fact_sheets/plant_pathology_and_ecology/boxwood_blight- a_new_disease_for_connecticut_and_the_u.s._12-08-11.pdf

The regular activity of a landscape crew not only within a single property, but through an entire day, week and beyond can impact the spread of this disease. One article pleaded that infected plants not be transported in the back of a truck unless they are bagged, for fear of wide spread dispersal of infecting spores. We suggest contractors think about these transmission issues.

- 1) If we have a suspected case of Boxwood Blight do we have a plan?
- 2) Do we spray with fungicides before removing all or part of the plant and all leaf debris? After?
- 3) Does everyone working understand that tools (loppers, pruners, hand saws etc.) can spread the disease not only on this property but at properties later in the day or week?
- 4) It is not just tools that can spread the spores (which are sticky). Clothes, shoes, wheelbarrow tires etc. can all disperse spores.
- 5) Does everyone have access to disinfectant spray bottles filled with a 5% bleach solution (9 parts water, 1 part - bleach) or to avoid bleaching-out clothes or shoes Lysol concentrate (O-Benzyl-P-Chorophenol), Lysol spray (Ethanol), or Zeritol (Hydrogen Dioxide.)? Does everyone understand the importance of spraying tools, gloves, shoes, etc. within a jobsite and before leaving?

4) Can I Spray To Prevent It Or Control It?

From our research, we believe the answer is a qualified Yes, but it is not 100% certain that even a perfectly executed spray program will prevent all infections. However, if you have a boxwood situation that is critical to a landscape and want to do your best to avoid infection, spraying could help. Keep in mind that any spray program calls for repeated fungicide applications (7 to 14-day intervals, according to product label) to susceptible boxwood throughout the growing season for the life of the boxwood plants.

Spraying Recommendations

Research on this issue produced an incomplete picture but some trends were clear.

- 1) Fungicides cannot eradicate the disease from infected plants.
- 2) Once the disease is on a property, even a perfectly executed fungicide spray program may not halt progression of the disease.
- 3) Here are specific recommendations from a comprehensive guide published by Purdue University’s Agricultural Extension Service (<https://www.extension.purdue.edu/extmedia/BP/BP-203-W.pdf>)

“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), Cleary’s 3336® (thiophanate- methyl), and Spectrol 90WDG (Chlorothalonil). The Virginia Tech Boxwood Blight Task Force also lists these fungicides: Broad Spectrum Landscape & Garden Fungicide (Ferti-lome); Vegetable, Flower, Fruit and Ornamental Fungicide (Hi-Yield); Fung-onil (Bonide); Ortho Max Garden Disease Control or Ortho Disease B Gon (Scotts)

(Sources: Purdue University in Indiana, Virginia Cooperative Extension, saundersbrothers.com)

You will need to apply fungicides every seven to 14 days to protect susceptible boxwood. More resistant varieties require fewer applications.”

- There is no cure for infected plants. The fungus cannot be eliminated from the plant, leaf droppings, mulch and soil.
- Infection does not absolutely kill all plants. It may modestly to severely damage a plant but it appears that some damaged plants can regrow to some degree. For example, damage may be in parts of a hedgerow, not every plant.
- The individual contractor has to make case by case decisions. If a client has an important Boxwood planting, preservation of damaged plant(s) may be a consideration.

Recommendations for the use of agricultural chemicals are included here as a convenience to the reader. The use of brand names and mention or listing of commercial products does not imply endorsement nor discrimination against similar products or services not mentioned. Individuals who use agricultural chemicals are responsible for ensuring that the intended use complies with current STATE regulations and conforms to the product label. Examine a current product label before applying any chemical. For assistance, contact your county Cooperative Extension agent.



5) How To Carefully & Safely Remove Diseased Plants

Overwhelmingly our research and reading indicates that best thing to do is to carefully remove diseased plants

- A) Be aware that removing diseased boxwood and leaf debris will not eradicate the boxwood blight pathogen from the location, since the pathogen produces long-lived survival structures that can persist in the soil for 5 to 6 years, possibly longer.
- B) Remove diseased boxwood and leaf litter promptly.
- 1) It is best to do cleanup on sunny dry days when sporulation is lessened. Consider using fungicides in advance of cleanup(spray in and around plant(s) to be removed).
 - 2) Remove the plant top/foilage first while taking care not to spread leaf litter. If possible place a garbage bag over the plant prior to removal.
 - 3) Remove leaf litter from soil surface by vacuuming, raking, or sweeping. If leaf debris has been incorporated into the soil, removing soil to a depth of 8" to 12" may help eliminate fungal inoculum of the pathogen. Diseased boxwood, leaf debris, and soil should be double bagged and removed to the landfill OR buried 2' deep in soil away from boxwood plantings. Burning woody stems can also destroy the fungus, but may be illegal

Do not compost boxwood debris or plant material

Research constantly states the importance of cleaning up leaf litter (dead or dying leaves that have dropped and littered the ground underneath the plant).

- 4) Some recommendations suggest removing all similar boxwood species within 10 feet of the infected plant, to reduce the chance of spreading to a much larger area.
- 5) Fungal spores will stick to tools, equipment, etc., sanitize all tools, equipment, tarps, shoes, gloves, etc., used after removing plants to prevent spread of fungal inoculum to healthy boxwood. Use a 5% bleach solution or other recommended disinfectant (pour 1 part 5% liquid bleach and 9 parts water into a bucket or sprayer) to treat tools and equipment. To avoid bleaching-out clothes or shoes consider Lysol concentrate (O-Benzyl-P-Chorophenol), Lysol spray (Ethanol), or Zeritol (Hydrogen Dioxide).
- 6) Dispose of bags in a landfill or bury 2' deep.

Sources

Virginia Cooperative Extension - Best Management Practices for Boxwood Blight in the Virginia Home Landscape
https://pubs.ext.vt.edu/content/dam/pubs_ext_vt_edu/PPWS/PPWS-29/PPWS-29-pdf.pdf , Assorted other sources.

Make sure your crew has larger garbage bags in the truck(s).
Do not transport unbagged stems, leaf debris or soil.



6) What To Replant

If a property has boxwood blight we recommend you strongly consider not planting boxwood of any variety on that property in the infected area.

There is no question that the evergreen habit, shapeable form, and deer resistance of Boxwood are hard to pull into a single plant. Here are some thoughts from a University Of Georgia article and our own recommendations on possible substitutes for boxwood.

Deer Resistant Substitutes

- Osmanthus cultivars such as 'Goshiki', 'Gulf Tide'
- Andromeda (Pieris) dwarf and upright varieties
- Ilex glabra cultivars include 'Compacta' and 'Shamrock'
- Cephalotaxus cultivars include 'Fastigiata', 'Prostrata' and 'Duke Gardens'
- Japanese falsecypress (Chamaecyparis pisifera) cultivars such as 'Golden Mop', 'Filifera Aurea'
- Skimmia
- Prunus laurocerasus 'Otto Luyken'
- Barberry cultivars include 'Crimson Pygmy', 'Royal Burgundy', 'Rose Glow'
- Juniper cultivars include 'Sea Green', 'Old Gold', 'Mint Julep', 'Gold Star'
- Hybrid Mountain laurel varieties
- Nandina 'Domestica', 'Gulf Stream' 'Firepower'
- Leucothoe cultivars such as fontanesiana, axillaris

Non Deer Resistant Substitutes

- Taxus cultivars such as Densiformis, Hatfield, Hicksi, Repandens
- Japanese Holly (Ilex crenata) cultivars such as 'Compacta,' 'Green Luster,' 'Hoogendorn,' 'Helleri,' 'Steeds', and 'Chesapeake'
- Evergreen azaleas (Rhododendron sp.)
- Euonymus cultivars such as Silver King, Golden, Manhattan
- Ilex x meserveae cultivars include 'Blue Maid', 'Blue Princess', 'Blue Prince', 'China Girl, 'China Boy'

Source - University Of Georgia 'Think Outside The Boxwood'
https://secure.caes.uga.edu/extension/publications/files/pdf/C%201107_1.PDF

& LP Statile's recommendations are mixed in.

Substitute Plant Sampler

Pictures taken at our Colts Neck yard



Osmanthus, False-holly 'Goshiki' left, 'Gulf Tide' right



Springfield, NJ
Colts Neck, NJ
lpstatile.com



Nandina



Ilex Shamrock



Pieris, both upright and dwarf varieties



Ilex Compacta



Ilex Steeds

7) Design Considerations - Should you continue to use Boxwood?

Different boxwood species have different susceptibility to Boxwood Blight. You should strongly consider using the more resistant varieties or substitution plants in future designs. Susceptibility to Boxwood Blight is listed below from most susceptible to least.

Highly Susceptible To Boxwood Blight

- B. sempervirens 'Suffruticosa'
- B. sinica var. insularis 'Justin Brouwers'

Susceptible

- B. sempervirens 'American'
- Buxus X 'Glencoe' (Chicagoland Green)
- B. sempervirens 'Marginata'
- B. sempervirens 'Elegantissima'

Moderately Susceptible

- B. sempervirens 'Vardar Valley'
- B. microphylla var. japonica 'Baby Gem'
- B. microphylla var. japonica 'Baby Jade'
- Buxus X 'Green Mountain'
- Buxus X 'Green Velvet'

Moderately Resistant

- B. microphylla 'Winter Gem'
- B. microphylla 'John Baldwin'
- B. microphylla 'Faulkner'
- B. sempervirens 'Dee Runk'
- B. sempervirens 'Fastigiata'
- Buxus 'Green Gem'

Most Resistant

(recommended for new plantings)

- B. microphylla 'Golden Dream'
- B. sinica var. insularis 'Nana'
- B. sinica var. insularis 'Franklin's Gem'
- B. microphylla var. japonica 'Green Beauty'

Source: North Carolina State - 2012 + Additional Sources

8) Summary For Landscape Contractors

- 1) The disease is present in NJ and you are likely to see it in the near future if you haven't already.
- 2) Circulate this or other documents to employees. You can print our 2 page field guide from this PDF and circulate amongst the staff. Everyone can benefit from knowing more.
- 3) Have a Boxwood Blight plan in effect. If you find it, what do you do?
- 4) If you believe you will spray make sure your license is up to date, that you understand a sample program, that you can source the fungicides, etc.
- 5) Have large garbage bags available to bag infected plants. Sample: product from Amazon ([link](#))
- 6) Have spray bottles filled with 5% solution of bleach available (9 parts water/1 part bleach) for disinfecting tools. Use Lysol concentrate (O-Benzyl-P-Chorophenol), or Lysol spray (Ethanol) for clothing and shoes.
- 7) Use less susceptible varieties for future designs.
- 8) Use alternative plants as replacements if needed, and also for future designs.
- 9) Think through the revenue and cost issues of this disease. Losses may cost you. Inspection and preventative treatment services may produce revenue.

Links (listings may include personal comments about a source)

University & Government Web Sites

The Connecticut Agricultural Experiment Station (www.ct.gov/caes)

https://www.ct.gov/caes/lib/caes/documents/publications/fact_sheets/plant_pathology_and_ecology/boxwood_blight- a_new_disease_for_connecticut_and_the_u.s._07-20-12_r.pdf Awesome Guide - Deep, Great Pictures

Purdue University Extension Service

<https://www.extension.purdue.edu/extmedia/BP/BP-203-W.pdf>

Great article, great pictures,

Alternatives To Boxwood - University Of Georgia - PDF

https://secure.caes.uga.edu/extension/publications/files/pdf/C%201107_1.PDF

Developed for Georgia landscapes but a lot of plants that work well in NJ, PA, NY are included

State Of NJ - Boxwood Blight Cleanliness "Best Management Practices" (BMP'S) guidelines:

<https://www.state.nj.us/agriculture/divisions/pi/pdf/BoxwoodBMP.pdf>

Rutgers University - Plant Pest Advisory

<https://plant-pest-advisory.rutgers.edu/boxwood-blight-confirmed-in-new-jersey/>

From NJ's State University

Virginia Tech • Virginia State University Best Management Practices for Boxwood Blight in the Virginia Home Landscape

https://pubs.ext.vt.edu/content/dam/pubs_ext_vt_edu/PPWS/PPWS-29/PPWS-29-pdf.pdf

Great bulletin. Can be printed and given to NJ homeowners. 6 pages - packed with information

Labs & Extension Agent Locations

Cooperative Extension County Offices - List of County Agricultural Extension Agent locations

<https://njaes.rutgers.edu/county/>

New Jersey Agricultural Experiment Station - Plant Diagnostic Laboratory, North Brunswick, NJ

<https://njaes.rutgers.edu/plant-diagnostic-lab/>

Spanish Fact Sheet

Connecticut Agricultural Experiment Station - Comprehensive document in Spanish

http://www.ct.gov/caes/lib/caes/documents/publications/fact_sheets/plant_pathology_and_ecology/caes_alerta_de_enfermedades_tizón_de_madera_de_boj_07-30-12_final.pdf

Science Web Sites

US National Library of Medicine - Boxwood blight: an ongoing threat to ornamental and native boxwood.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5932091/>

A good science article with deep links to current research.

Additional Links Visited & Referenced

Virginia Cooperative Extension - Boxwood Blight Task Force
<https://ext.vt.edu/agriculture/commercial-horticulture/boxwood-blight.html>

JPEG Photo https://www.ct.gov/caes/lib/caes/documents/special_features/boxwood_blight/boxwood_blight_identification_guide_11_x_17_final_300_dpi.jpg

Connecticut Agricultural Experiment Station
<https://www.ct.gov/caes/cwp/view.asp?a=3756&q=500388>

Nature.com articles
<https://www.nature.com/articles/srep26140/figures/1>

North Carolina State University <https://plantpathology.ces.ncsu.edu/wp-content/uploads/2013/05/lvors-box-blight-fungicides.pdf?fwd=no>

University Of Kentucky
<https://plantpathology.ca.uky.edu/files/ppfs-or-w-20.pdf>

Saunders Brothers Growers
<https://www.saundersbrothers.com/index.cfm/fuseaction/home.showpage/pageID/152/index.htm>

Rutgers University - Boxwood Blight
http://ir4.rutgers.edu/Ornamental/SummaryReports/NJNLA_NJPlants_BoxwoodBlight_20140121.pdf



<https://www.nature.com/articles/srep26140/figures/1>



https://pubs.ext.vt.edu/content/dam/pubs_ext_vt_edu/PPWS/PPWS-29/PPWS-29.pdf.pdf



<http://blogs.cornell.edu/nysipm/2018/09/20/boxwood-blight-is-breaking-the-bank/>



https://www.canr.msu.edu/uploads/files/Boxwood_blight_TomDudek.pdf



<https://plant-pest-advisory.rutgers.edu/bbr-boxwood-blight-revisited/>



Larkin Lacey & Kelly Iverson, NCSU Dept. of Plant Pathology

Fungus growing on stem

<https://extension.umd.edu/hgic/topics/boxwood-culture-and-diseases-including-boxwood-blight>



http://ir4.rutgers.edu/Ornamental/SummaryReports/NJN-LA_NJPlants_BoxwoodBlight_20140121.pdf



Central New Jersey's
Largest Wholesale
Nursery

Springfield, NJ
Colts Neck, NJ
lpstatile.com