



BOXWOOD BLIGHT BEST MANAGEMENT PRACTICES



Version 2.0, Revised September 2017

Endorsements:

AmericanHort
Boxwood Blight Working Group
Horticultural Research Institute
National Plant Board

SUGGESTED BEST MANAGEMENT PRACTICES (BMP'S) FOR BOXWOOD BLIGHT

Version 2.0
Revised September 2017

Updates to the recommendations will be made as more information regarding the disease and its management comes to light.

The following voluntary industry-recommended BMPs were designed to provide guidelines to help growers manage the risk of boxwood blight (*Calonectria pseudonaviculata*) introductions and respond if the disease is confirmed on nursery grounds. These suggestions are based largely on BMPs promoted by the Connecticut Agricultural Experiment Station (CAES), the Oregon Department of Agriculture, and the Virginia Polytechnic Institute and State University and have received the support of the industry, coordinated by AmericanHort and the Horticultural Research Institute (HRI). These recommendations are strictly voluntary and are intended to provide guidance that is practical in terms of cost and benefit, relevant to multiple types of production, and takes into consideration the diversity of nursery sizes, their regional climatic conditions, and their production systems. All statements regarding plant material pertain only to *Buxus*, *Pachysandra*, and *Sarcococca* species and are not to be interpreted more broadly. Please be advised that holiday boxwood greenery and germplasm are also known as potential boxwood blight carriers.

These best management practices are presented and suggested for voluntary adoption by nursery growers producing *Buxus* spp. and other boxwood blight host plants. They were developed by a working group convened by the Horticultural Research Institute, the research affiliate of AmericanHort, with review and input from the National Plant Board (NPB). The NPB developed a model compliance agreement for growers either choosing to operate under a formal compliance agreement, or required to after detection of boxwood blight at their place of production. Growers should be advised that if operating under a compliance agreement, key aspects of the best management practices, such as record-keeping, may become legally binding and subject to oversight by state plant regulatory personnel.

UPDATED BEST MANAGEMENT PRACTICES

Individual nurseries are encouraged to review the recommended practices and apply some or all of them, depending on their specific circumstances.

A) Training

- a. Educate personnel to recognize the disease symptoms and know what to do if symptoms are observed.
 - i. Early detection is critical; train personnel to recognize and report disease symptoms.
 - ii. Train personnel in BMPs, including sanitation.
 - iii. If a diseased plant is suspected, contact your state agricultural department or your local/regional National Plant Diagnostic Network laboratory (www.npdn.org) to submit a sample for confirmation.

B) Mitigate Accidental Introduction

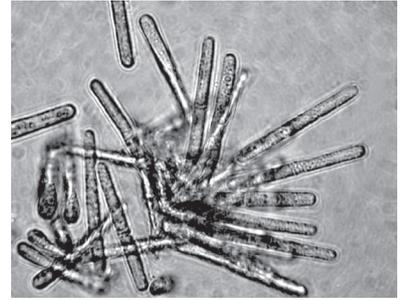
- a. Propagate locally to avoid accidental introduction by incoming plant material whenever possible.
 - i. Avoid acquiring cuttings from high traffic and public areas, such as parks, parking lots, hedgerows along walkways, and cull piles.
 - ii. Inspect mother plants for signs and symptoms prior to taking cuttings.
 - iii. Avoid treating mother plants with fungicides in order that symptoms of disease will be evident, unless stock and site are known to be disease free.
 - iv. Place a physical barrier between containerized boxwood and the ground, such as a weed barrier cloth or gravel to facilitate leaf debris cleanup.

- b. When purchase is necessary.
 - i. Purchase only from reputable suppliers, ideally nurseries that are licensed and/or certified according to applicable phytosanitary laws and regulations.
 - ii. Trained nursery personnel should inspect plants and cuttings for signs and symptoms at the time of purchase.
 - iii. Separate plants obtained from different vendors.
 - iv. New buy-in's meant for production should be separated by a physical barrier or break (minimum 3 meters) from host plant nursery production stock for a minimum of 30 days.
 - v. Suspend the use of fungicides on new plants during the holding period.
 - vi. Re-inspect material regularly, based on environmental conditions conducive for disease development (warm, wet/humid, 60-80°F).
 - vii. Plants with suspicious symptoms of boxwood blight should be sent for diagnosis to your agricultural department or your local/regional National Plant Diagnostic Network laboratory (www.npdn.org).
- c. Returned plants.
 - i. Avoid accepting returns on-site.
 - ii. No dead material should be accepted nor disposed of on-site.
 - iii. Do not compost returned material.

C) Mitigate Local Spread as if There Were an Accidental Introduction.

- a. Follow standard in-field sanitation practices.
 - i. Crews should begin work with the block or house with lowest likelihood of infection (lots from previous seasons) and finish with the blocks with highest risk (recent buy-ins).
 - ii. Individual pruning crews should work on a single house or block at a time.
 - iii. Equipment should be sanitized between blocks.
 - iv. Pruning should be done when plants are dry or during low humidity periods, when possible.
 - v. Do not over-prune plants.
 - vi. Remove debris from production area and dispose of properly, by placing in cull or compost piles.
 - vii. Keep boxwood at least 3 meters from *Pachysandra* and *Sarcococca*.
 - viii. Insert a 3-meter barrier block (non-host plant such as *Nandina* or other non-host plant) between boxwood and *Pachysandra* or *Sarcococca*.

- b. Holding areas, delivery trucks, potting mixes, and containers.
 - i. Locate the holding area on concrete, asphalt, or weed mat over gravel or plastic, if possible.
 - ii. Surfaces should be cleared of plant debris and standing water.
 - iii. Avoid bringing in plant diggers or large equipment that may have worked on sites where boxwood blight has been introduced.
 - iv. Clean and sanitize equipment as much as possible before it enters nursery property.
 - v. Do not allow customer vehicles into the production areas of a nursery.
 - vi. Use new or sanitized pots and flats for boxwood production.
 - vii. Use new potting mixes and compost, free of boxwood debris.



Photos courtesy Margery Daughtrey, Cornell University.

Top to bottom:
Calonectria pseudonavicularata spores

Boxwood blight in the landscape

Blighted leaves and distinct black stem cankers caused by BB

C. pseudonavicularata white sporulation



Photos courtesy Margery Daughtrey, Cornell University.

Top to bottom:
Characteristic circular, black lesions caused by the BB fungus

Close-up of sporulation on the underside of a leaf shows the orangey sporulation of *Volutella buxi* and the white sporulation of *C. pseudonaviculata*, for comparison

Boxwood dying from the bottom up, from BB. Note black cankers and defoliation

- viii. To avoid cross-contamination, clean pots and new potting mix should be stored in an area away from any cull piles or production beds and protected from drainage/irrigation water.
- c. Water management – water is an important part of disease dispersal.
 - i. Avoid overhead watering when possible.
 - ii. Water plants in the morning hours unless weather conditions require additional watering.
 - iii. Direct runoff water from holding areas and compost and cull piles away from production areas.
 - iv. Prevent the accumulation of pooling water in growing blocks.
 - v. Space plants to allow for air circulation.
- D) Scouting and Evaluating On-Site Boxwood, *Pachysandra*, and *Sarcococca* Material
 - a. On-site host plant material from previous seasons should be inspected by trained nursery personnel for signs and symptoms of boxwood blight on a regular basis; frequency to be based on environmental conditions conducive for disease development (warm, wet/humid, 60-80°F).
 - b. Restrict access to and do not sell boxwood with suspicious symptoms until they have been inspected and cleared.
- E) Pathogen Eradication and Containment – if a boxwood sample from the nursery has been confirmed as having boxwood blight by a laboratory
 - a. All infected plants and plant debris should be burned, buried a minimum of 2 ft. below the surface, or disposed of in an approved landfill or incinerator.
 - b. Cover or bag diseased plants before transport.
 - c. Do not move during rain events.
 - d. If plants are too big to bag, then burn or bury them on-site or transport in a covered trailer for disposal. Clean trailer with a disinfectant (such as a quaternary ammonia-based product) after use.
 - e. Remove all fallen leaf and plant debris from areas where pathogen is detected.
 - f. Do not compost infected plant material.
 - g. Bury or disinfect pots but do not reuse in boxwood production.
 - h. Clothing, equipment, and vehicles used during the disposal of diseased plants should be sanitized before reentering production areas; outer clothing of workers who conduct disposal should either be disposable or laundered before returning to the nursery.
- F) Record Keeping. Accurate and detailed records of the following activities should be maintained a minimum of 12 months for traceability, if possible.
 - a. Plants moving off-site.
 - i. Quantity
 - ii. Destination
 - b. Plants brought on-site.
 - i. Quantity
 - ii. Source
 - c. Plant propagation techniques.
 - d. Location of receiving and holding areas.
 - e. Mortality due to any boxwood blight-suspicious cause(s).
 - f. Diagnostic records.
 - g. Fungicide treatments.
 - h. Inspection records.
 - i. Personnel training.
 - j. Weather records, if available.