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**BOXWOOD BLIGHT – A NEW DISEASE OF BOXWOOD IN THE NURSERY  
AND LANDSCAPE IN ALABAMA**

A. K. Hagan<sup>1</sup> and Kassie Conner<sup>2</sup>

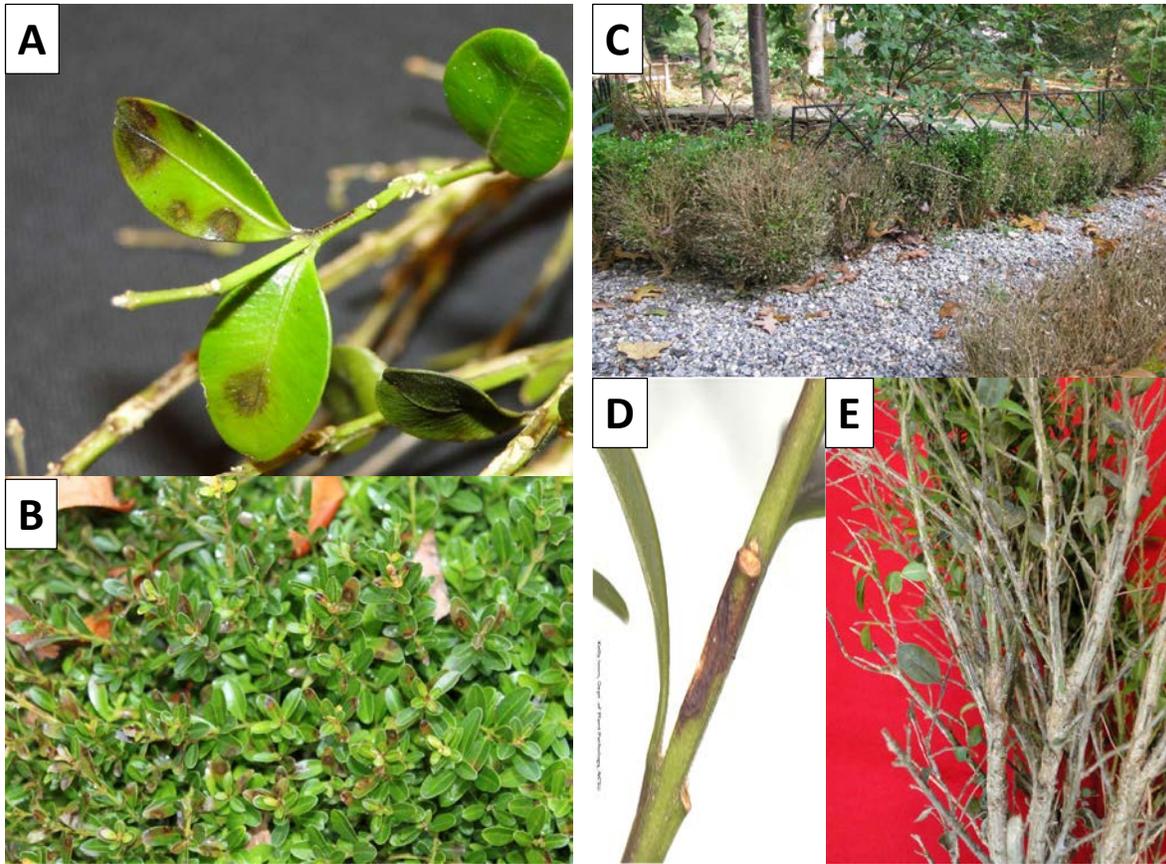
<sup>1</sup>Extension Plant Pathologist and Professor, Dept. Entomology and Plant Pathology

<sup>2</sup>Diagnostician, Plant Diagnostic Laboratory  
Auburn University

Within the past year or two, boxwood blight, which is characterized by a leaf blight and shoot dieback of several boxwood (*Buxus* spp.) species, has jumped the ‘pond’ from England and/or Western Europe to the U.S. Through the early winter months, this disease has primarily been found on boxwood in both the landscape as well as container and field-grown nursery stock in the New England and Mid-Atlantic States into Ohio, Virginia and North Carolina, as well as Oregon. This disease has also recently been identified on boxwood in a Birmingham residential landscape. Eventually, boxwood blight will be introduced into nurseries nationwide on diseased liners and container stock as well into landscapes via diseased plants.

**Symptoms**

The causal fungus *Cylindrocladium pseudonaviculatum* (*C. buxicola*) infects the leaves, shoots, and main stem(s) of boxwood. On the leaves, early symptoms appear as light to dark brown spots that often have a dark brown border (Fig. 1A). Leaf spots, which may coalesce to cover much of the leaf surface (Fig. 1B), may eventually exhibit a zonate or ‘target spot’ pattern. Eventually, badly diseased brown or straw-colored leaves are shed leaving the diseased plants almost completely defoliated (Fig. 1C). Brown to reddish-brown colored lesions with tan to light brown centers form on the shoots and larger stems (Fig. 1D). Later the lesion surfaces as well as the underlying tissues turn black (Fig. 1E). Boxwood typically does not succumb to boxwood blight. Symptomatic nursery field or container stock is unattractive and unsalable, while diseased plants in the landscape are unsightly and may not recover even with appropriate fungicide treatments. Unlike some *Cylindrocladium* spp., the causal fungus of boxwood blight does not cause a root rot.

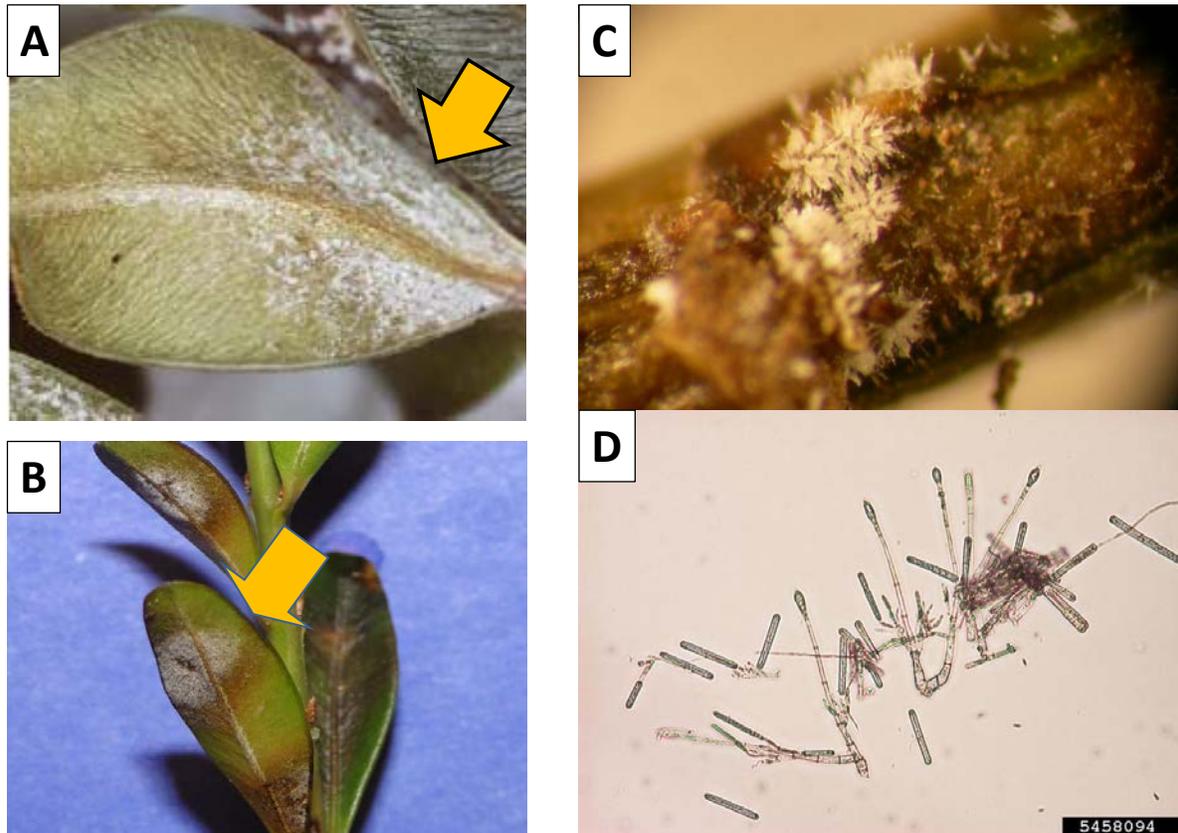


**Figure 1.** Boxwood blight A) leaf spot on leaf; B) leaf spotting in upper canopy; C) defoliating boxwood; D) lesion on shoot; and E) numerous shoot and stem lesions on boxwood.

### Pathogen Biology

The causal fungus *C. pseudonaviculatum* readily sporulates on leaves and shoots (Fig. 2A). On the leaf undersides, a white layer of fruiting structures called sporodochia are formed on which conidia are produced (Fig. 2B). Similar structures may also be seen forming on stem lesions (Fig. 2C). The cylindrical, hyaline (clear) conidia are splash dispersed short distances to healthy leaves and shoots (Fig. 2D). Long distance spread occurs via the distribution of 'diseased' liners and nursery stock, which in reality may appear perfectly healthy until exposed to weather patterns favoring infection and subsequent symptom development. While disease may develop over a wide range of temperatures up to 86F, ideal temperatures are in the mid-60's to mid-70's. Summer afternoon temperatures above 91F over a week may be lethal to the causal fungus *C. pseudonaviculatum*. Depending on the location, disease development on container or field stock in Alabama would most likely occur in mid-fall into mid-spring during extended periods of wet weather. While winter disease development would slow in North Alabama due to low night temperatures, weather patterns may favor boxwood blight development during the winter months near the Gulf Coast. Disease development is also likely to occur all winter in North Alabama on container stock or liners stored in unheated poly houses.

North Alabama on container stock or liners stored in unheated poly houses.



**Figure 2.** Boxwood Blight A) white layer of sporodochia and conidia on the boxwood leaf; B) sporulation on underside of leaf in lesion area; C) close up of sporodochia on dead shoot; and D) cylindrical, hyaline conidia.

### Host Range

Boxwood blight has been reported on all cultivated species of boxwood, though there are differences in species and cultivar susceptibility to this disease. The English boxwood (*Buxus sempervirens* 'Suffruticosa') and American or common boxwood (*B. sempervirens*) are likely to suffer from heavy leaf spotting, defoliation, and shoot dieback. Cultivars of the Korean (*B. sinica* var. *insularis*), Japanese (*B. microphylla* var. *japonica*), littleleaf (*B. microphylla*), and hybrid boxwoods (*B. sinica* var. *insularis* x *B. sempervirens*) are hosts of boxwood blight. A list of cultivars and species of boxwood that potentially may be damaged by boxwood blight can be found in Table 1.

**Table 1.** List of boxwood blight susceptible boxwood taxa.

Host	Cultivar	Host	Cultivar
<b>Japanese Boxwood</b>	'Baby Gem'	<b>Korean Boxwood</b>	'Justin Brouwers'
	'Green Beauty'		'Winter Gem'
	'Morris Midget'		'Winter Green'
	'National'	<b>Hybrid Boxwood</b>	'Big Leaf Gordo'
	'North Star'		'Green Mountain'
<b>American Boxwood</b>	'Angustifolia'		'Green Gem'
	'Arctic Emerald'		'Green Velvet'
	'Blauer Heinz'		'Chicagoland'
	'Compacta'	'Green Ice'	
	'Elegantissima'	<b>English Boxwood</b>	'Suffruticosa'
	'Graham Blandy'		'Suffruticosa variegata'
	'Jade Pillar'		
	'Latifolia Maculata'		
'Memorial'			
'Variegata'			

## Control

For Alabama nursery producers, scouting current stock as well as incoming liners and other plant material will be the key to preventing the accidental introduction of boxwood blight into a field or container nursery. As previously noted, this disease is being spread on liners, B&B, and container stock from nursery to nursery as well as from the nursery into home landscapes. Ideally, boxwood stock plants and liners should be sourced from nurseries in areas of the U.S., where boxwood blight has not yet been found. Alabama propagators should propagate cuttings taken from healthy stock plants known to be free of boxwood blight and other foliar diseases such as *Volutella* blight rather than newly purchased plant material. Regardless of the source, all incoming liners, B&B, and container boxwood stock received by a nursery must be isolated from existing stocks and monitored for several weeks when weather patterns favor disease development to see if foliar symptoms appear. As a further precaution, boxwood blocks, regardless of age and container size, should be scattered around a nursery rather than located in a single block. Should suspicious leaf spot or blight symptoms appear, immediately send a sample to the Auburn University Plant Diagnostic Laboratory and isolate disease stock.

Should boxwood blight be diagnosed, burning and not recycling or composting diseased stock and media is recommended. Other sanitation practices that will help slow disease spread include sanitizing any reused containers as well as collecting and burning fallen leaves and other boxwood debris. Refer to ANR-359, 'CONTROL OF DISEASES ON TREES AND SHRUBS' <https://sites.aces.edu/group/timelyinfo/Documents/pp359.pdf> for additional information concerning the use of sanitation and other management practices to reduce the risk of disease in container and field grown nursery stock.

**Table 2.** Reaction of boxwood taxa to boxwood blight.

Highly Susceptible	Susceptible	Moderately Susceptible	Moderately Tolerant	Tolerant
Common boxwood <i>B. sempervirens</i> 'Suffruticosa'	<i>Buxus</i> x 'Glencoe' (Chicagoland Green)	Littleleaf boxwood <i>B. microphylla</i> var. <i>japonica</i> 'Morris Dwarf'	Hybrid boxwood <i>B. x 'Green Mound'</i>	Littleleaf boxwood <i>B. microphylla</i> 'John Baldwin'
Littleleaf boxwood <i>B. sinica</i> var. <i>insularis</i> 'Justin Brouwers'	Littleleaf boxwood <i>B. microphylla</i> var. <i>japonica</i> 'Morris Midget'		Hybrid boxwood <i>B. x 'Conroe'</i>	Common boxwood <i>B. sempervirens</i> 'Fastigiata'
Common boxwood <i>B. sempervirens</i> 'Elegantissima'	Littleleaf boxwood <i>B. microphylla</i> var. <i>japonica</i> 'Morris Dwarf'		Littleleaf boxwood <i>B. microphylla</i> 'Green Pillow'	Common boxwood <i>B. sempervirens</i> 'Dee Runk'
Common boxwood <i>B. sempervirens</i> 'American'	American boxwood <i>B. sempervirens</i> 'Jensen'		Littleleaf boxwood <i>B. microphylla</i> 'Grace Hendrick Phillips'	Littleleaf boxwood 'Winter Gem'
			Littleleaf boxwood <i>B. microphylla</i> 'Jim Stauffer'	Littleleaf boxwood 'Golden Dream'
			Hybrid Boxwood <i>B. 'Green Gem'</i>	Harland boxwood <i>B. harlandii</i>
				Littleleaf boxwood <i>B. sinica</i> var. <i>insularis</i> 'Nana'
				Littleleaf boxwood <i>B. macrophylla</i> var. <i>japonica</i> 'Green Beauty'

From: Ganci, M., D. M. Benson, and K. L. Ivors. Susceptibility of Commercial Boxwood Varieties to *Cylindrocladium buxicola*.

Boxwood varieties greatly differ in their reaction to boxwood blight. Common boxwood *Buxus sempervirens* 'Suffruticosa', *B. sempervirens* 'Elegantissima', 'American', 'Marginata', and 'Jensen' and littleleaf (Korean) boxwood *B. sinica* var. *insularis* 'Justin Brouwers' are highly susceptible to this disease and are most likely to suffer heavy leaf spotting followed by premature defoliation and shoot dieback. Other boxwood blight-susceptible boxwoods include *Buxus* x 'Glencoe' (Chicagoland Green), and littleleaf (Japanese) boxwood *B. microphylla* var. *japonica* 'Morris Midget' and 'Morris Dwarf'. In contrast, the littleleaf boxwood *B. microphylla* 'Golden Dream' and 'Green Beauty', littleleaf (Korean) boxwood *B. sinica* var. *insularis* 'Nana' and Harland boxwood *B. harlandii* proved highly tolerant to this disease.

While fungicides can be used to prevent the spread of boxwood blight to healthy plants, they will not 'cure' diseased nursery stock or landscape plants. Ideally, protective fungicide applications should be made to liners during the rooting process to prevent the accidental introduction and subsequent spread of boxwood blight. Depending on the location, fungicide treatments may be needed on Alabama-grown boxwood in the spring and fall when mild and wet weather patterns favor disease development. Along the Gulf Coast, the treatment window for boxwood blight control may extend through the winter months. Since the fungus can attack all above-ground plant parts, thorough coverage of the leaves, shoots, and stems with the fungicide mixture will also be critical for control of boxwood blight.

Currently, limited information is available concerning the efficacy of available fungicides or the ideal treatment schedule required to control boxwood blight in the U.S. Fungicides for controlling boxwood blight are listed in Table 2. Please refer to the product label for use instructions and restrictions, particularly the target hosts, surfactant guidelines, and re-entry periods. Also, many fungicides cleared for use in nurseries and garden centers are not registered for use in commercial or residential landscapes. Since numerous fungicide screening trials are likely to be conducted for the control of boxwood blight, modifications of the fungicide list are likely to occur. In a 2012 NCSU study (Ivors *et al.* 2013), superior boxwood blight control was obtained with Bravo WeatherStik (chlorothalonil), Medallion (fludioxonil), Palladium (cyprodinil+fludioxonil), Specto 90WDG, and Concert II (chlorothalonil + propiconazole). Other efficacious fungicides included Heritage (azoxystrobin), Pageant (pyraclostrobin + boscalid), Insignia (pyraclostrobin), and Compass O (trifloxystrobin).

For residential landscapes, few fungicides can at this point be suggested for controlling boxwood blight. Among the fungicides listed in the table, only chlorothalonil is readily available through box stores and retail garden centers.

**Table 2.** Commercial fungicides that may have activity against boxwood blight.

Fungicide	Rate/100 gal	Timing	Comments
azoxystrobin Heritage 50WDG	1-4 oz	14-28 d	Apply when conditions favor disease and repeat if needed. Make no more than two consecutive applications before switching to a non-Group 11 fungicide.
chlorothalonil Daconil Weather Stik Daconil Ultrex Echo 720 6F Concord DF	1.5 pt 1.4 lb 1.5 pt 1.4 lb	7-14 d	Apply at 7-day intervals as foliar spray to cuttings and liners and 7- to 14-day intervals on container stock when conditions favor disease development. Controls <i>Volutella</i> blight. See label for complete list of target woody ornamentals and diseases.
fludioxonil Medallion	2-4 oz	7-14 d	See label for further instructions. Group 12 fungicide. Alternate with Pageant fungicide for resistance management.
iprodione Chipco 26019 N/G Chipco 26GT Sextant Iprodione Pro SE GT-26 O	1-2 lb/A 1-2.5 qt/A 1-2.5 qt/A 1-2.75 qt/A 1-2.5 qt/A	7-14 d	See label for plant list. <b>NURSERY USE</b> only. Group 2 fungicide.
kresoxim-methyl Cygnus	1.6-3.2 oz	7-14 d	Apply as protective spray.
pyraclostrobin Insignia	4-16 oz	7-14 d	DO NOT use an organosilicone adjuvant as phytotoxicity may occur. See label for use rates for controlling specific diseases. Make no more than two consecutive applications before switching to a non-Group 11 fungicide.
pyraclostrobin + boscalid Pageant	16 oz	7-14 d	Begin applications when conditions favor disease and prior to symptom development. Do not use an organosilicate surfactant as phytotoxicity may occur. Contains Group 7 and Group 11 fungicide components. <b>Commercial nursery, greenhouse, and landscape use only.</b> Tank mixing Pageant with a chlorothalonil or mancozeb fungicide is suggested. Shorten interval when conditions favor rapid disease development
cyprodinil+fludioxonil Palladium	2-4 oz	7-14 d	Begin applications when conditions favor disease and prior to symptom development. Contains Group 9 and Group 12 fungicide components.
triflumizole Terraguard SC	4-8 fl oz	7-14 d	Begin applications when conditions favor disease and prior to symptom development. Refer to label for application rates and instructions. Group 3 fungicide.

**Sources:**

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