Boxwood blight: An emerging concern for nurseries and landscapers in Maryland

Topics:

8:00 to 8:30  Introduction and importance of boxwood blight
8:30- 9:00    How to identify the disease
9:00 to 9:15  Break
9:15 – 10:00  Disease management strategies
10:00 -10:30  PA Quarantine and compliance agreement
10:30- 10:45  Break
10:45 -12:00  Where do I stand on the compliance agreement: QA

If you have any questions, call us at 410-841-5920 or email (ppwm.mda@maryland.gov.), Plant Protection and Weed Management, 50 Harry S Truman Pkwy, Annapolis, MD.
Introduction and importance of boxwood blight

Ramesh Pokharel, Ph.D.
Plant Disease Specialist,
Maryland Department of Agriculture
- Very important landscape plants
- Evergreen
- Can be trained into different shapes
- Cold hardy
- No deer damage
Boxwood blight defoliates and weakens the plants

Other pathogens

- *Volutella*
- *Fusarium*
- *Macrophoma*
- *Nematode (Pratylenchus)*
Abiotic causes

- Winter injury
- Watering
- Chemicals
What is Boxwood blight?

• Foliar fungal disease of *Buxus* spp.

• Caused by *Calonectria pseudonaviculata* (syn. *Cylindrocladium pseudonaviculatum*, *C. buxicola*).

• Short-term dispersal takes place by wind and water

• Long-term dispersal is with plants moved by humans, and by animals
What is……

• Does not do well below 50 and above 86° F and mycelium is killed at 95° F.

• The fungus grows best from 75° to 85° F.

• High humidity or moisture is essential for disease development

• In favorable conditions, life cycle is completed in 7 days
What is......

• Produces sticky spores

• In unfavorable conditions, this pathogen may produce microsclerotia and/or chlamydospores

• The microsclerotia/mycelium survives in leaf debris up to 5 years
Infection process

• Starts germination within 3 hours of landing on leaf

• Penetrates directly or through stomata without appressorium

• Does not need wound
Boxwood blight positive sites in Maryland

- Home owner
- Landscape
- Nursery

Year: 2011 to 2016
Seasonal occurrence of samples testing positive for BWB (2011-16)
Why we consider this disease important

• Exotic and difficult to control

• Causes rapid defoliation and death

• Microsclerotia/mycelium can survive for several years

• Fungicides can kill mycelium, halt spore formation and symptom development but do not eradicate
Economic importance

It causes

• leaf spots and blight
• rapid defoliation
• cankers on stems
• severe dieback
• eventual death of the plant

• Destroys the beauty of expensive boxwood plants

• May cause economical loss
Case study of a nursery

- July 10, 2013- Boxwood blight symptoms observed
- July 14, 2013- Confirmed boxwood blight infection
- August 2013- Destruction order issued with following options:
  
  **Option 1:** Destroy all *Buxus* spp.

  **Option 2:** Destroy only the cultivar and the pot size

  **Option 3:** Destroy only infected plants

  A Stop Sale order and no pesticide use for 3 months, for options 2 or 3
Case study continued....

- May 15, 2014- Suspected BWB samples collected
- May 28, 2014- Samples confirmed positive for BWB
- July 2014 - Destruction order issued with following options:
  
  1: destroy all Buxus in infected and surrounding houses

  2: Destroy all *Buxus* spp, disinfect facility, and do not grow *Buxus* spp for at least 5 years

Nursery destroyed 157,247 plants

What about destruction cost?
How to identify the disease

Field
  – Symptoms

Laboratory
  – Fruiting structures such as sporophore and spores
  - Molecular
Field symptoms

Fallen leaves
Typical BWB symptoms
Incubate 5-7 days in moisture chamber

C. Buxicola
Fusarium sp.

Volutella
Laboratory Diagnosis

*Cylindrocladium*

*Volutella*

*Fusarium*
Dark black spot on the stem

'Suffruticosa'

Positive

Negative
'Suffruticosa'

Positive

Positive
What about this symptom?

Positive
In the field

Both negative
Both positive
“Green Beauty”

“Vardar Valley”

May serve as

“Trojan Horse”
Or
“Typhoid Mary”

Both positive
Disease management strategies

1. Avoidance
2. Exclusion
3. Eradication
4. Protection
5. Therapy
6. Resistance
Management strategies

Exotic Pathogens

• Avoidance
• Exclusion
• Eradication
• Host resistance
Help us keep the disease out of Maryland

• Adopt BMPs

• Obtain certified or clean plant material

• Destruction and

• strict quarantine
After obtaining plants

- **Keep boxwood lots separate in the nursery**
Keep accurate updated records

Inspect plants for any abnormality

Any abnormal plant should be separated and treated as if infected

Do not buy or sell any suspicious plants
Host resistance

- No cultivar is completely resistant
- Cultivars may vary in damage level
- Avoid susceptible cultivars such as 'Suffruticosa'
| Most susceptible          | B. sempervirens ‘Suffruticosa’  
<table>
<thead>
<tr>
<th></th>
<th>B. sinica var. insularis ‘Justin Brouwers’</th>
</tr>
</thead>
</table>
| Susceptible               | B. microphylla var. japonica ‘Morris Dwarf’  
|                          | B. microphylla var. japonica ‘Morris Midget’  
|                          | B. sempervirens ‘Jensen’  
|                          | B. sempervirens ‘Marginata’ , Buxus X ‘Glencoe’ (Chicagoland Green)  
|                          | B. sempervirens ‘American’  
|                          | B. sempervirens ‘Elegantissima’ |
| Moderately susceptible    | Buxus X ‘Green Mound’, Buxus X ‘Conroe’ (Gordo)  
|                          | B. microphylla ‘Green Pillow’  
|                          | B. microphylla ‘Grace Hendrick Phillips’  
|                          | B. microphylla ‘Jim Stauffer’, Buxus X ‘Green Mountain’ |
| Resistant                 | B. microphylla ‘Golden Dream’  
|                          | B. harlandii, B. sinica var. insularis ‘Nana’  
|                          | B. microphylla var. japonica ‘Green Beauty’ |
Other host plants of BWB

*Pachysandra*

*Source The Connecticut Agricultural Experiment Station*

*Sarcococca*
My boxwood was confirmed positive for BWB

What Next ?
Manage plant disposal
Collect infected plant materials, dispose properly
Curative

Collect and burn or bury 2-3” deep in a safe area
Take care during transportation of infected plant materials
Avoid close planting/storing
Ideal spacing

Less than Ideal
Avoid overhead irrigation

- Time of day
- Wind conditions
- Duration
Runoff water
Floor surface
Clean and disinfect areas, tools, equipment, and vehicles
Remove fallen leaves
Minimize

Human, vehicle, animal movement among plants, especially diseased ones
Disease control

• Difficult to eradicate the pathogen

• Disease management is possible, but needs integrated effort

• Mostly applies to an established pathogen
# Chemical Control

<table>
<thead>
<tr>
<th>Trade name</th>
<th>Chemical</th>
<th>Amount/100 gallon water</th>
<th>Application intervals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daconil</td>
<td>Chlorothalonil</td>
<td>1.375 pints</td>
<td>7-14 days</td>
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<tr>
<td>Weatherstik</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spectro 90WDG</td>
<td>Chlorothalonil +</td>
<td>1.5 lb E</td>
<td>Every 7-14 days not more than 50.6 lb per acre per season</td>
</tr>
<tr>
<td></td>
<td>Thiophanate methy</td>
<td></td>
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</tr>
<tr>
<td>Concert II</td>
<td>Chlorothalonil +</td>
<td>35.0 fl oz</td>
<td>Every 14 days</td>
</tr>
<tr>
<td></td>
<td>Propiconazole</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Torque</td>
<td>Tebuconazole</td>
<td>10.0 fl oz</td>
<td>Every 14 days; max. 3 applications</td>
</tr>
<tr>
<td>Tourney 50WDG</td>
<td>Valent</td>
<td>4.0 oz</td>
<td>Every 14-26 days; not to exceed 4.0 lb per acre per season</td>
</tr>
<tr>
<td>Medallion WDG</td>
<td>Fludioxonil</td>
<td>4.0 oz</td>
<td>Every 7-14 days</td>
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</tbody>
</table>
Why no fungicides for BWB?

- They can’t eradicate the pathogen
- They suppress symptoms
- How many homeowners would apply?
- Is this affordable?
- Risks to human health, environment, and resistance development?
Then

- Avoid other BWB host plants: *Pachysandra* and *Sarcococca*

  I am so sad
  I can’t grow boxwood for five years
Thanks
Further information on Boxwood Blight: http://mda.maryland.gov/plants-pests/Pages/nursery_inspection_plant_quarantine.aspx

Any questions or concerns Call us at 410-841-5920 or email: ppwm.mda@maryland.gov