The Boxwood Dilemma

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History

What was the most common foundation plant used in the 50's – 70s???

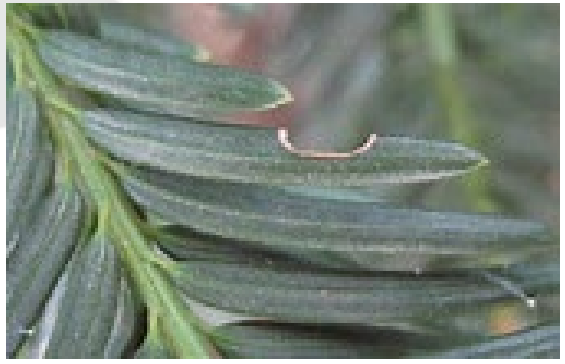
TAXUS

Foundation Planting

- Hide the bases of houses
- Front area of the house, entrance
- Enhance the house, not hide!
- Welcome feeling
- Evergreen for winter color

Taxus

- Evergreen, dark green foliage
- Easy to sheer
- Slow growth habit
- Pest resistance
  - *Phytopthora*
  - Black vine weevil



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Boxwoods

- Used for centuries
  - Earliest records date back to ancient Egypt
  - Renaissance – formal gardens
  - Tudor period – knot gardens
  - 18th century – topiaries
  - 19th century – introduction of new Asian varieties
  - 1980 – hybrids on the market

Boxwoods

- Almost replaced all taxus in foundation, entrance plantings (i.e. overused!?!)
- Annual revenue in 2014 of $126 million
  - 15% of the broadleaf evergreen
- A boxwood-flanked promenade, in the words of landscape architect Diane McGuire, was historically “the most common element found in almost every garden in the southern United States.”

Boxwoods

- Dumbarton Oaks (Beatrix Farrand, 1921)
  - Box Walk
  - Box Terrace
  - Box Ellipse

- Deep association with Old World and cottage gardens of England

Boxwoods

- The real issue with boxwood was what sixteenth-century English physician John Gerard described as the “evil and loathsome smell,” which, according to Soderini, was not only “annoying,” but could give one headaches as it “infested the air.”
  - Gerard – English botanist (c.1545-1612) in London.

  - https://lab.plant-humanities.org/boxwood/

Boxwoods

- Durable
- Tolerates pruning
  - Hedges, topiaries, accent plants, etc.
- Fertile, moist well-drained soils
- Tolerates different light conditions
- No pest problems – RIGHT?

Boxwood Pest Challenges

- Winter injury (broadleaf evergreen)
- Boxwood leaf miner
- Boxwood psyllid
- Box tree moth
- Boxwood blight
- Volutella stem/leaf blight/canker on boxwood

Boxwood Winter Injury

Boxwood leafminer

- Fly (*Diptera genus, Monarthropalpus flavus)*
  - Larvae small, orangish mosquito-like fly
- Serious pest, but doesn't kill plants
- Life cycle
  - Adults fly in spring, laying eggs into upper leaf surface
  - Larvae hatch and feed inside leaf
  - Overwinter in the leaf

Boxwood leafminer

- Symptoms
  - Blister-like appearance on the underside of leaf
  - Leaves have brown or yellowish blotches, eventually dropping
  - Lays eggs on new growth
  - Heavy infestations can cause death
    - New growth tends to cover old damage next season

Boxwood leafminer

- Management
  - Not necessary unless heavy defoliation
  - Adults – spray when emerge in spring
    - Sometimes difficult to time
    - Early spring when adults are flying
    - May need more than one treatment
  - Soil treatments (systemic)
    - Must be in the plant when larvae are feeding

Boxwood psyllid

- *Psylla buxi*
  - Tiny greenish insect with clear wings and strong legs
    - Looks like a tiny cicada, hops when disturbed
  - Incomplete metamorphosis – egg, nymph, adult
  - Piercing sucking mouth parts
  - White waxy material covers body
  - Immature and adults feed

Boxwood psyllid

- Symptoms
  - Curling and cupping of leaves
  - Sometimes see stunting of growth

- One generation per year
- Plants tend to outgrow the damage
- Not a big deal

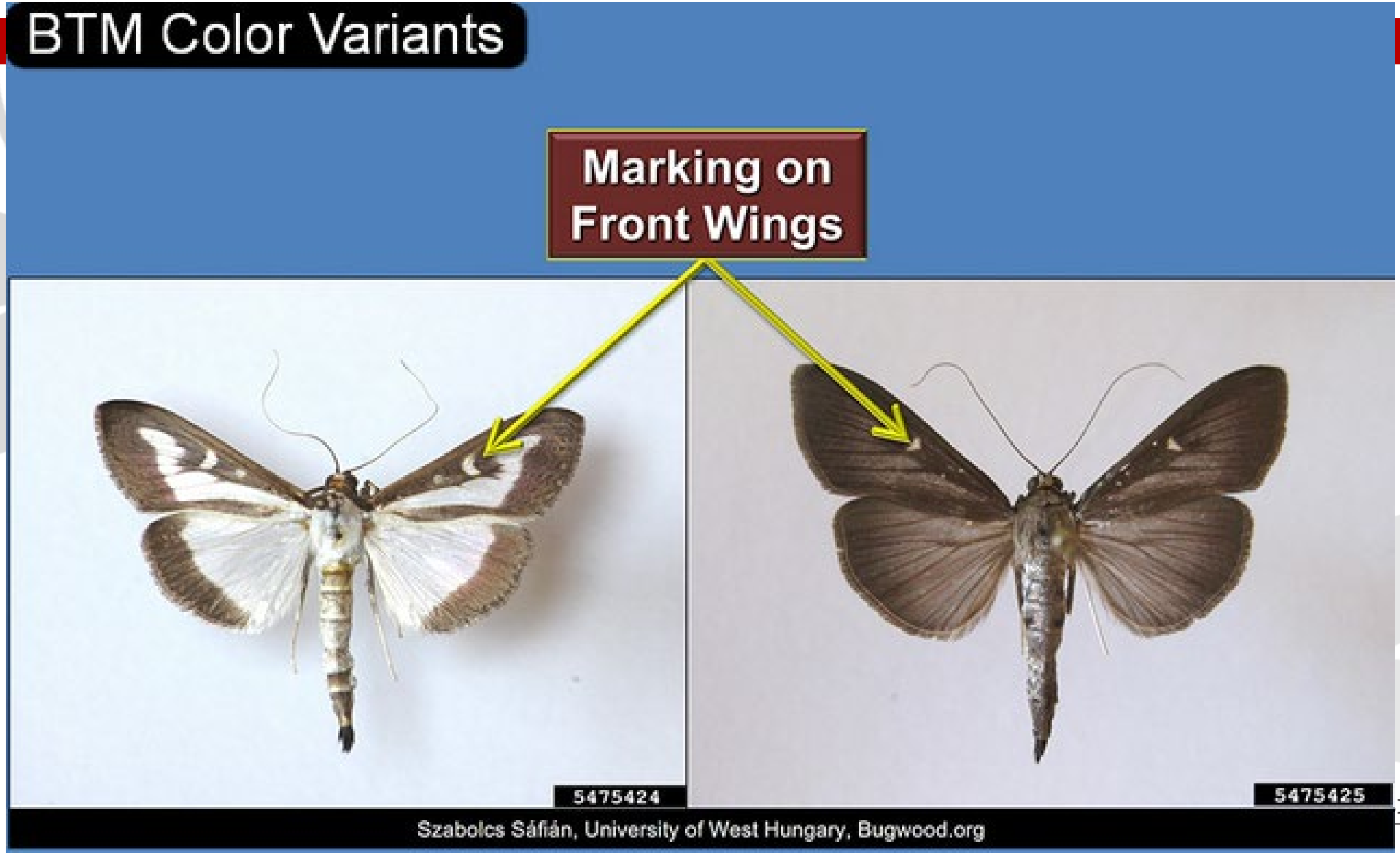
Boxwood psyllids

- Management
  - –Only use insecticides if populations are heavy
  - –Foliar systemic insecticide sprays
  - –Soil treatments, systemic

Box Tree Moth

- Caterpillar native to China and Korea
- New York State 2021
- Canada and Michigan
- Ohio – Lebanon area (Clermont, Hamilton, Warren, Montgomery)
- Symptoms
  - Skeletonized leaves and total defoliation
  - Webbing
  - Curlicue leaf damage

BTM Color Variants



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BTM Caterpillar
S.W. Ohio


BTM "Curlicue" Leaf Damage
Joe Boggs, OSU


"Curlicue" Leaf Damage
Joe Boggs, OSU Exte

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BTM Caterpillar Silk
S.W. Ohio
Joe Boggs, OSU Extension©


TM Caterpillar
nbedded in Silk
W. Ohio
Joe Boggs, OSU Ex


rass
Joe Boggs, OSU Extens


M Frass
Joe Boggs, OSU Exte


TM Early Pupa
Joe Boggs, OSU


BTM Late Pupa
INCH
Joe Boggs, OSU

BTM Management

- Don't make preventive treatments unless there are infestations nearby
  - Sometimes unintended secondary pest outbreaks
- Monitor, watch closely
- Sprays are effective – get them early

Sprays

- **Homeowners:** Over-the-counter products with the following active ingredients are effective against BTM:
- **- Synthetics**: carbaryl, acephate, bifenthrin, cyfluthrin, esfenvalerate, permethrin, resmethrin, and tetramethrin
- **- Botanical**: pyrethrin
- **- Microbial**: Bacillus thuringiensis, Bt *kurstaki,* and Bt *aizawai.* Bt products are most effective on small caterpillars.

Boxwood blight

- *Calonectria pseudonavicuata*
- Symptoms
  - Leaf spots, eventually coalesce, drop
  - Stem cankers or dark brown to black lesions that circle stem
  - Defoliation – starts at the bottom goes up
  - Death
- Pathogen survives at least five years on debris
- Rainfall splashes spores
- Fungicides to prevent infection

Figure 1. The spots on these leaves are typical of early stage boxwood blight. Photo by M. Daughtrey, New York.

Figure 2. Note the white sporulation on the underside of infected leaves. The fungus that causes boxwood blight sporulates following high humidity. Photo by G. Ruhl, Indiana.

Figure 3. The boxwood plant on the left shows defoliation from boxwood blight that starts from the bottom and moves up. The neighboring plant exhibits spots on its lower leaves; however, it does not yet show any symptoms of defoliation. Photo by M. Daughtrey, New York.

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N Gregory

Symptom: Black, constricted stem and leaf bligh

M. Paret

UF IFAS NFREC

Infected branches c
long blackish-brown
streaks on stems. T
fungus does not inf
roots; thus, plants r
grow even after a s
infection. However,
repeated defoliatio
dieback can predisp
plants to other dise
such as **Volutella bl**
resulting in decline
eventual death.

Advanced stage of t
disease on a
B. sempervirens cu

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Boxwood blight management

- Remove infected plants when diagnosed
- Clean up as much leaf matter as possible
- Fungicide sprays
  - May have to apply consistently
- Disease resistant varieties

Canker or stem blight

- *Volutella buxi*
- Symptoms
  - Some branches or plants slow to leaf out, less vigorous growth
  - Leaves turn from normal color to various shades of green, yellow, tan
  - Leaves and branches show small, rose-colored fruiting bodies (fungus)
  - Bark of the branch loose, sloughs off
  - Wood is gray to black underneath

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Volutella buxi

- Remove dead branches as soon as noticeable
- Remove any leaves that fall to the ground (decreasing potential for future infection)
- Fungicides need to be applied before growth in the spring

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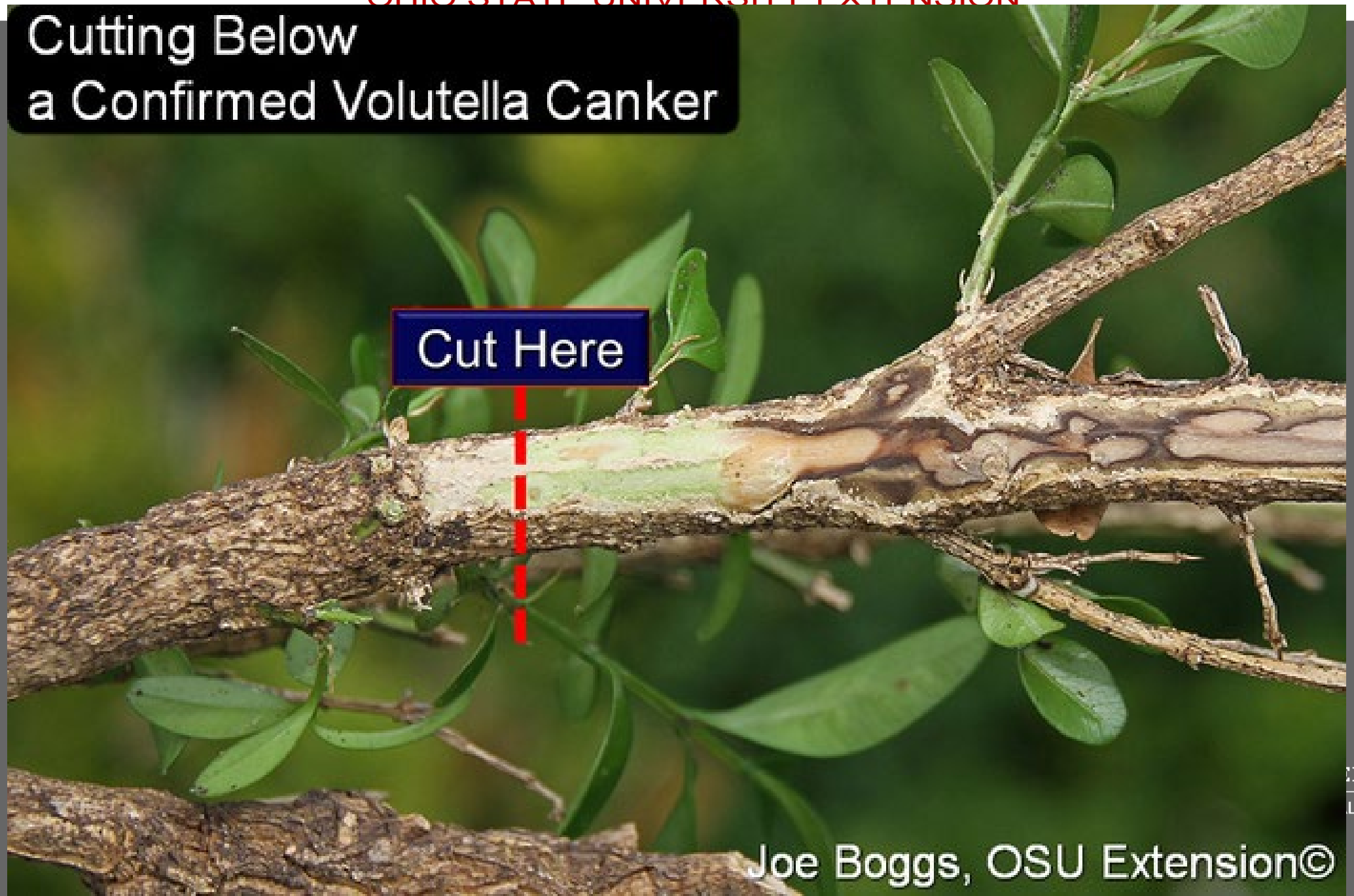
Cutting Below
a Confirmed Volutella Canker
Cut Here
Joe Boggs, OSU Extension©

EXTENSION

Boxwood Damage: Compare and Contrast

Winter Injury/Volutella

BTM Feeding Damage

Produced by Joe Boggs, OSU Extension©

Boxwood Dilemma

- Determine the cause
  - Send samples to the C. Wayne Ellett Plant and Pest Diagnostic Clinic for confirmation
  - ppdc.osu.edu

Physical Sample Submission of Caterpillars, Worms, Grubs, etc.

Include a completed **Insect/Arthropod ID Request form** in a separate plastic bag.

Caterpillars are extremely difficult to identify if placed directly into alcohol without following the steps below for blanching and shipping.

1. Boil water (either in the microwave or on the stove) and remove from heat.
2. Drop the specimen into the boiling water.
3. When the specimen rises to the surface, scoop it out and place it into a leak-proof vial of 70% alcohol (rubbing alcohol or isopropyl).

4. Place the container into a small box and pad the container to keep the specimen from being damaged during transit.
5. Ship the specimen to the address on the submission form.

Caterpillars can also be shipped alive in a crush proof container with a few leaves or wrapped in a damp paper towel.

Boxwood Dilemma

- Remove if boxwood blight
- Prune out dead material
  - Below the cankered area
- New growth will eventually fill in
  - The farther back you cut the longer it will take
- Keep boxwoods healthy (drought)
- Monitor monitor monitor

Insecticides & Fungicides	Examples of Brand Names & Products
Acephate	Bonide Systemic Insect Control Concentrate
Chlorothalonil	Bonide Fung-onil Multi-purpose Fungicide Concentrate GardenTech Daconil Fungicide Concentrate Ferti-lome Broad Spectrum Landscape & Garden Fungicide Conc. Hi-Yield Vegetable, Flower, Fruit & Ornamental Fungicide Ortho MAX Garden Disease Control Conc. Southern Ag Liquid Ornamental & Vegetable Fungicide Tiger Brand Daconil
Copper-based Fungicides	Bonide Liquid Copper Concentrate Bonide Copper Fungicide Wettable Powder Camelot O Fungicide/ Bactericide Concentrate Monterey Liqui-Cop Fungicide Concentrate Natural Guard Copper Soap Liquid Fungicide Concentrate Southern Ag Liquid Copper Fungicide

Dinotefuran	Gordon's Zylam Liquid Systemic Insecticide (10% concentrate) Ortho Trees & Shrub Insect Control Granules (2%) Valent Brand Safari 20SG Insecticide (20% concentrate) Valent Brand Safari 2G Insecticide (2% granules)
Horticultural Oil	Bonide All Seasons Spray Oil Concentrate; & RTS[1] Ferti-lome Horticultural Oil Spray Concentrate; & RTS[1] Monterey Horticultural Oil Concentrate; & RTS[1] Safer Brand Horticultural & Dormant Spray Oil Concentrate Southern Ag ParaFine Horticultural Oil Summit Year Round Spray Oil Concentrate
Imidacloprid	Bayer BioAdvanced Garden 12 Month Tree & Shrub Insect Control Landscape Formula Bonide Annual Tree & Shrub Insect Control with Systemaxx Ferti-lome Tree & Shrub Systemic Insect Drench Hi-Yield Systemic Insect Spray Concentrate (drench) Martin's Dominion Tree & Shrub Insecticide Monterey Once A Year Insect Control II

Insecticidal Soap	Natural Guard Insecticidal Soap Concentrate Safer Brand Insect Killing Soap Concentrate
Malathion	Bonide Malathion 50% Insect Control Gordon's Malathion 50% Spray Concentrate Hi-Yield 55% Malathion Insect Spray Martin's Malathion 57% Concentrate Ortho Max Malathion Insect Spray Concentrate Southern Ag Malathion 50% EC Spectracide Malathion Insect Spray Concentrate Tiger Brand 50% Malathion Spray
Spinosad	Bonide Colorado Potato Beetle Beater Concentrate Bonide Captain Jack's Deadbug Brew Concentrate; & RTS[1] Conserve SC Turf & Ornamental Concentrate Ferti-lome Borer, Bagworm & Leafminer Spray Concentrate Monterey Garden Insect Spray Concentrate Natural Guard Spinosad Bagworm, Tent Caterpillar & Chewing Insect Control Concentrate & RTS[1] Ortho Insect Killer Tree & Shrub Concentrate Southern Ag Conserve Naturalyte Insect Control Concentrate

Tau-Fluvalinate	Bayer BioAdvanced 3-in-1 Insect, Disease & Mite Control Conc.; & RTS[1] Bayer BioAdvanced 3-in-1 Insect, Disease & Mite Control I Conc.; & RTS[1]
Thiophanate methyl	Cleary's 3336-WP Turf & Ornamental Fungicide Southern Ag Thiomyl Systemic Fungicide

Pesticides are not up to date – check label for current information.
This is just for examples.

Resources

- Bygl.osu.edu
- https://hgic.clemson.edu/factsheet/boxwood-diseases-insect-pests/
- Ohio Department of Agriculture Division of Plant Health
- USDA