



RUTGERS
THE STATE UNIVERSITY
OF NEW JERSEY



2025 Ornamental IPM Program Webinar

Contemporary IPM Topics and Management

May 27, 2025

Bill Errickson & Steve Rettke (Monmouth)

Tim Waller (Cumberland)

Support: Erin Quinn

Cooperating Agencies: Rutgers, The State University of New Jersey, U.S. Department of Agriculture, and Boards of County Commissioners, Rutgers Cooperative Extension, a unit of the Rutgers New Jersey Agricultural Experiment Station, is an equal opportunity program provider and employer.

TODAYS SPEAKERS

Bill Errickson (Ag. Agent - Monmouth County RCE)

Steve Rettke (IPM Program Associate – Monmouth County RCE)

Tim Waller (Ag. Agent – Cumberland County RCE)

Erin Quinn (IPM Program Support)

Disclaimer - Materials do not cover all possible control scenarios and are intended for licensed professionals. Tradenames do not imply endorsement and are used as examples. You must strictly follow the label for each compound prior to use. Rutgers is not responsible for misused materials or damages thereof. The label is the law. Labels will provide detailed information on use and restrictions. Additionally, application intervals, compatibility, surfactant use, PHI, PPE, important and other key information is described in detail. Always discuss treatments with your local agents. **Note: Neonicotinoids can only be legally applied in commercial agriculture settings by licensed applicators.** (ADD NJ HERE)

Agenda



1. Lacewing predator
2. Bronze birch borer
3. Emerald ash borer
4. Greater peach tree borer
5. Black vine weevil
6. Euonymus scale
7. Cryptomeria scale
8. White Prunicola scale
9. Juniper scale
10. Japanese Maple scale
11. Bagworm
12. *Volutella* blight in Buxus
13. Powdery mildew vs. Downy mildew
14. *Cercospora* leaf spot (hydrangea)

Current GDD: 5/27/25
North NJ: 450 GDDs
Central NJ: 550 GDDs
Southern NJ: 640 GDDs

Plant and Pest Advisory for Updates



RUTGERS UNIVERSITY

Agriculture and Natural Resources
New Jersey Agricultural Experiment Station

HAVE YOU SIGNED UP FOR
**PLANT & PEST
ADVISORY**
UPDATES YET?



[HTTPS://PLANT-PEST-ADVISORY.RUTGERS.EDU/](https://plant-pest-advisory.rutgers.edu/)

Cooperating Agencies: Rutgers, The State University of New Jersey, U.S. Department of Agriculture, and Boards of County Commissioners, Rutgers Cooperative Extension, a unit of the Rutgers New Jersey Agricultural Experiment Station, is an equal opportunity program provider and employer.

Multiple pest updates



Elongate Hemlock Scale – male (L) and crawler (R). (T. Waller RCE)

Spruce spider mite (apparent symptoms)



(Photo: Timothy Waller – Rutgers Cooperative Extension – Cumberland County)

Beneficial Insect: Lacewings (Crysoplera spp.)



GDD Window (base 50): emergence at 253 GDD

- Popular, commercially available beneficial insects
- Adults ½ to ¾" long, delicate, green or brown, small heads, large eyes, & transparent wings are longer than the body
- Larvae are spindle shaped, yellow to brown in color, and mottled
- **Eggs are laid on the end of long, fine silk stalks, and are usually attached to leaves or twigs**
- Hatching larvae eat a wide range of insects, including own siblings
- **Piercing, sucking sickle-shaped mouthparts of larva are sharp & hollow (can easily penetrate soft bodied insects)**
- Adults often seen near porch lights, especially in warmer months
- **Prey pests:** aphids, caterpillars, lace bugs, beetle larvae, insect eggs, and mites (sometimes called "aphid lions")



Photo via Steven K. Rettke, Rutgers Coop. Ext.

Current GDD: 5/27/25
North NJ: 450 GDDs
Central NJ: 550 GDDs
Southern NJ: 640 GDDs

Beneficial Insect: Lacewings

Photo credits: Steve Rettke, Rutgers RCE unless otherwise noted



Photos: David Cappaert

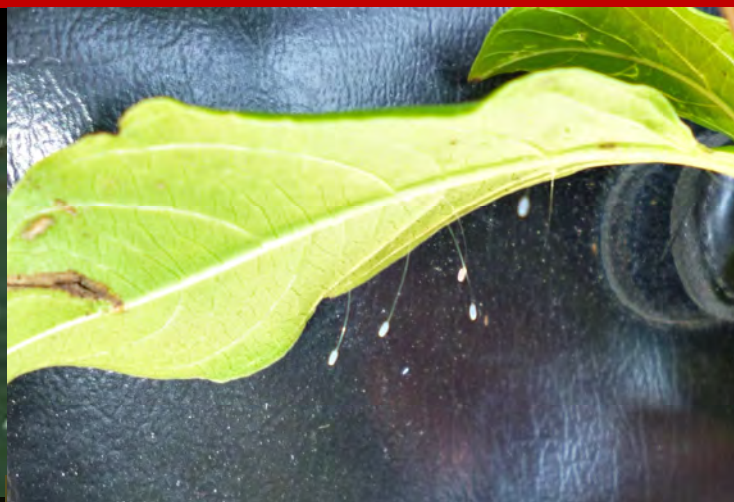


Photo: Whitney Cranshaw, CSU

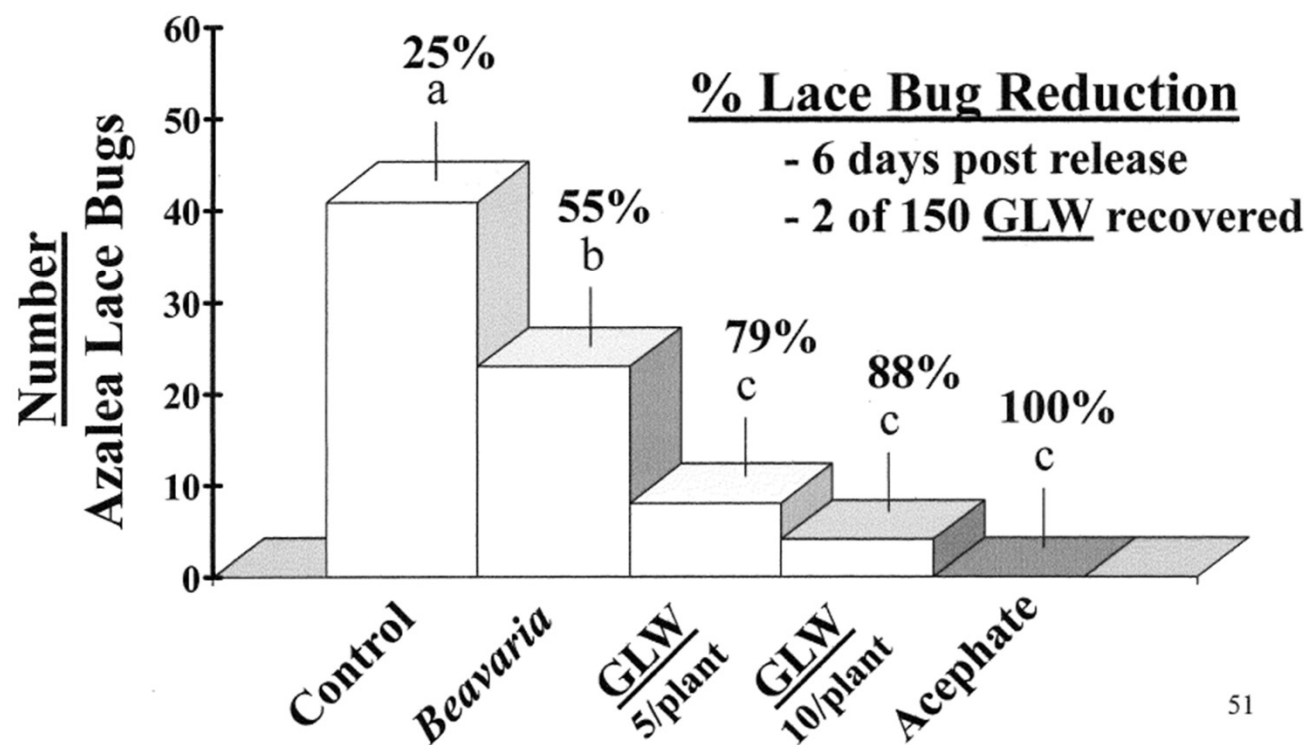


Current GDD: 5/27/25
North NJ: 450 GDDs
Central NJ: 550 GDDs
Southern NJ: 640 GDDs

Beneficial Insect: Lacewings

Evaluation of Green Lacewings for Suppressing Azalea Lace Bug Populations in Nurseries¹

Paula M. Shrewsbury² and Deborah C. Smith-Fiola³
Department of Entomology², Rutgers Cooperative Extension³
Rutgers University, New Brunswick, NJ 08903



51

Current GDD: 5/27/25
North NJ: 450 GDDs
Central NJ: 550 GDDs
Southern NJ: 640 GDDs

Beneficial Insect: Lacewings

GDD Window (base 50): emergence at 253 GDD

Fostering beneficial insect populations

- Allow minor populations of soft body pest populations, especially in plants not sold that year
- Avoid broad spectrums wherever possible
- Monitor shaded regions for beneficial predators
- Misting foliage before releasing can help them stick
- Provide pollen and nectar sources
- Release early in the season when pest populations are low

Beneficial predator food!



Pesticide Impacts / Considerations

- Insecticides negatively impact predators through direct contact and also when they eat prey that has been treated with insecticides
- Larvae are more susceptible than adults, and insecticides can prohibit them from reaching adulthood

Current GDD: 5/27/25
North NJ: 450 GDDs
Central NJ: 550 GDDs
Southern NJ: 640 GDDs

Bronze Birch Borer (*Agrilus anxius*)

GDD Window (base 50): 400-880

- Adults are black beetles with a shiny greenish-bronze color on their backs, about ½” long
- **Mostly found on the sunny side of trunks**
- Female deposits eggs under cracks and crevices of bark
- Eggs hatch in two weeks or less, and tiny white larvae (7-12mm long) immediately tunnel into the phloem tissue to build galleries
- Larvae molt and overwinter in the xylem as fourth instars
- Larval development can take one to two years
- Larvae pupate in xylem in late spring, and in early summer, adults chew their way through the bark, **leaving a “D” shaped hole**
- **Adults begin to fly when black locust trees bloom**
- Causes wilting and dying of upper crown, ridges and bumps on limbs and branches
- Trunk may develop a rusty brown stain
- Removal of bark near ridges will reveal winding, sawdust-packed tunnels called galleries
- **Host plants:** Birch, beech, hornbeam

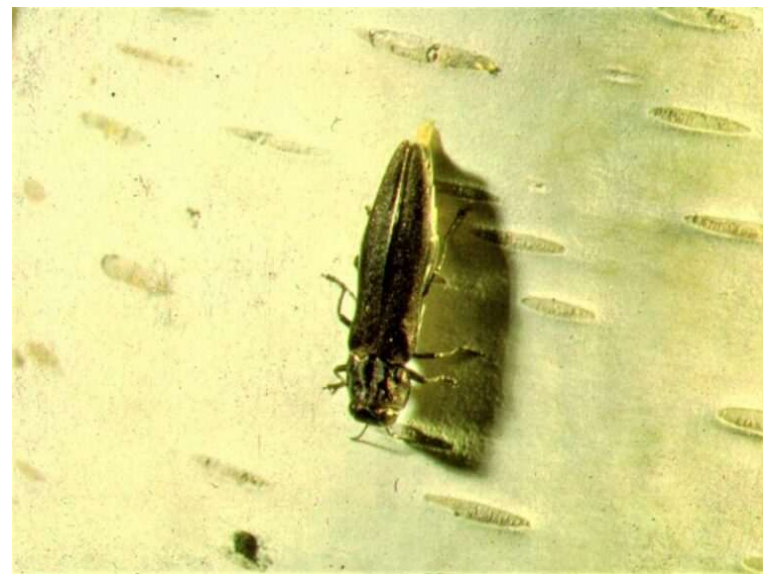


Photo via Ohio State Coop. Ext.

Current GDD: 5/27/25
North NJ: 450 GDDs
Central NJ: 550 GDDs
Southern NJ: 640 GDDs

Photo credits Steve Rettke, Rutgers RCE unless otherwise noted



Bronze Birch Borer (*Agrilus anxius*)



(EAB gallery)



Photo: Purdue Extension



Photos: Purdue Extension

Current GDD: 5/27/25
North NJ: 450 GDDs
Central NJ: 550 GDDs
Southern NJ: 640 GDDs

Bronze Birch Borer (*Agrilus anxius*)

GDD Window (base 50): 400-880

Management

- Cultural Practices:

- **Natural predators:** woodpeckers, parasitic wasps
- Reduce plant stress – plant birch trees in cool, moist, shaded environment
- Plant borer-resistant species (river birch, Japanese birch)
- Irrigate sufficiently
- Prevent defoliation and injury by controlling other pests
- Remove dying trees and branches before adults begin to emerge

Materials

○ Contact insecticides:

- Pyrethroids [3]: -thrins

○ Systemic insecticides:

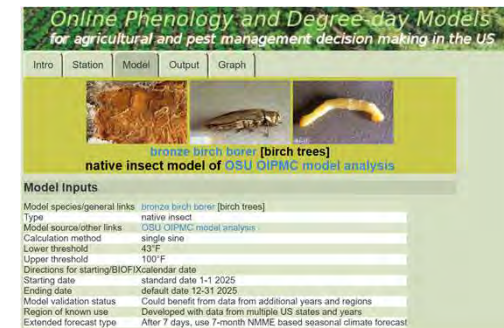
- Neonicotinoids [4A]: imidacloprid, clothianidin, dinotefuran

○ Considerations:

- Pyrethroids: target newly hatch eggs (timing near adult flight and egg laying, before boring into host plants)
- Neonicotinoids: targets developing larvae within host plants

○ Biorationals:

- Azadirachtin [1B] (trunk injection)



Current GDD: 5/27/25

North NJ: 450 GDDs

Central NJ: 550 GDDs

Southern NJ: 640 GDDs

Emerald Ash Borer (*Agrilus planipennis*)



GDD Window (base 50): 450-500

- Adults are wood-boring beetles that are bright metallic green in color, bullet-shaped, and 1/3" long with two pairs of wings
- Larvae are 1-1.25" long, and white to cream colored with ten abdominal segments. The last segment has two brown pincers.
- One-year long life cycle
- **Adults emerge in early summer through a D-shaped exit hole, with adult activity peaking in mid-summer**
- Adults feed on ash foliage for multiple days before beginning to mate
- **Eggs are laid in the bark and hatch in 7-10 days**, when larvae tunnel through the bark and into the phloem
- Larvae feed on phloem, creating S-shaped galleries which widen as the larvae grow, and leaving frass under the bark of the tree
- Prepupal larvae overwinter in the bark
- Initial infestations may not be apparent for two or more years
- Look out for jagged holes made by woodpeckers searching for larvae
- Bark can split vertically over larval galleries
- Causes foliage to wilt, branch dieback, thinning canopy, and eventually death after 3-5 years of infestation
- Epicormic shoots appear on the tree trunk
- **Host plants:** *Fraxinus* spp. (white ash, black ash, green ash)



Photo via UMN Extension

Current GDD: 5/27/25

North NJ: 450 GDDs

Central NJ: 550 GDDs

Southern NJ: 640 GDDs

Emerald Ash Borer (*Agrilus planipennis*)

Photo credits Steve Rettke, Rutgers RCE unless otherwise noted



Photo: PSU Extension

Current GDD: 5/27/25
North NJ: 450 GDDs
Central NJ: 550 GDDs
Southern NJ: 640 GDDs

Emerald Ash Borer (*Agrilus planipennis*)

GDD Window (base 50): 450-500

Management

- **Cultural Practices:**
 - **Natural predators:** woodpeckers (downy, hairy, and red-bellied), parasitoid wasps (*Tetrastichus planipennisi*, *Spathius agrili*, and *Oobius agrili*)
 - Encourage plant health
 - Remove infested trees
 - Do not move ash wood
 - EAB will usually only travel 0.5-1 miles per year, but humans can make the problem worse by carrying firewood and other products

Materials

- **Contact insecticides:**
 - Pyrethroids [3]: -thrins
- **Systemic insecticides:**
 - Avermectins [6]: emamectin benzoate (trunk-injection)
 - Neonicotinoids [4A]: imidacloprid (soil drench), dinotefuran (barkspray)
- **Considerations:**
 - Treat large trees before they become infested
 - See *Bronze Birch Borer*

Biorationals:

- **Systemic insecticides:**
 - Azadirachtin [UN] (trunk injection)



Current GDD: 5/27/25
North NJ: 450 GDDs
Central NJ: 550 GDDs
Southern NJ: 640 GDDs

Greater Peach Tree Borer (*Synanthedon exitiosa*)



GDD Window (base 50): 600-1800

- Overwinters as various larvae stages
- Adults are often mistaken for wasps when flying
- Females are dark blue with a broad orange band around the body, dark forewings, and clear hind wings
- **Male is smaller and has three to four narrow, yellowish bands across the body with two pairs of clear wings, black scales on top of their head between their eyes, and yellow scales between the antennae**
- Larvae are white with a brown head, reaching up to 1.5" long
- Larvae become active and feed from April to July, working their way into the trunk as they grow
- Adults emerge and lay up to 500 eggs during mid to late summer on tree trunks, in the bark, and in the soil near the trunk
- **Eggs hatch in 10 days**
- First sign is a mass of gum protruding from the trunk base
- Causes lower fruit production, twig and branch dieback, and can lead to death
- **Host plants:** *Prunus* spp. (peaches, plums, cherries, nectarines)

Sexual dimorphism: Male (left) - Female (right)



Photo: University of Utah

Current GDD: 5/27/25
North NJ: 450 GDDs
Central NJ: 550 GDDs
Southern NJ: 640 GDDs

Greater Peach Tree Borer (*Synanthedon exitiosa*)

Photo credits Steve Rettke, Rutgers RCE unless otherwise noted



Photo: James Solomon

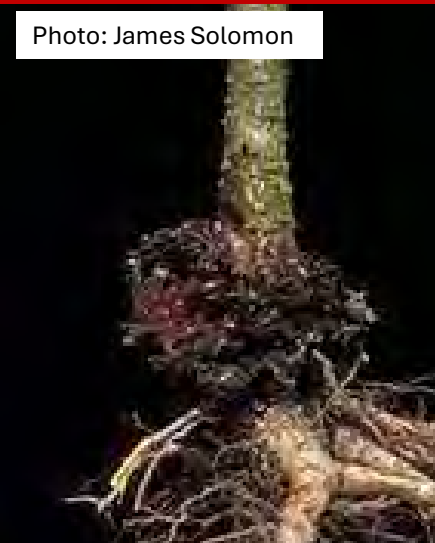


Photo: CSU Extension



(Trapped GPTB Male)

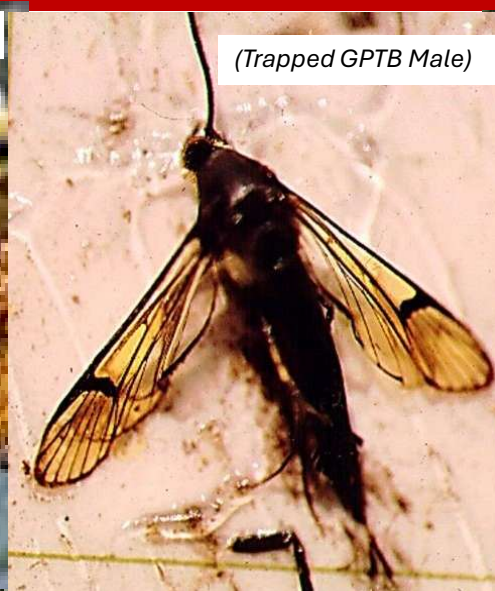


Photo: Missouri Botanical Garden



Photo: Oregon State University

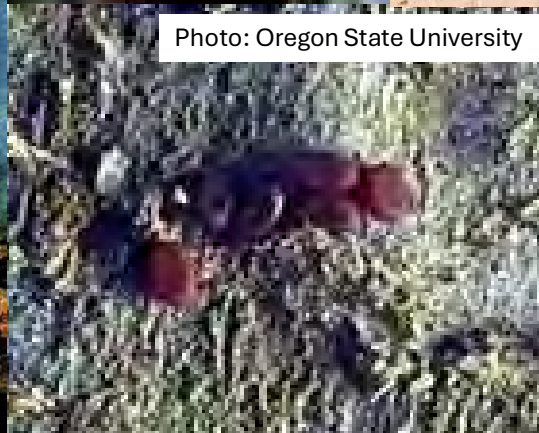


Photo: CSU Extension



Current GDD: 5/27/25
North NJ: 450 GDDs
Central NJ: 550 GDDs
Southern NJ: 640 GDDs

Photo: Ohio State Coop. Ext.



Greater Peach Tree Borer (*Synanthedon exitiosa*)



GDD Window (base 50): 600-1800

Management

- Cultural Practices:

- **Natural predators:** beneficial nematodes (*Steinernema carpocapsae*)
- Reduce plant stress and maintain healthy trees
- Pheromone traps
- Avoid using mulch around the bases of tree trunks
- Avoid damaging the bark
- Remove and destroy severely infested trees

Materials

○ Contact insecticides:

- Pyrethroids [3]: -thrins, esfenvalerate

○ Systemic insecticides:

- Diamides [28]: Cyantraniliprole, chlorantraniliprole
- Neonicotinoids [4A]: dinotefuran
- Avermectins [6]: Emamectin benzoate

○ Considerations:

- Will harm non-target species

- Biorationals:

- Azadirachtin [UN]
- Spinosyns [5]: spinosad

Current GDD: 5/27/25

North NJ: 450 GDDs

Central NJ: 550 GDDs

Southern NJ: 640 GDDs

Black Vine Weevil (*Otiorhynchus sulcatus*)

GDD Window (base 50): 400-900

- Also known as taxus weevil
- Larvae are white, legless, and C-shaped with a brown head
- Adults are gray to black, flightless, 9-13mm in length, with a short snout and bent antennae, and wings covered in patches of short, golden hairs
- Mature larvae are 10-15 mm in length and form pupal cells in the soil in early spring
- During the day, they hide in the soil or in dark spots on the stems near dense foliage
- **Eggs are laid in the soil near the base of host plants**, hatching in 10-14 days into small larvae that feed on roots until temperatures go down in the fall, when they move deeper into the soil to overwinter
- One generation per year
- **Larvae feed on small roots at first, but move to the bark of large roots or the stem as they grow older**
- Infested container-grown plants may not show symptoms until planted in the ground
- **Adults cause notching of broadleaved evergreen foliage and other host plants**
- **Host plants:** 100+ species (*Rhododendron* spp., *Taxus* spp., *Euonymus* spp., Japanese holly, hemlock)



Photo via Steve Rettke, Rutgers RCE

Current GDD: 5/27/25
North NJ: 450 GDDs
Central NJ: 550 GDDs
Southern NJ: 640 GDDs

Photo credits Steve Rettke, Rutgers RCE unless otherwise noted

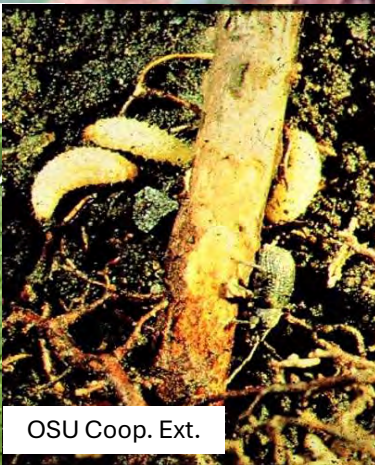


Black Vine Weevil (*Otiorhynchus sulcatus*)

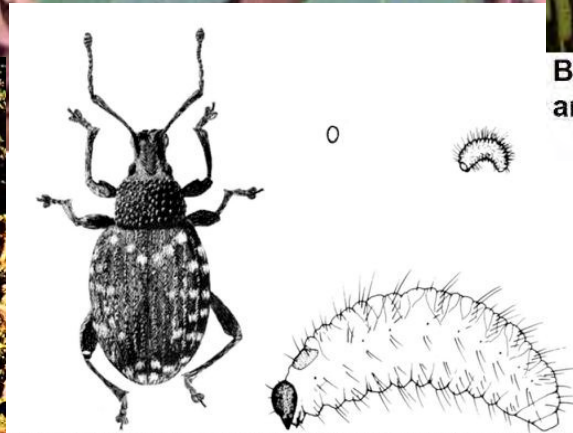


Black vine weevil grub damage to young taxus roots and underground stem.

Photo by Jim Baker, North Carolina State University, Bugwood.org



OSU Coop. Ext.



Developmental stages of the black vine weevil, clockwise from left: adult, egg, young larva, and older larva.

Illustration by J. R. Baker, NC State University

Current GDD: 5/27/25
North NJ: 450 GDDs
Central NJ: 550 GDDs
Southern NJ: 640 GDDs

Black Vine Weevil (*Otiorhynchus sulcatus*)



GDD Window (base 50): 400-900

Management

- Cultural Practices:

- **Natural predators:**
Entomopathogenic nematodes:
(*Heterorhabditis bacteriophora*,
Steinernema kraussei)
- Place wooden boards on top of mulch under host plants in early May, checking the underside of the board in the middle of the day for adults
- Reduce plant stress
- Crop rotation
- Remove weeds from surrounding area
- Sticky & pit-fall traps for adults

Materials

○ **Contact insecticides:**

Pyrethroids [3]: thrinex-bifenthrin

○ **Systemic insecticides:**

- Neonicotinoids [4A]: imidacloprid

○ **Considerations:**

- First foliar application should be made three weeks after detection of first adult, and second application three weeks after that

- Biorationals:

- Fungus: *Metarhizium brunneum*

Current GDD: 5/27/25

North NJ: 450 GDDs

Central NJ: 550 GDDs

Southern NJ: 640 GDDs

Armored scales (*Diaspididae*)



- **Euonymus Scale** (533-820 GDDs = 1st gen crawlers)
- **Cryptomeria Scale** (600-800 GDDs = 1st gen crawlers)
- **White Prunicola Scale** (707-1151 GDDs = 2nd gen crawlers)
- **Juniper Scale** (707-1260 GDDs = crawler emergence)
- **Japanese Maple Scale** (800-1200 GDDs = 1st gen crawlers)

Current GDD: 5/27/25
North NJ: 450 GDDs
Central NJ: 550 GDDs
Southern NJ: 640 GDDs

Some Major Families of Scale Insects in NJ Nurseries



- **Armored Scales** (cell feeders)
- **Soft Scales** (phloem feeders)
- Mealybugs (phloem feeders)
- Felt Scales (phloem feeders)
- Gall-Like Oak Scales (phloem feeders)
- Oak Pit Scales (cell feeders)

Current GDD: 5/27/25
North NJ: 450 GDDs
Central NJ: 550 GDDs
Southern NJ: 640 GDDs

Armored scales (*Diaspididae*)



Management

- **Cultural Practices:**

- **Natural predators:** brown lacewings, green lacewings, lady beetles, & **Parasitoid wasps**
- **Prevent dusty conditions**
- Reduce plant stress
- Dispose of heavily infested plants

Materials

○ **Contact insecticides:**

- Carbamates [1A]: carbaryl
- Pyrethroids [3A]: -thrins
- Organophosphates [1B]: acephate (translaminar), malathion

○ **Considerations:**

- **Will harm non-target species**
- Timing is essential in controlling armored scales (target crawler stage before waxy covering forms)

○ **Systemic insecticides:**

- **Neonicotinoids** [4A]: dinotefuran, acetamiprid, thiamethoxam
- Tetrionic acids [23]: spirotetramat

Biorationals:

- Insecticidal soaps and

Horticultural oils

- Neem oil

- **Insect growth regulators:**

- **Pyriproxyfen** [7A]
- **Buprofezin** [16]

Current GDD: 5/27/25

North NJ: 450 GDDs

Central NJ: 550 GDDs

Southern NJ: 640 GDDs

Lady Beetle Predator



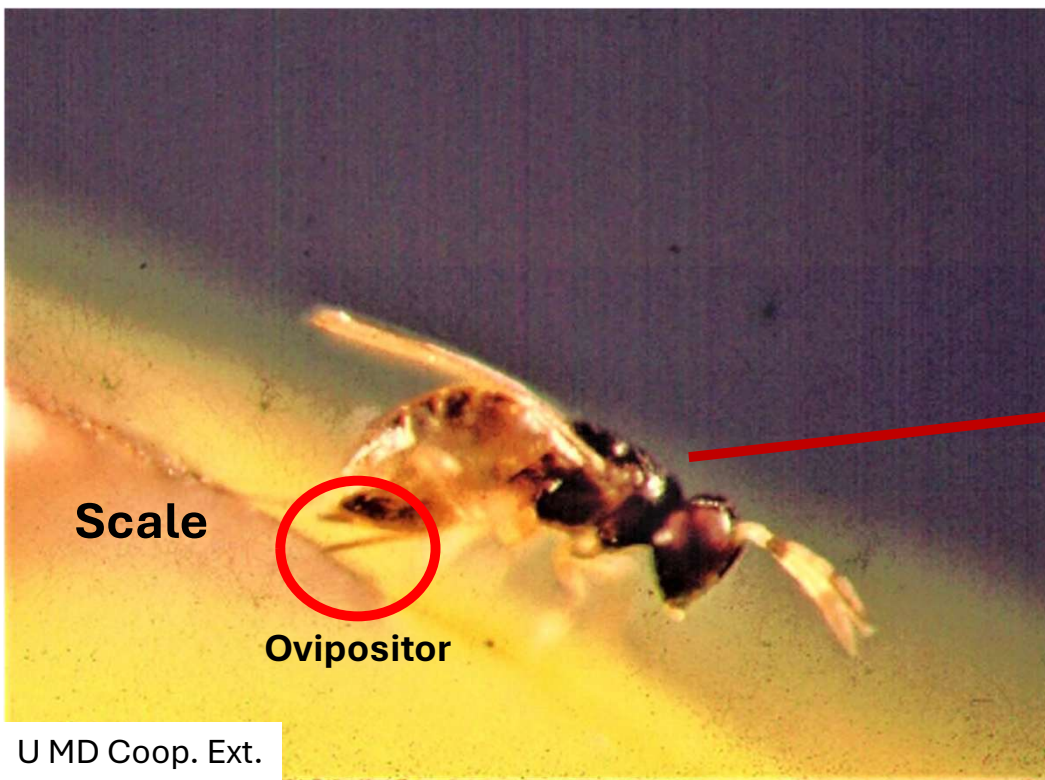
Photo Credit: Steven K. Rettke, RCE

Big, Rough Tears of Armored Scale

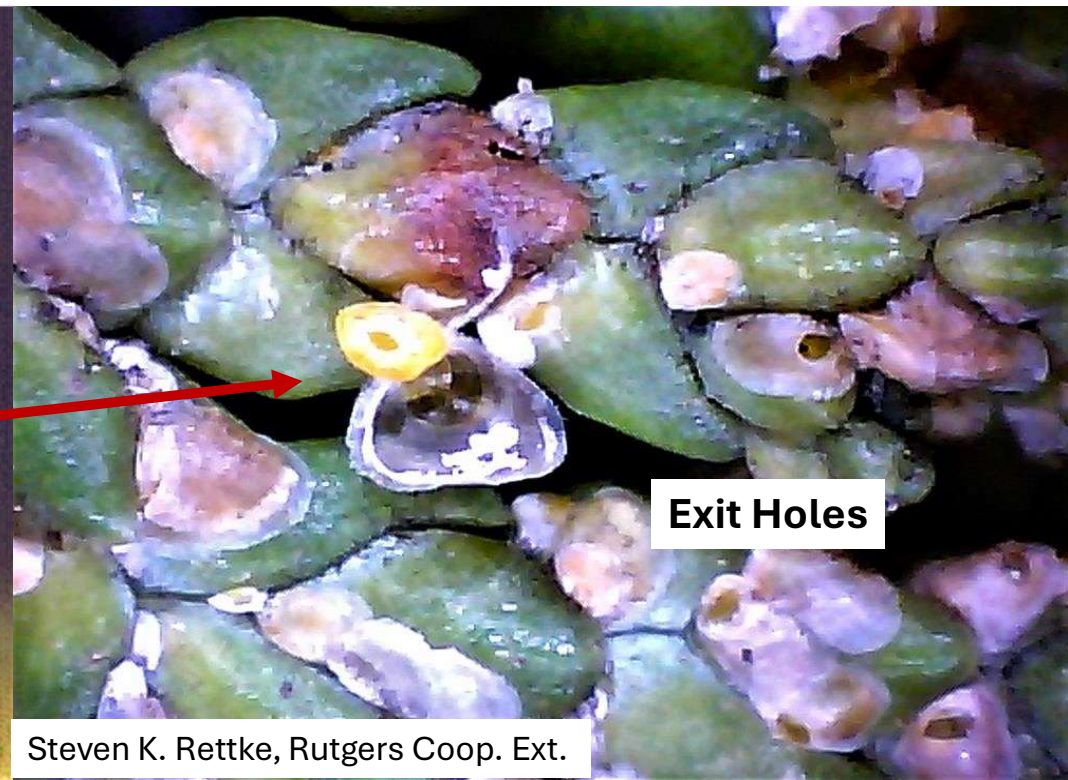


Photo Credit: Steven K. Rettke, RCE

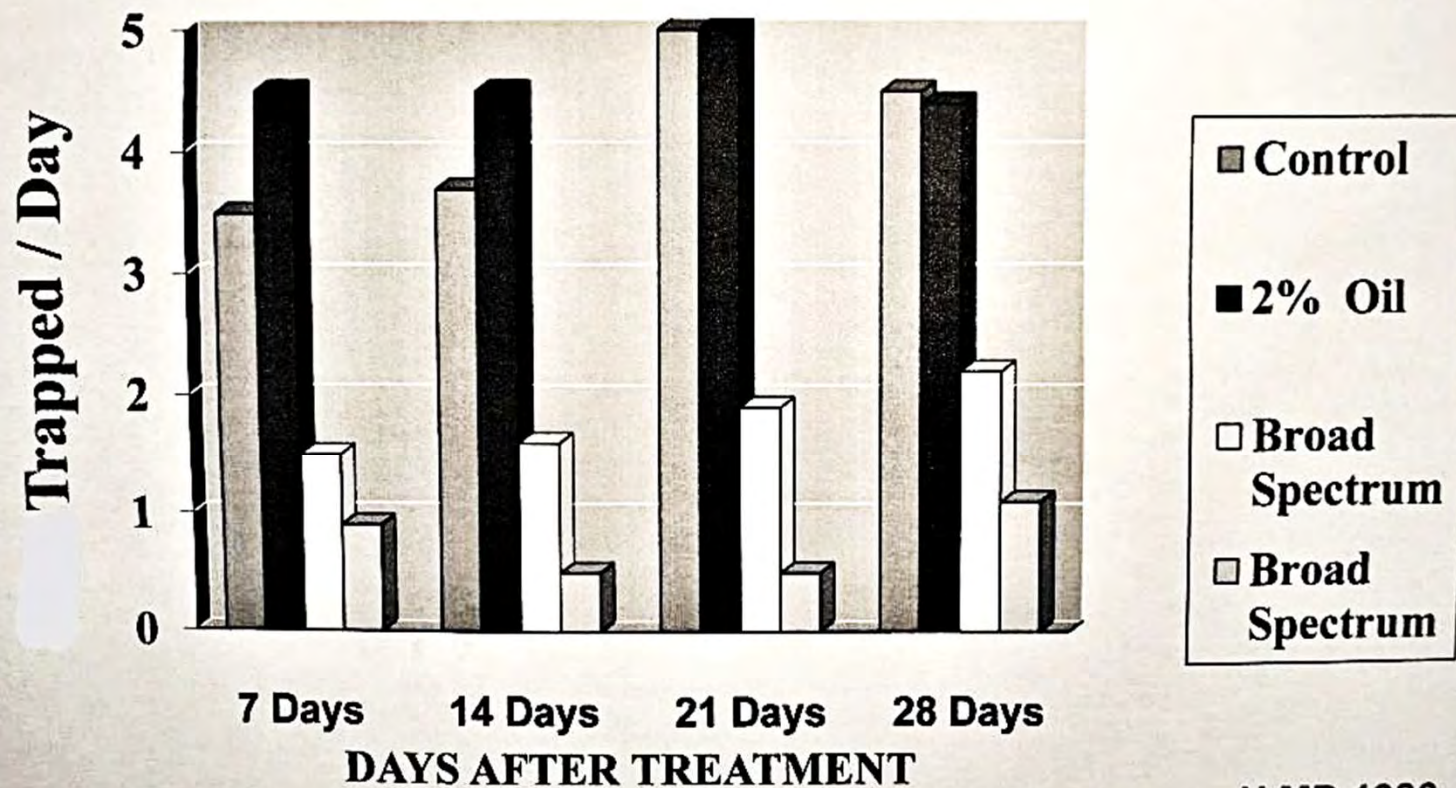
Parasitoid Wasp Laying Egg into Armored Scale



Parasitoid Wasp Exit Holes in Armored Scales

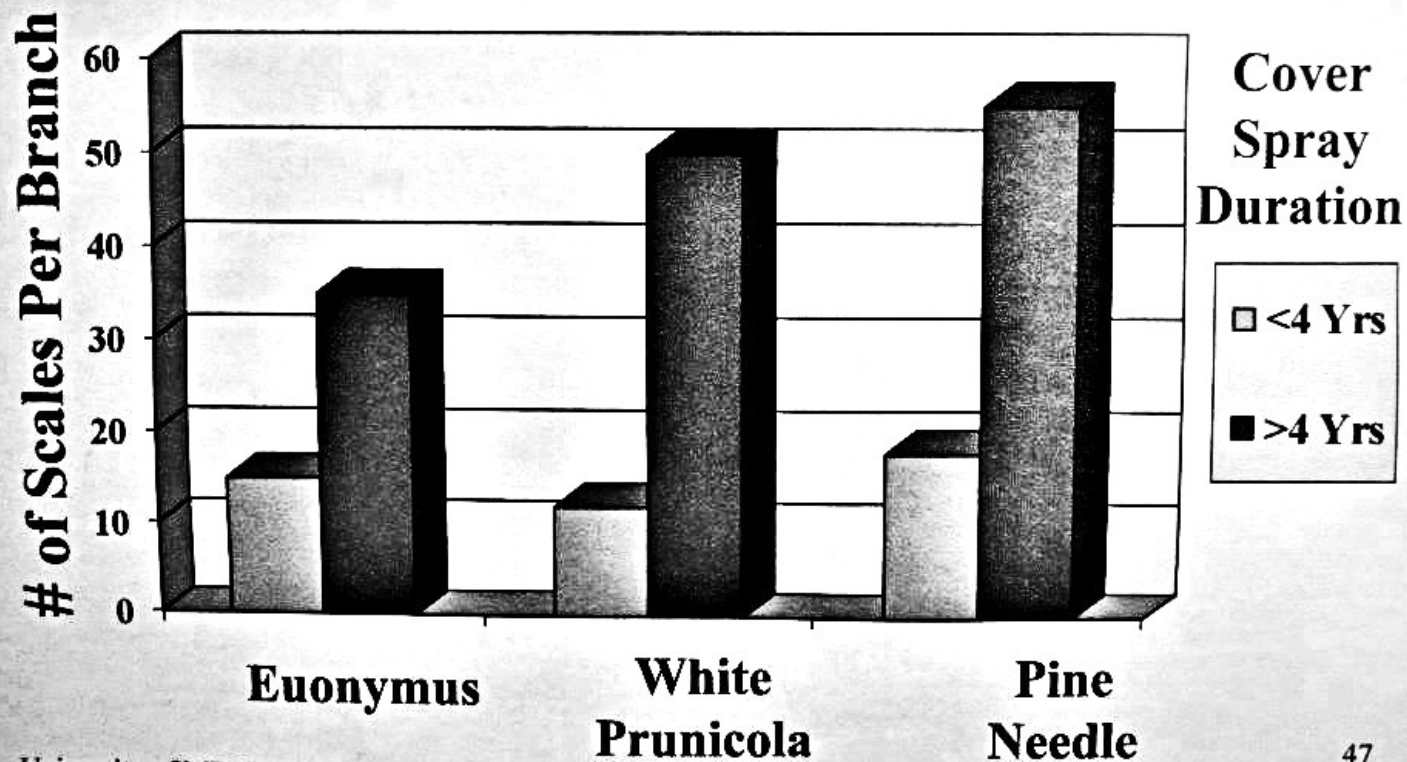


Insecticide Impacts on Beneficial Chalcid Wasps



U MD 1986

Impacts of Landscape Cover Sprays on Scale Insects

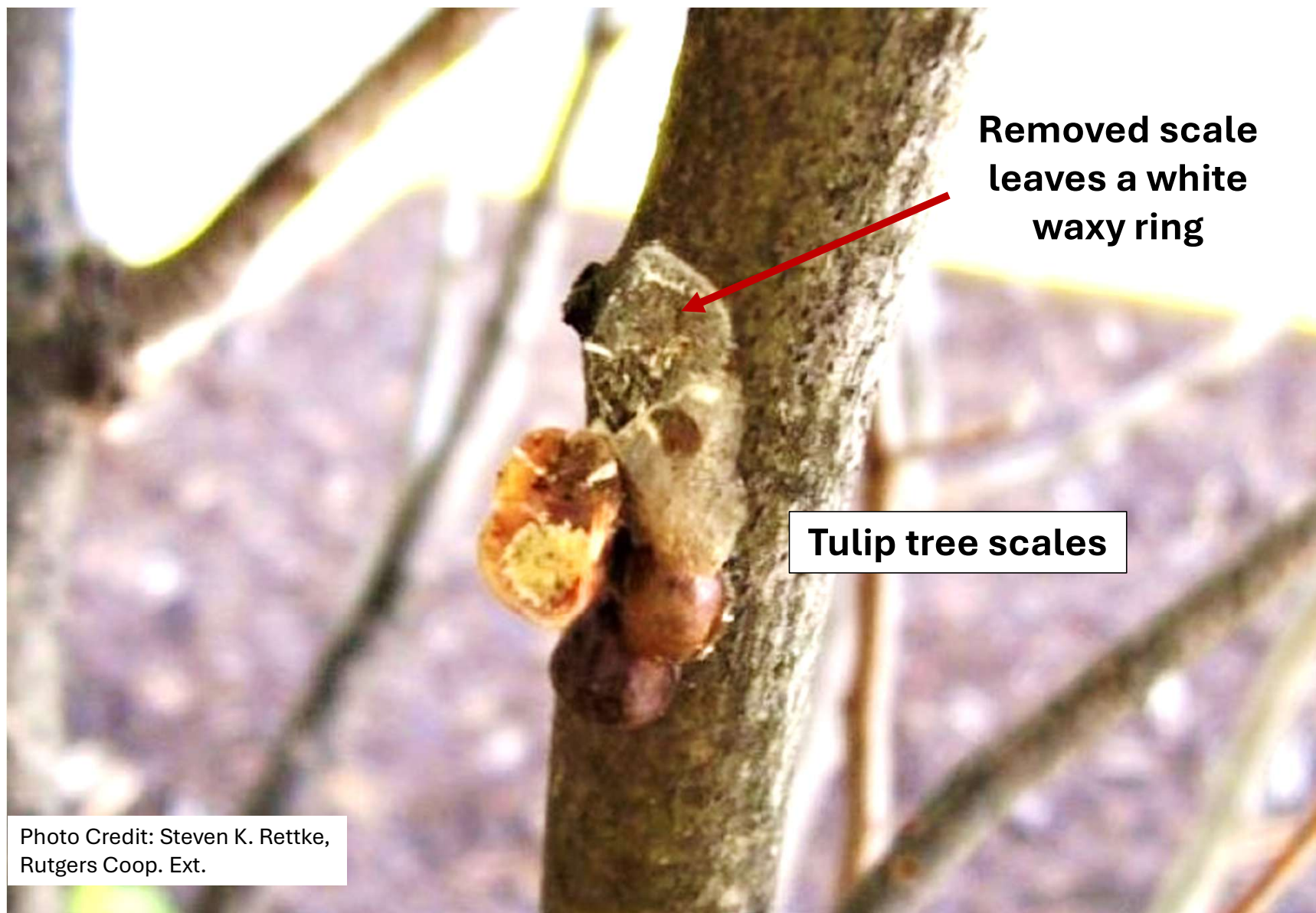


Scale Mimicry



Euonymus Scale?
No...Bark callus tissue

Photo Credit: Steven K. Rettke,
Rutgers Coop. Ext.



**Removed scale
leaves a white
waxy ring**

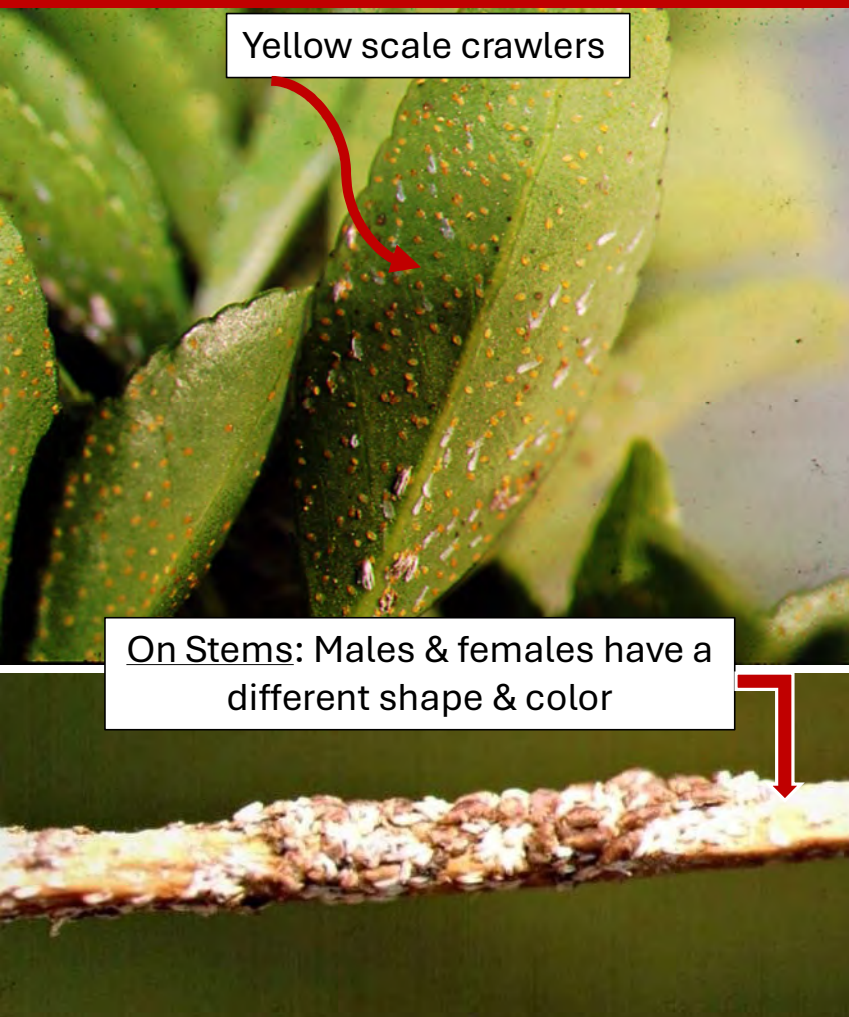
Tulip tree scales

Photo Credit: Steven K. Rettke,
Rutgers Coop. Ext.

Photo credits: Steve Rettke, Rutgers RCE unless otherwise noted

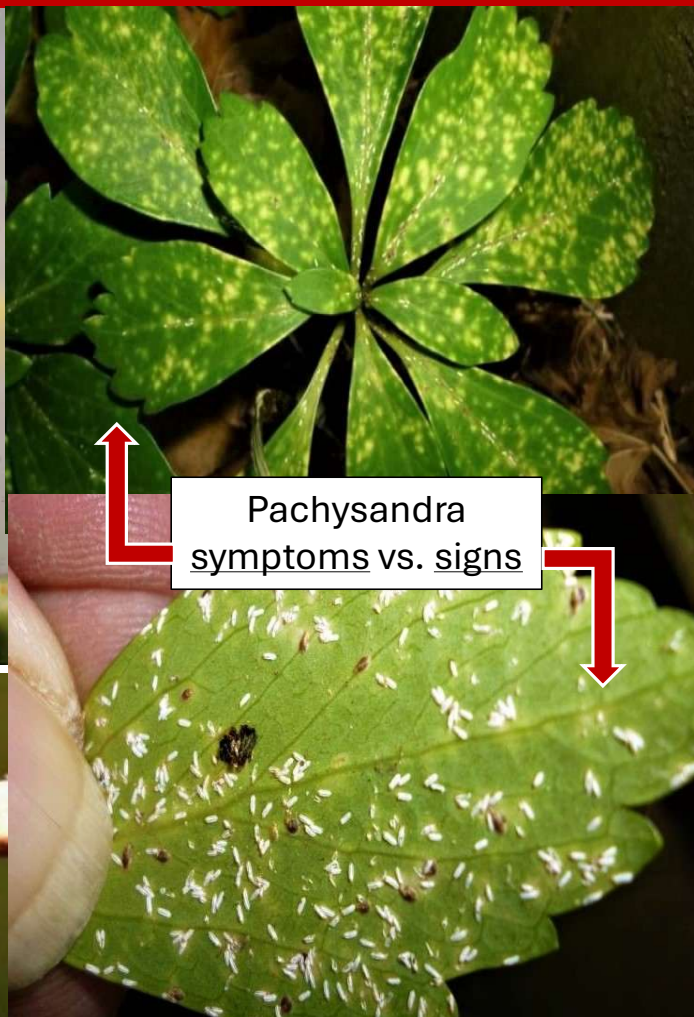


Euonymus Scale (*Unaspis euonymi*)



Yellow scale crawlers

On Stems: Males & females have a different shape & color



Pachysandra symptoms vs. signs



White males on leaves

Current GDD: 5/27/25
North NJ: 450 GDDs
Central NJ: 550 GDDs
Southern NJ: 640 GDDs

Euonymus Scale (*Unaspis euonymi*)

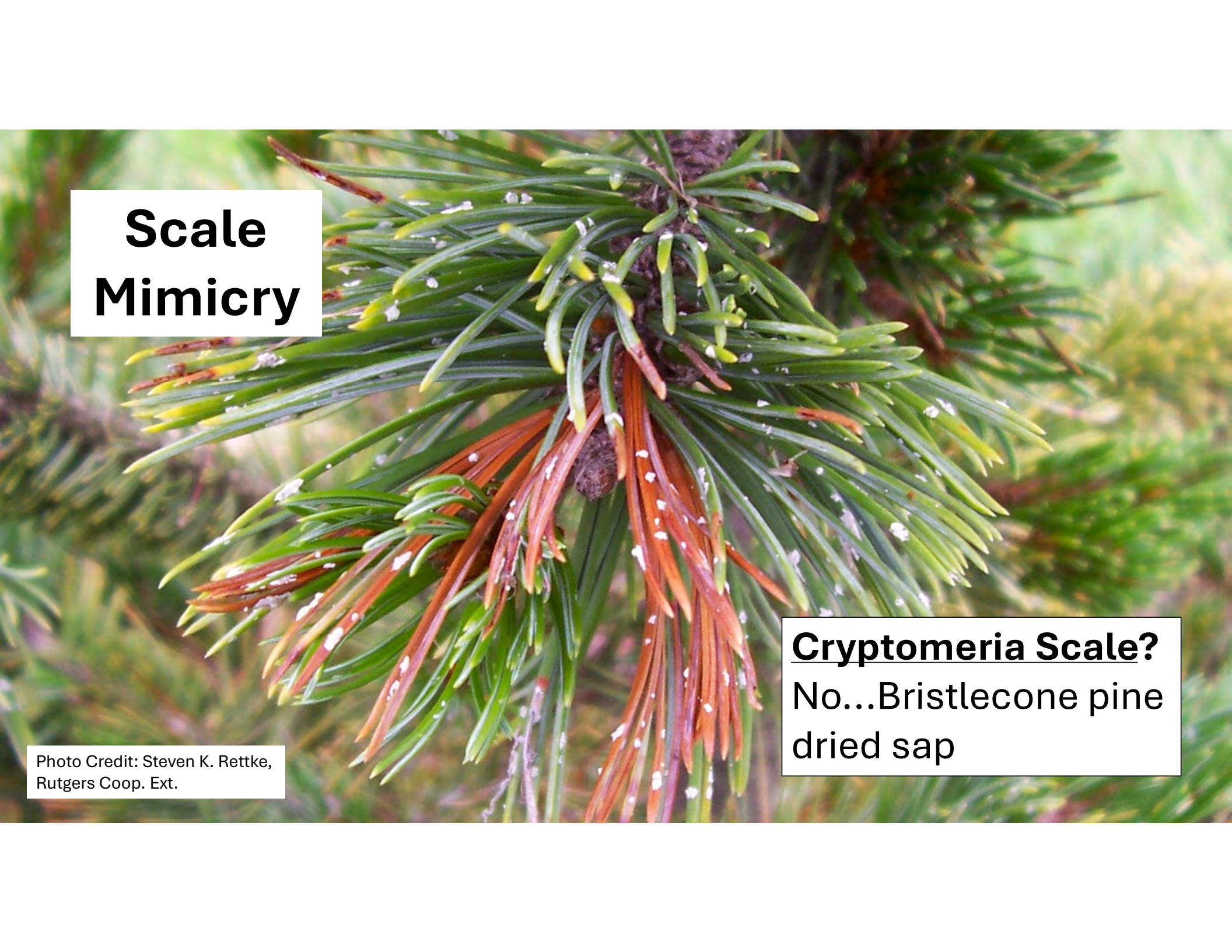
GDD Window (base 50): 533-820

- **Host plants:** Variegated evergreen euonymus, Japanese pachysandra, boxwood, bittersweet, & Allegheny spurge
- Armored scale, waxy covering protects them from predators and pesticides (Overwinter on bark as mated females)
- **Scale crawlers are light-yellow in color and active during early June when Kousa dogwood is in bloom**
- **Males are white, thin, and elongated**, feeding on leaves causing yellow spots (Male adults fly & die after 24 hours)
- **Females are dark-brown, oyster-shell shaped**, and larger than the males, feeding on branches
- **2 overlapping generations per year (early June and August)**
- High populations result in defoliation and a decline in plant health
- Crawlers have 1-2 days after hatching before they must settle & start feeding (Feed within plant cells)



Photo via DKB Cheung

Current GDD: 5/27/25
North NJ: 450 GDDs
Central NJ: 550 GDDs
Southern NJ: 640 GDDs

A close-up photograph of a Bristlecone pine branch. The branch features long, thin, green needles and some older, reddish-brown needles. Numerous small, white, scale-like insects are visible on the needles and the branch. The background is a blurred green, suggesting a forest setting.

Scale Mimicry

Cryptomeria Scale?
No...Bristlecone pine
dried sap

Photo Credit: Steven K. Rettke,
Rutgers Coop. Ext.

Cryptomeria scale (*Aspidiotus cryptomeriae* 'Kuwana')

Scale Symptoms on top Fraser Fir needles



Photo Credit: Steven K. Rettke,
Rutgers Coop. Ext.

Scale Signs beneath Fraser Fir needles

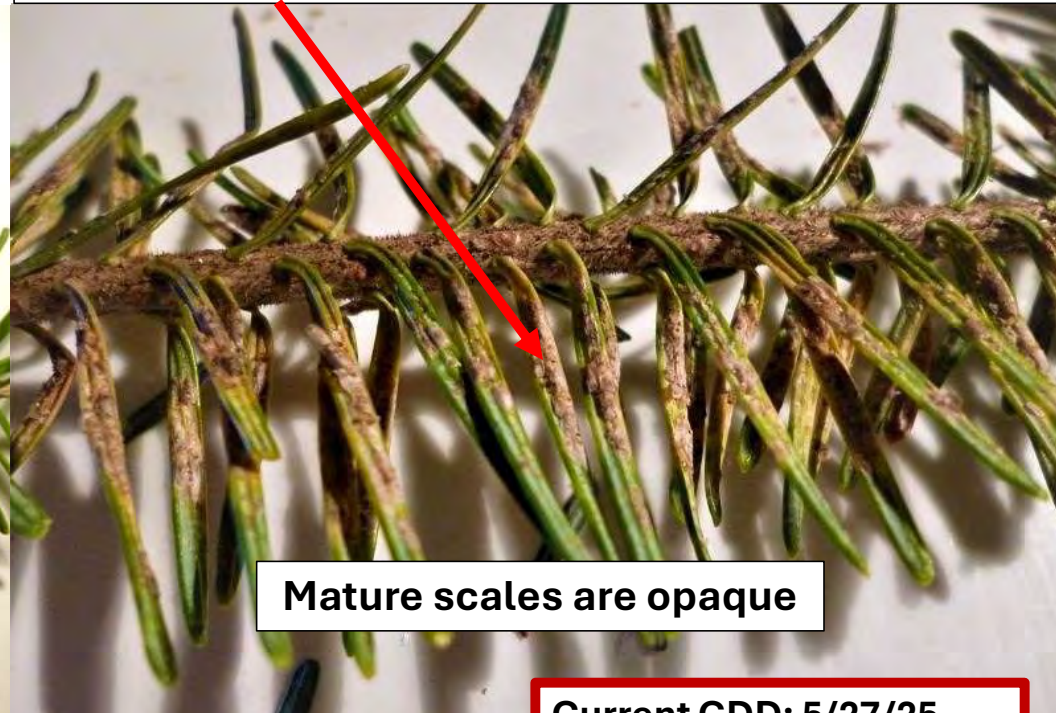


Photo Credit: Steven K. Rettke,
Rutgers Coop. Ext.

Current GDD: 5/27/25
North NJ: 450 GDDs
Central NJ: 550 GDDs
Southern NJ: 640 GDDs

Cryptomeria scale (*Aspidiotus cryptomeriae* 'Kuwana')



GDD Window (base 50): 600-800 (1st generation); 1750-2130 (2nd generation)

- **Host plants: conifers** (hemlocks, pines, firs)

True firs in Christmas tree farms are most susceptible (rarely on cryptomeria)

- **Beware of the scale hiding beneath a transparent cover!**
- Overwinter as immature nymphs in a waxy covering on needles
- **Looks like a fried egg** (nymphs and adult females are yellow, and produce a white wax coating around them) **& flat in appearance**
- Crawlers are lemon yellow in color
- **Crawler periods last 4 or more weeks**
- **Two crawler generations per year, in June and August**
- Causes mottling or chlorotic banding appearance on upper needle surfaces & causes premature needle drop
- **Monitor lower branches losing their green coloring**
- Damage happens and spreads quickly



Photo Credit: Steven K. Rettke, RCE

Current GDD: 5/27/25
North NJ: 450 GDDs
Central NJ: 550 GDDs
Southern NJ: 640 GDDs

Scale Mimicry



White
Prunicola
Scale?
No...Dried
seed oils

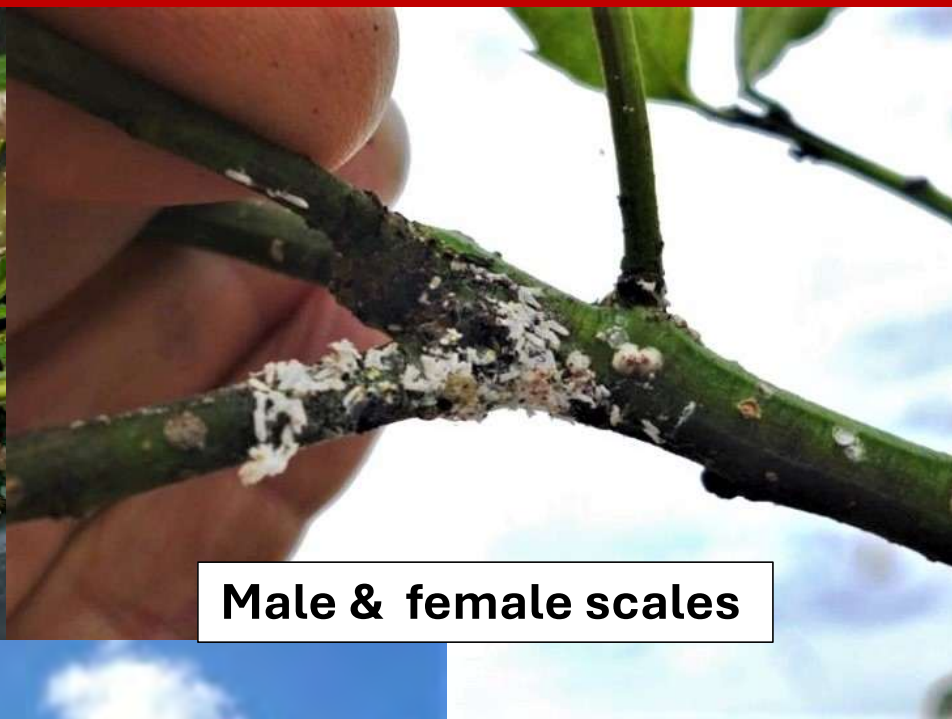
Photo Credit: Steven K. Rettke,
Rutgers Coop. Ext.

White Prunicola Scale (*Pseudaulacaspis prunicola*)

Photo credits Steve Rettke, Rutgers RCE unless otherwise noted



Mass of males w/white waxy fibers obscures individual scales



Male & female scales



Current GDD: 5/27/25
North NJ: 450 GDDs
Central NJ: 550 GDDs
Southern NJ: 640 GDDs

White Prunicola Scale (*Pseudaulacaspis prunicola*)

GDD Window: 707-1151 (2nd generation crawlers)

- **Host plants:** *Prunus* (flowering cherry), blue holly, lilac, & privet
- Overwinter on bark as mated females
- **Most infestations occur on the stems and major branches**
- Armored scale, difficult to control due to long crawler emergence periods
- **Second and third generations occur during early and late summer periods**
- **Indistinguishable from white peach scale without a compound microscope**
- Leaves a white ring of its outer margin when removed from bark or leaf tissue
- **Mature females are circular & white with a yellow center, & is 1/16" diameter**
- **Male covers are elongate**, white, and up to 1/16" in length
- Crawlers are salmon-colored
- Causes leaf yellowing, shedding, stunting, and branch death



White, circular female cover

1635041

Current GDD: 5/27/25
North NJ: 450 GDDs
Central NJ: 550 GDDs
Southern NJ: 640 GDDs

Scale Mimicry

Juniper Scales?

No...Artillery fungus spores

Photo Credit: Tim Waller,
Rutgers Coop. Ext.

Juniper Scale (*Carulaspis juniperi*)

Photo credits Steve Rettke, Rutgers RCE unless otherwise noted



Parasitoid wasp exit holes



Actual scale body



Testing for scale viability



nice portrait of the armor of a female juniper scale.

Photo by United States National Collection of Scale Insects Photographs,
USDA Agricultural Research Service, Bugwood.org



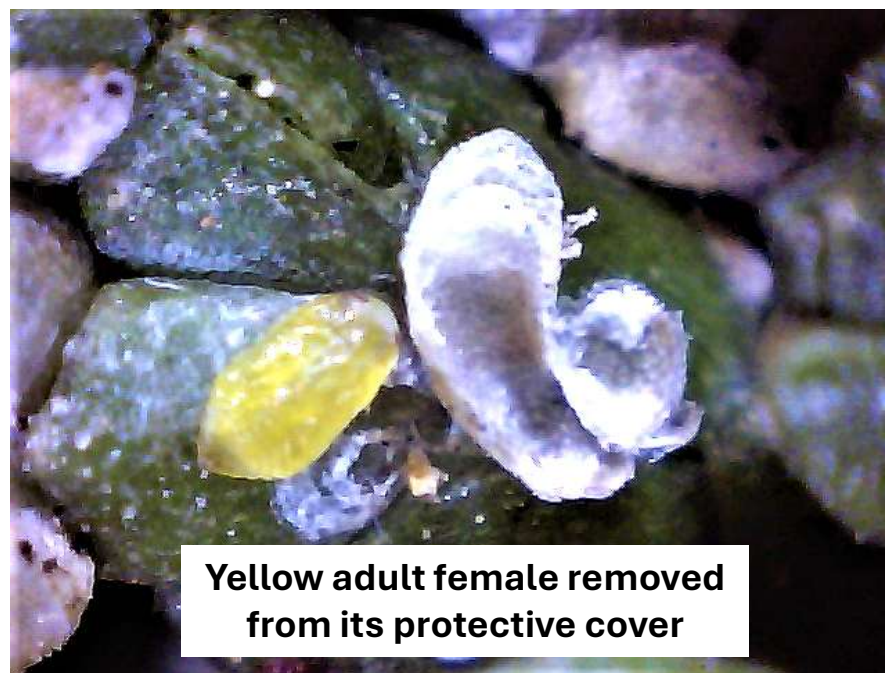
White outer scale ring

Current GDD: 5/27/25
North NJ: 450 GDDs
Central NJ: 550 GDDs
Southern NJ: 640 GDDs

Juniper Scale (*Carulaspis juniperi*)

GDD Window (base 50): 22-148 (dormant), 707-1260 (crawlers)

- **Host plants: Conifers** (Juniper, false-cypress, Leyland cypress, arborvitae)
- **Female covers are circular and white** (1/16" in diameter)
- **Male covers are elongated and white**, but smaller in size
- Yellowish cast skins are attached to the surface of the waxy covering of both sexes
- **Adult females overwinter on the foliage** =(dormant oil sprays?)
- **One generation per year**
- Scales usually build up on the south side of shrubs, or the sides against buildings
- **Crawlers start hatching by mid-June and can continue into July**
- No symptoms with light infestations
- Heavy infestations can lead to yellowed foliage and needle drop
- Unabated populations lead to dieback and unsightly plants

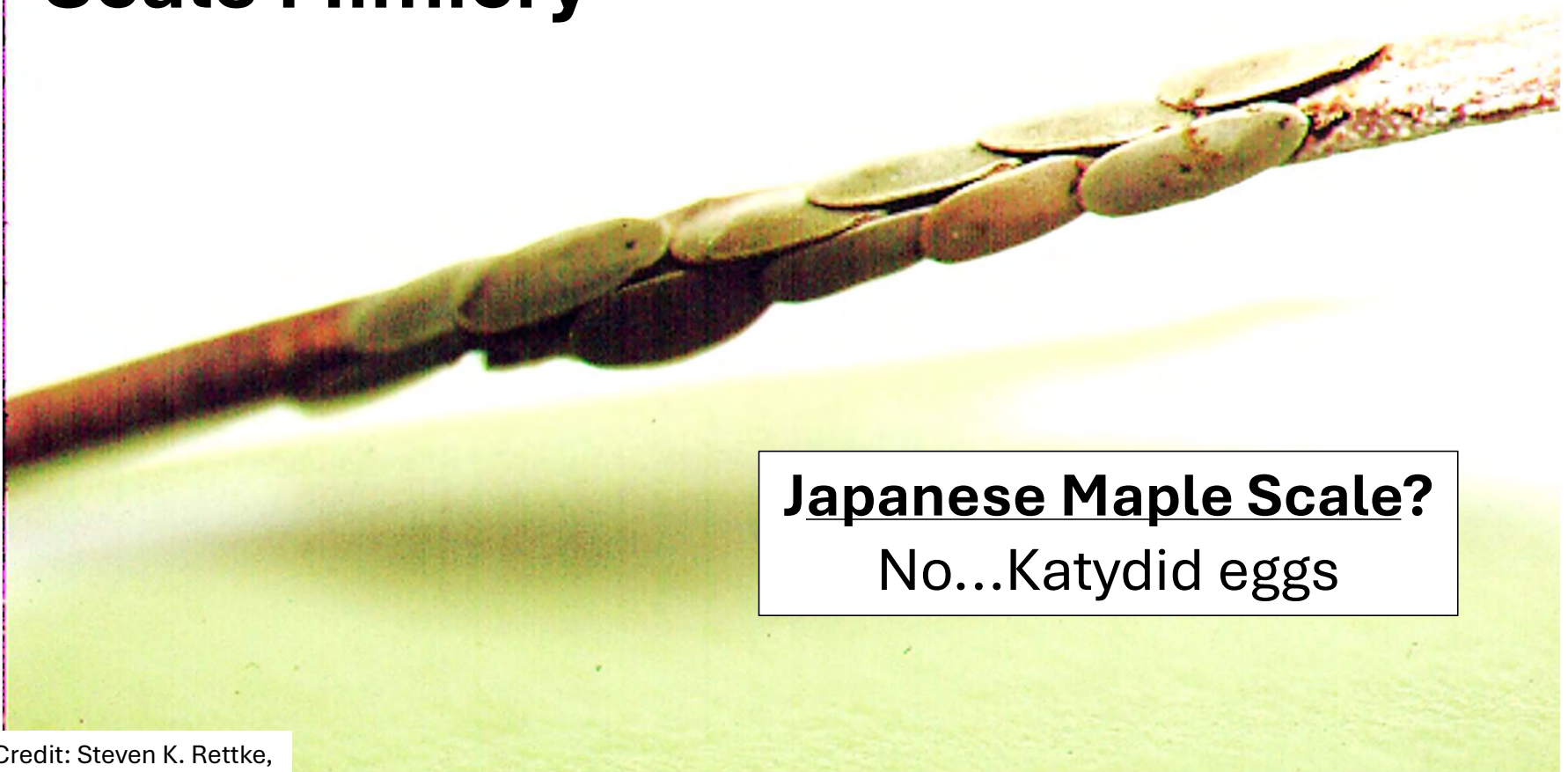


**Yellow adult female removed
from its protective cover**

Photo Credit:
Steven K. Rettke, RCE

Current GDD: 5/13/25
North NJ: 450 GDDs
Central NJ: 550 GDDs
Southern NJ: 640 GDDs

Scale Mimicry



Japanese Maple Scale?
No...Katydid eggs

Photo Credit: Steven K. Rettke,
Rutgers Coop. Ext.

Japanese Maple Scale (*Lopholeucaspis japonica*)

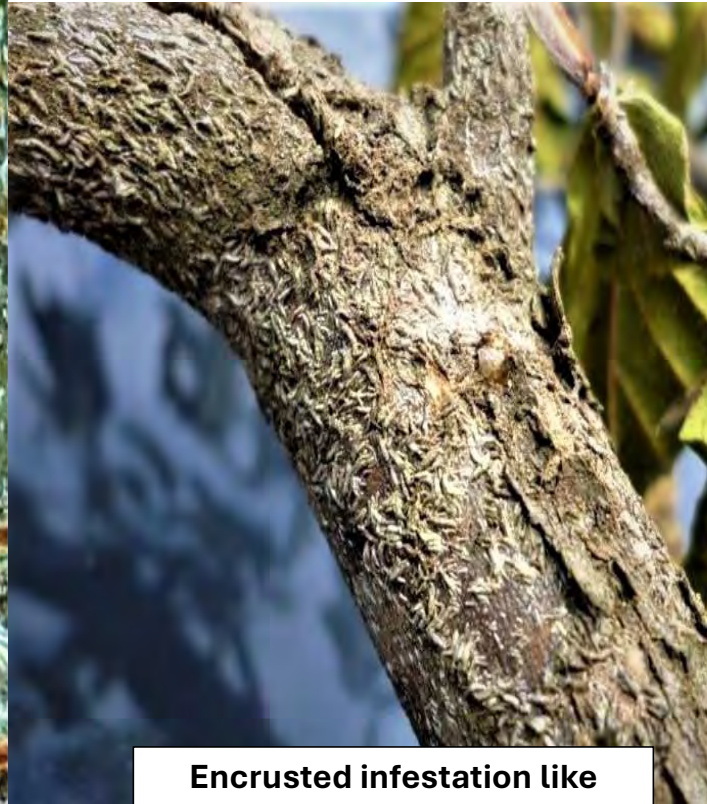
Photo credits Steve Rettke, Rutgers RCE unless otherwise noted



GDDs: 1st gen = 800-1200; 2nd gen = 2500+



Twice-stabbed Lady
Beetle Predator



Encrusted infestation like
barnacles on a rock



Purple colored female
scale is diagnostic

Japanese Maple Scale (*Lopholeucaspis japonica*)

GDDs: 1st gen = 800-1200; 2nd gen = 2500+

Host plants: Large host range, including maples, firethorn, serviceberry, lilac, cotoneaster, Prunus

- 1st generation crawlers emerge in June; extends for 4+ weeks
- 2nd generation in August (1st & 2nd generations can overlap)
- **Under the white cover, the female scales have a deep purple color = Diagnostic**
- Both males & females have elliptical white, waxy covers
- Feed only on branches
- Females are larger than males
- Trees in hot environments are more likely to become infested
- Individual branch dieback & tree tree death may occur
- Whole stem surfaces or trunks may become covered in multiple layers of scales



Photo Credit: Steven K. Rettke, RCE

Current GDD: 5/27/25
North NJ: 450 GDDs
Central NJ: 550 GDDs
Southern NJ: 640 GDDs

Bagworm (*Thyridopteryx ephemeraeformis*)



GDD Window (base 50): 600-900

- Eggs overwinter in 1-2.5" pinecone-shaped cases or "bags" that the caterpillar forms and suspends from host plants
- Small black/gray and amber larvae hatch in the early summer and immediately begin feeding while constructing their cases, in which they reside
- Growth and molting continue through summer, until larvae stop feeding around mid-August, when they close the case with silk to pupate
- During early to mid-fall, pupation ends and 1-inch long, fur-covered, black adult male moths with clear wings emerge
- Adult females remain in their bags and release pheromones to attract males
- **Females deposit 500-1000 eggs in their bag**, and adults die after reproduction
- **One generation per year**
- Causes complete defoliation, brown spots on leaves, and leaf skeletonization, as well as canopy thinning
- **Host plants:** over 125 trees and shrubs
 - o **Evergreen** – arborvitae, juniper, cedar, fir, pine, spruce
 - o **Deciduous** – birch, boxelder, elm, willow, sycamore, black locust, honey locust, persimmon, poplar, maple, sweet gum



Photo via Tim Waller, Rutgers RCE

Current GDD: 5/27/25

North NJ: 450 GDDs

Central NJ: 550 GDDs

Southern NJ: 640 GDDs

Bagworm (*Thyridopteryx ephemeraeformis*)

"Ballooning" = how they get to new locations!

Ballooning Bagworms



Common Bagworm
"Ballooning" Silk



Current GDD: 5/27/25

North NJ: 450 GDDs

Central NJ: 550 GDDs

Southern NJ: 640 GDDs

Bagworm (*Thyridopteryx ephemeraeformis*)

Photo credits Steve Rettke, Rutgers RCE unless otherwise noted



Photo: Tim Waller, RCE



Current GDD: 5/27/25
North NJ: 450 GDDs
Central NJ: 550 GDDs
Southern NJ: 640 GDDs

**Late instar
bagworm
caterpillar**
(September)

Photo Credit: Steven K. Rettke,
Rutgers Coop. Ext.

Current GDD: 5/27/25
North NJ: 450 GDDs
Central NJ: 550 GDDs
Southern NJ: 640 GDDs

Bagworm (*Thyridopteryx ephemeraeformis*)



GDD Window (base 50): 600-900

Management

- Cultural Practices:

- **Natural predators:** birds, parasitoids, insects, fungi (*Apergillus parasiticus*, *Beauveria bassiana*, *Parcillomyces lanosum*)
- Most often spread by transporting infested nursery stock – check plants before moving or planting
- Early detection is important to prevent spread
- Reduce plant stress
- **Remove egg cases and drop them into soapy water**
- Pheromone traps

Materials

○ Contact insecticides:

- Carbamates [1A]: carbaryl
- Pyrethroids [3A]: -thrins
- Oxadiazine [22A]: indoxacarb

○ Systemic insecticides:

- Diamides [28]: chlorantraniliprole, cyantraniliprole, cyclaniliprole, cyclaniliprole +flonicamid [29]

○ Considerations:

- Will harm non-target species

- Biorationals:

- Spinosyns [5]: spinosad
- *Bacillus thuringiensis* var *kurstaki* (Bt)
- **Mechanical removal of bags: before egg hatch or throughout season**

Current GDD: 5/27/25

North NJ: 450 GDDs

Central NJ: 550 GDDs

Southern NJ: 640 GDDs

Volutella Blight of Buxaceae

- Caused by **Coccinonectria** & **Pseudonectria** spp.
- Specifically, **boxwood**, **pachysandra**, and **sarcococca**
- Mature leaves are more resistant than young leaves
- **Warm weather pathogen:** 68-77F+, 85%+ humidity is ideal
- Overwinters in boxwood branches, leaves, and plant debris from the previous season
- **Symptoms become apparent in spring to early summer**
- Growth of branches is delayed, plants show poor vigor
- **Stem cankers, girdled stems, dieback** (*must be carefully pruned*)
- Loose bark and discolored bark around cankers
- **Straw color leaves stay attached for significant periods (BW)**
- **Large necrotic & expanding infections in Pachysandra**
- In high humidity weather, salmon-colored fruiting structures develop on lower surfaces of leaves (Sporodochia)
- Spores are wet and sticky, traveling only short distances by wind
- Easily transported by humans, wildlife, during propagation



Boxwood



Pachysandra

Photo credits Steve Rettke, Rutgers RCE unless otherwise noted



Volutella Blight of Pachysandra



Rich Buckley, Rutgers PDL



Rich Buckley, Rutgers PDL

Volutella Blight of Boxwood

Confirmed Volutella
Symptoms



Photos: Joe Boggs, OSU



Photo: B. Watt, UMaine



Sabrina Tirpak, Rutgers PDL

Volutella Blight

Management

- Cultural Practices:

- Avoid winter injury, poor vigor, and stem wounds
- Prune diseased branches when foliage is dry
- Sanitize pruning tools after working with diseased plants
- Prevent creating further wounds with pruning tools
- Maintain plant health and reduce unnecessary plant stress
- Avoid excess water and fertilization
- Maintain proper air circulation
- Keep area around plants clean, destroy debris
- Choose well drained soil , avoid overhead watering

Materials

○ Contact fungicides:

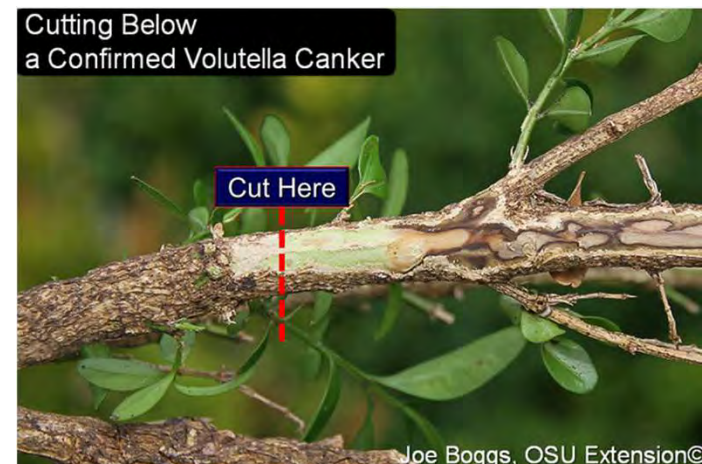
- Chlorothalonil [M05]
- Mancozeb [M03]
- Coppers [M01]
- Bordeaux mixture

○ Systemic insecticides:

- Thiphanate-methyl [1]
- Propiconazole [3]

○ Considerations:

- Weight Pros/Cons of using long REI materials. May be worth it in high disease severity instances.



- **SANITATION is CRITICALLY IMPORTANT!**

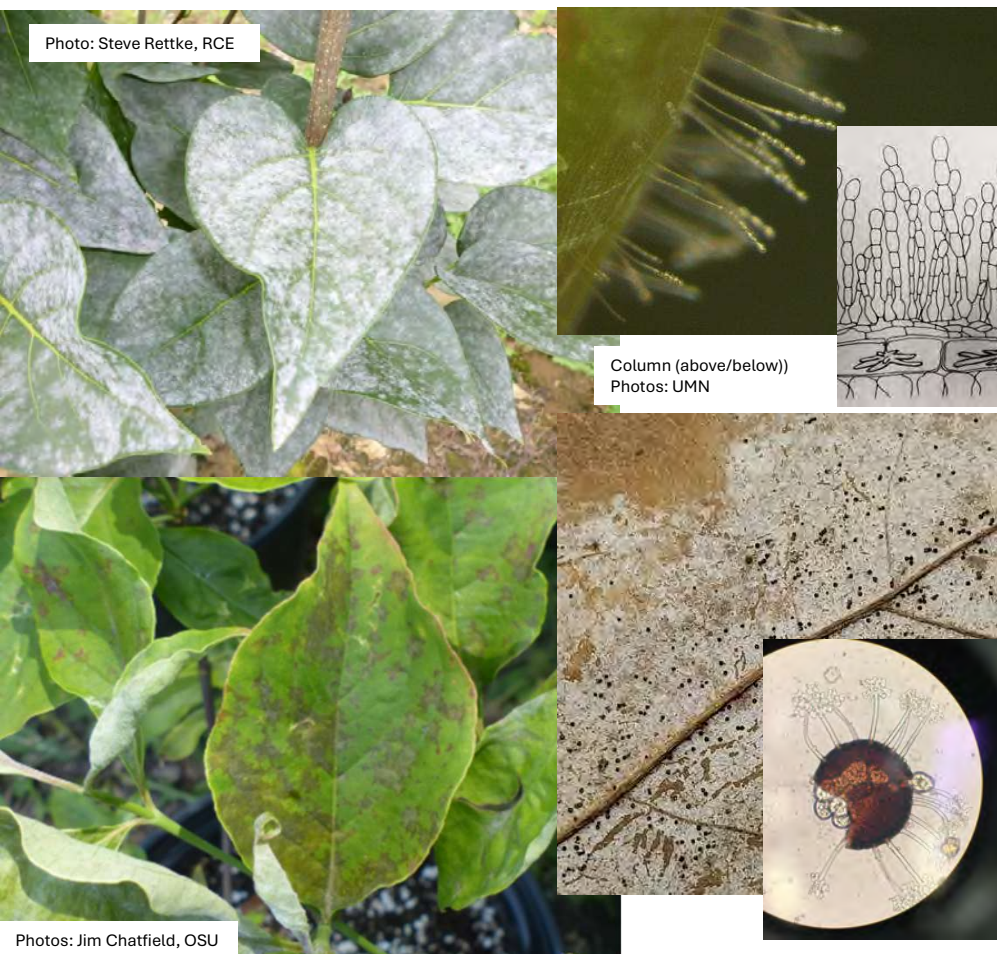
Know the difference!



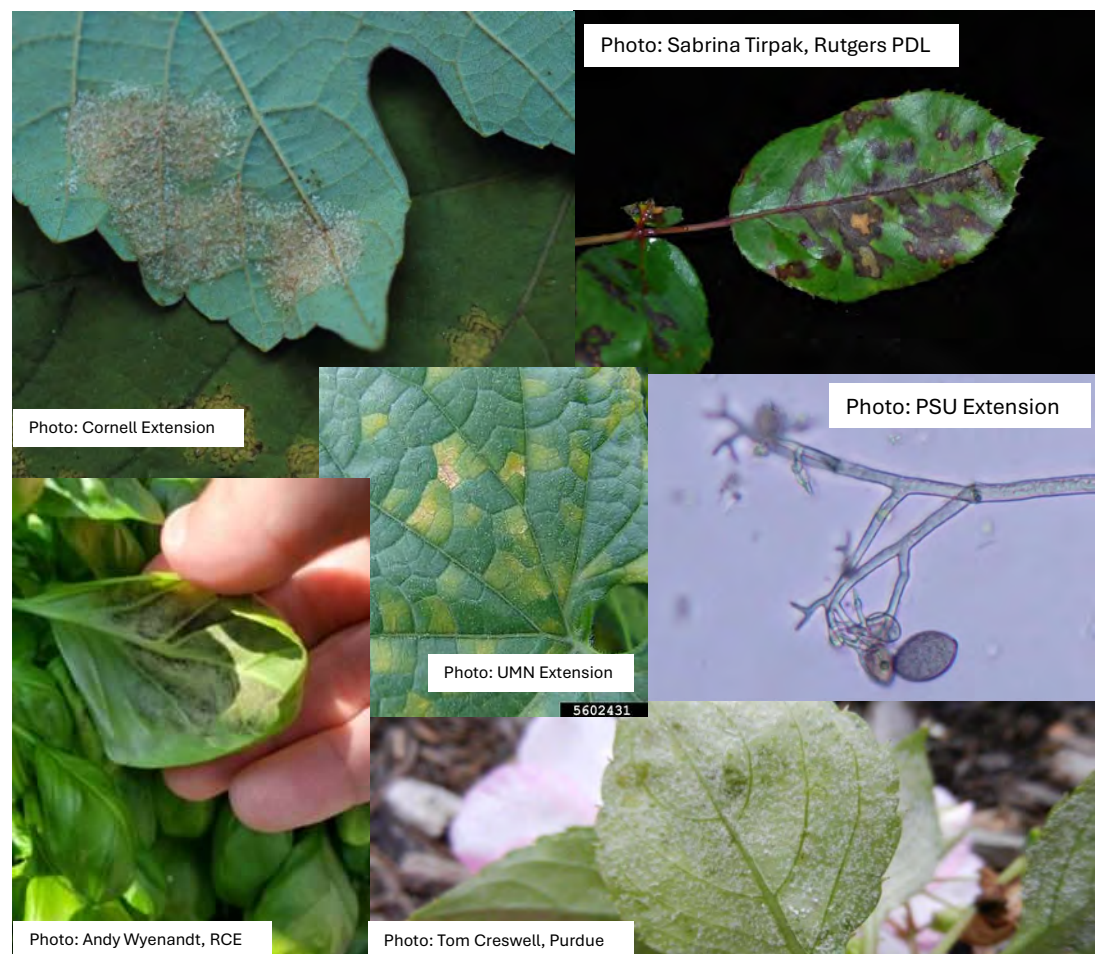
Photo: Tim Waller, RCE

Powdery Mildew vs. Downy Mildew

Powdery Mildew: (FUNGAL)



Downy Mildew: (OOMYCETE / not fungal)



Powdery Mildew vs. Downy Mildew: Treatments

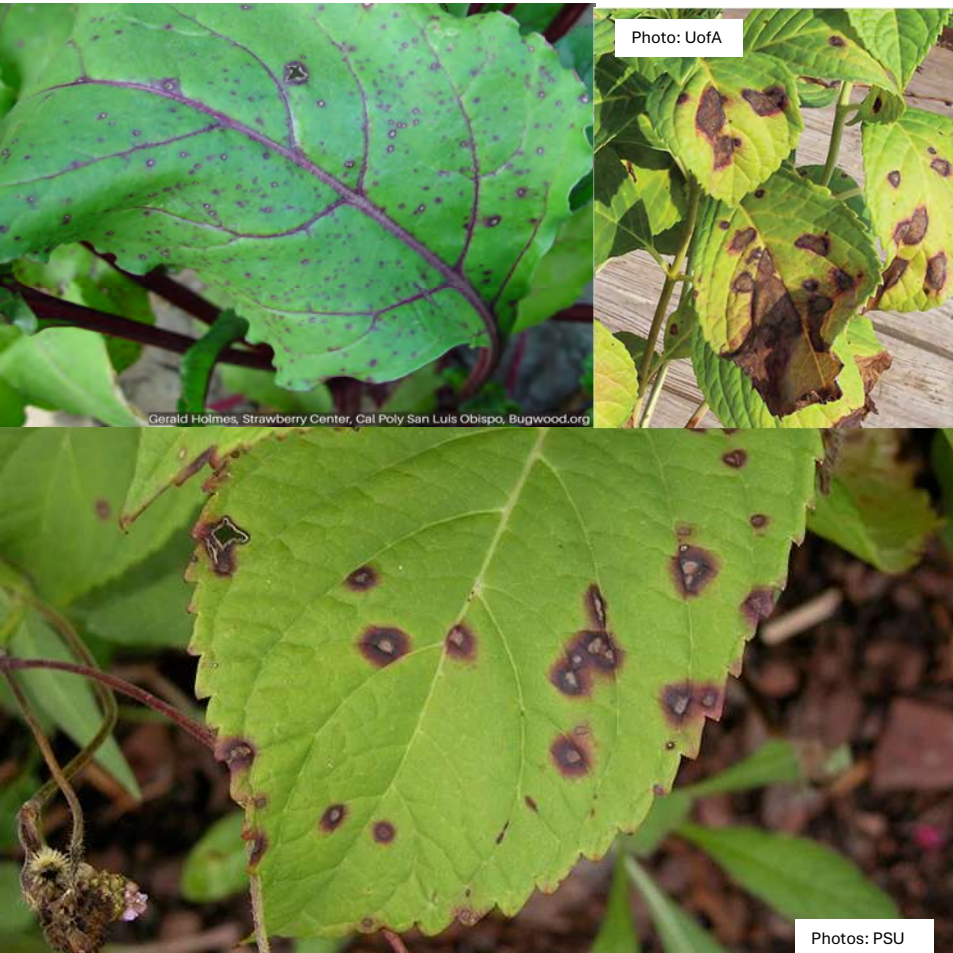
Powdery Mildew:

- DMIs [3]
 - Tebuconazole (12hr)
 - Myclobutanil (24hr)
 - Propiconazole (24hr)
- Pre-mix
 - Cyprondinil/Fludioxonil [9+12] (12hr)
 - Boscalid/Pyraclostrobin [7+11] (12hr)
- QoI [11]
 - Fluoxastrobin (12hr)
 - Azoxystrobin (4hr)
- T-methyl [1] (12hr)
- Sulfurs [M2] (24-24hr)
- Biorationals:
 - *Reynoutria sachalinensis* extract
 - Horticultural oils
 - Neem oil
 - Hydrogen peroxide [NC]
 - Potassium bicarbonate [NC]

Downy Mildew:

- Pre-mix
 - Cyprondinil/Fludioxonil [9+12] (12hr)
 - Boscalid/Pyraclostrobin [7+11] (12hr)
- QoI: Fenamidone [11] (12hr)
- Fixed coppers [M01]
- **Protectant & Local translaminar**
 - Cyazofamid [21]
 - Dimethomorph, Mandipropamid [40]
 - (and combinations)
- **Xylem Mobile Systemic (upwards):**
 - **Mefenoxam [4]**
 - Fluopicolide [43]
 - Oxathiapiprolin [49]
- **Amphimobile / Fully systemic**
 - Aluminum tris (O-ethyl phosphonate) [P07]
 - Mono- and di- potassium salts of phosphorus acid [P07]

Cercospora leaf spot



Cercospora Leaf spot (Fungal):

- Pre-mix
 - Azoxystrobin/Benzovindiflupyr [11+7]
 - Fluxapyroxad/Pyraclostrobin [7+11]
 - Pydifumetofen/Difenoconazole [7+3]
 - Chlorothalonil/Propiconazole [M05 + 11]
 - (based on Dr. Fulya Basel-Gurel (Tennessee State University), research)
- Biorationals:
 - *Reynoutria sachalinensis* extract

Bacterial streaming = not fungal leaf spot



Use the Rutgers Plant Diagnostic Lab

Enables us to learn more about specific issues

Mechanical
damage

Abiotic /
Environmental

Physiological /
nutritional /

Arthropod
pest

Disease



Rutgers Plant Diagnostic Laboratory
Ralph Geiger Turfgrass Education Center
20 Indyk-Engel Way
New Brunswick, NJ 08901

Telephone: 732-932-9140

Fax: 732-932-1270

Email: rutgerspdl@njaes.rutgers.edu



Thank you for attending



Presentation will be available on our website.

Next session: June 10th, 2025

Key pests for next time:

- | | |
|---------------------------|-------------------------------------|
| 1. Oriental beetle | 8. Fletcher scale |
| 2. Japanese beetle | 9. Mealybugs |
| 3. Flower thrips | 10. Leaf spot Vs Bacterial shothole |
| 4. Spider mites | 11. Common viral symptoms |
| 5. Indian wax scale | 12. Black spot of rose |
| 6. Calico scale | 13. Mating disruption lures |
| 7. Cottony Camellia scale | 14. Sanitation considerations |

Funding provided by:



National Institute of Food and Agriculture
U.S. DEPARTMENT OF AGRICULTURE

Implementation of IPM in New Jersey
-Ornamental Crops 2025