



Managing Pests and Diseases

*Is every bug a
bad bug? No!*

Joyce Tomaselli

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Just press the Button...
BUGS DROP DEAD!

New BLACK FLAG Aerosol INSECT KILLER

4¢ 1/39 EACH
The Black Flag brand is a *Science Supply*

IT'S HERE... the handiest, easiest-to-use insect killer you've ever seen... at a price never equaled! It's the new Black Flag Aerosol Insect Killer! Just a touch of your finger on the handy push-button releases a magic mist that's sure, sudden death for flies, mosquitoes, flying ants, gnats and other insect pests.

NO MESS, NO FUSS with this neat, compact Black Flag Aerosol. It's ready to use instantly. No spray gun to fill... no spilling, no dripping, no staining of walls, curtains, drapes or toys. You get all the insect-killing power of the famous Black Flag formula, plus the modern convenience of the push-button Aerosol brand.

FAST SHOCKDOWN, QUICK KILL! Black Flag's exclusive "fast-acting" formula kills on contact. It's so fast, it kills mosquitoes, gnats, flying ants, houseflies and other flying insect pests.

IT'S TO A BEEHIVE OPERATING AND THAT THE ENTIRE AREA WILL BE FREE OF ALL INSECT PESTS. Easy to use in the most convenient, unobtrusive, unobtrusive light fixtures and lamps.

SUPER-ATTRACTIVE! Black Flag brand's delectable fragrance after you use it. It's also guaranteed to make your home a full mosquito, spider, ant, etc.

COSTS LESS! Black Flag is priced lower than high-pressure bombs!
DOES MORE! Many times more efficient than ordinary sprays!

**NO spray gun to buy!
NO dripping!
NO staining!**

BLACK FLAG

A PRODUCT FOR EVERY SPECIAL HOUSEHOLD NEED

DRIVE OR CREEP! Black Flag offers an irresistible force against the general home pest. It's more common than your front porch.

DRINK SPRAY! Black Flag is the only insecticide that can be used in the kitchen. It's safe for your family.

BLACK FLAG is a household spray that kills houseflies, mosquitoes, gnats, flies, and other flying insects. It's safe for your family.

BUGS BARK! The Black Flag brand's exclusive "fast-acting" formula kills on contact. It's so fast, it kills mosquitoes, gnats, flying ants, houseflies and other flying insect pests.

ARMED AND DANGEROUS! Black Flag brand's delectable fragrance after you use it. It's also guaranteed to make your home a full mosquito, spider, ant, etc.

SNAROL! Black Flag brand's delectable fragrance after you use it. It's also guaranteed to make your home a full mosquito, spider, ant, etc.

BOYLE-MIDWAY, INC. - CRANFORD, N. J. - ATLANTA - CHICAGO - LOS ANGELES

Agenda

- Review of Integrated Pest Management and Pests and Diseases
- Structural (indoor) pests
- Asian Longhorned Tick
- Pests and Diseases of Plants
- Spotted Lanternfly
- Jumping Worms
- Bees and Wasps will be covered Week 4
- Lawns will be covered Week 5.
- Wildlife will be covered Week 7.



Integrated Pest Management (IPM)

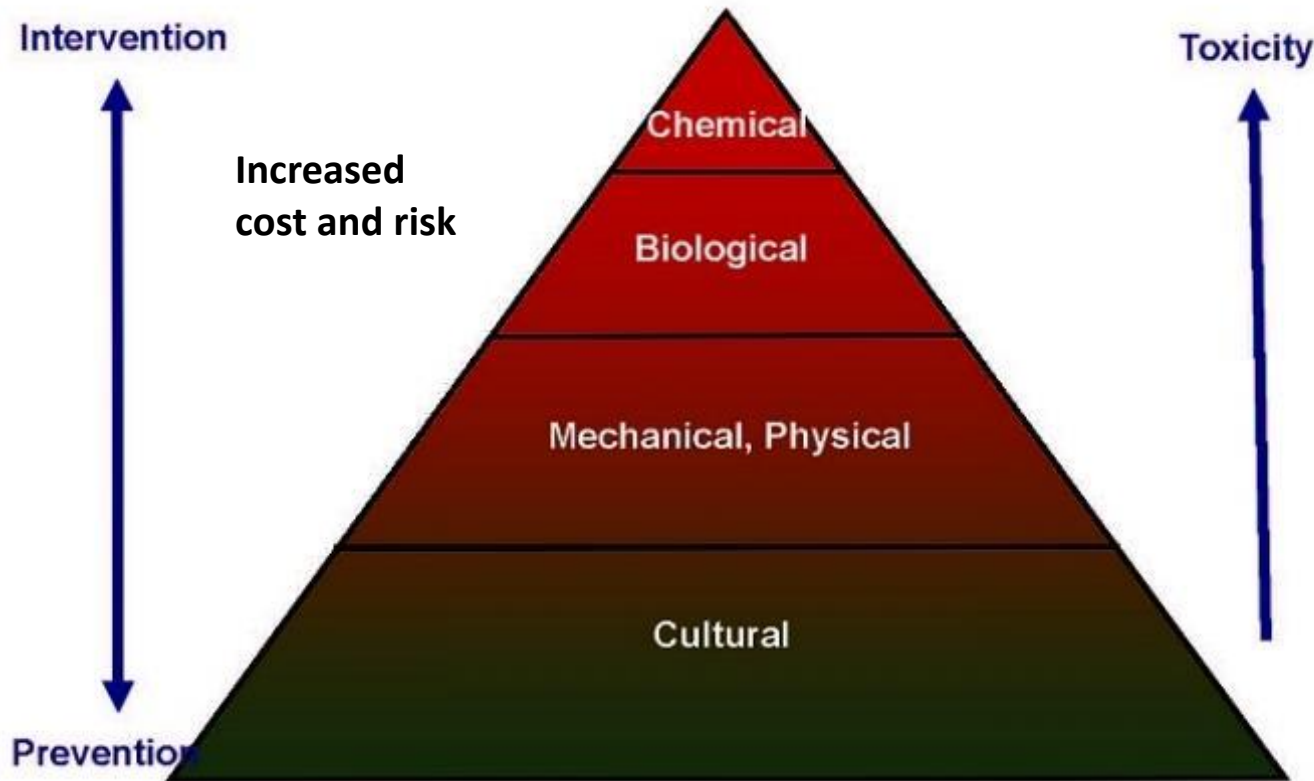
- IPM is a common sense approach to Pest Control.
 - It is a system for managing pest problems using a range of safe, least-toxic methods.
 - IPM is integrated because it uses biological, organic, cultural, mechanical and chemical options for managing pest problems.
 - Goal: manage problems at acceptable levels.
 - Methods: prevent, monitor, diagnose and take action if necessary.
 - Actions: Use least harmful, physical and cultural methods first. Use least-toxic pesticides as a last resort.
- Hotline requests for pesticide recommendations are decreasing dramatically.



IPM Tactics and Best Practices

Identify the pest, determine tactics

Prioritize methods



Exclusion: prevent entry to structure or vulnerable items

Non-Chemical methods: traps, heat, cold, vacuum, pick and discard

Cultural methods: sanitation, crop rotation, weed control, resistant varieties, proper spacing and light

Pesticides: last resort, least toxic alternatives (e.g. a spray of water)

Remember: Natural \neq Non-toxic

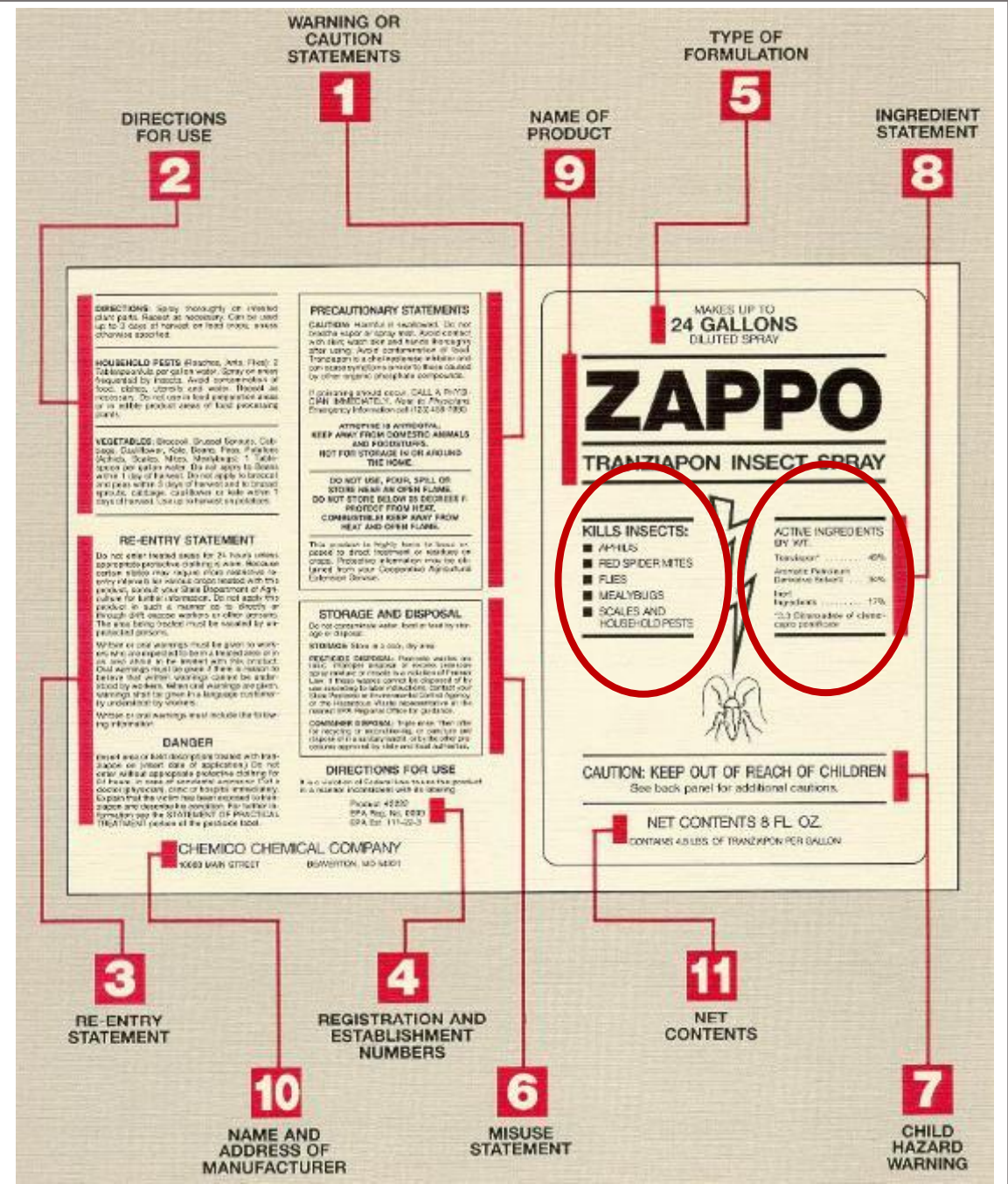
Consider pest behavior, life cycle, population dynamics and interactions



Pesticide Labels

1. Warning or Caution Statements
2. Directions for Use
3. Re-Entry Statement
4. Registration Numbers
5. Type of Formulation
6. Misuse Statement
7. Child Hazard Warning
8. Ingredient Statement
9. Name of Product
10. Manufacturer Information
11. Net Contents

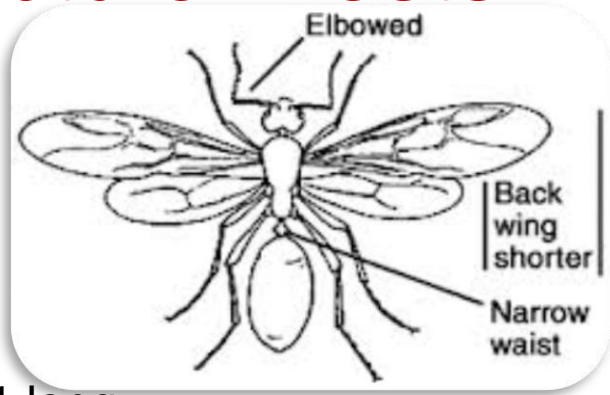
Always read and follow label directions. The Label is the Law



Structural Pests – Ants and Termites

Ants

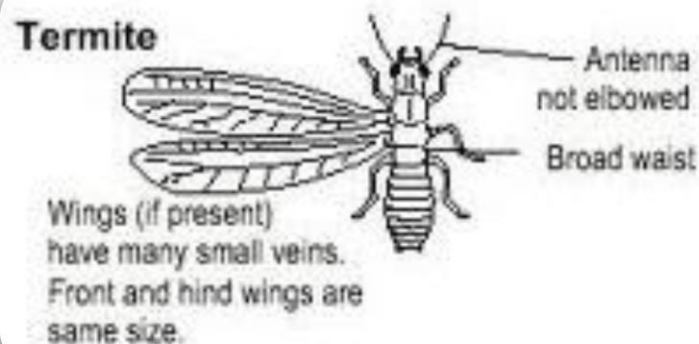
- 3 distinct body parts
- Elbowed antennae
- 2 sets of wings: 1 short, 1 long;
- Keep wings until suitable nest site is located
- Workers forage in open
- Galleries (nest) cleanly sanded
- Carpenter ants seek wet wood for their nests



Termites

- 3 parts are there, but not always obvious
- Straight antennae
- 2 sets of wings: all same length; drop wings shortly after emergence (pile of wings near swarm)
- Workers not exposed to elements, only winged reproductives emerge
- Subterranean, nomadic
- Prefer moist conditions & wood in contact with ground
- Termites eat wood and wood products

Termite



Structural Pests – Ants and Termites

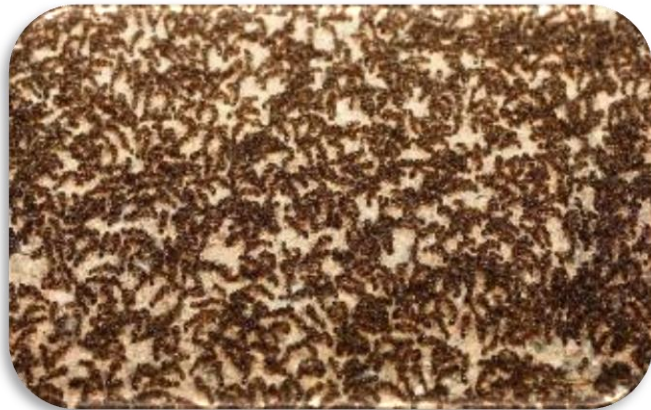
Ants Indoors

- Carpenter Ants - Identify and correct source of moisture
- If other ants are coming from outside, eliminate food sources – sweets especially
 - Exclude (caulk, etc.)
 - Set baits
- Spray nest directly – if you can find it. Perimeter sprays are temporary
- Remove or replace rotten wood



Ants Outdoors

- Ignore them!



Termites

- Look for damaged wood, mud and shelter tubes on foundation, near surface, in basement, and along cracks
- Check crawl spaces, utility access, pipes, vents
- Is the tunnel active? Knock off part – do the insects repair this?
- Sound wood with hammer; probe with ice pick if sound is hollow
- Look for small, irregular holes in wood surface
- Pesticide application must be done by licensed applicator in New York state.
- Keep shrubs/mulch/debris a few feet away from foundation (Firewood at least 30 ft.)

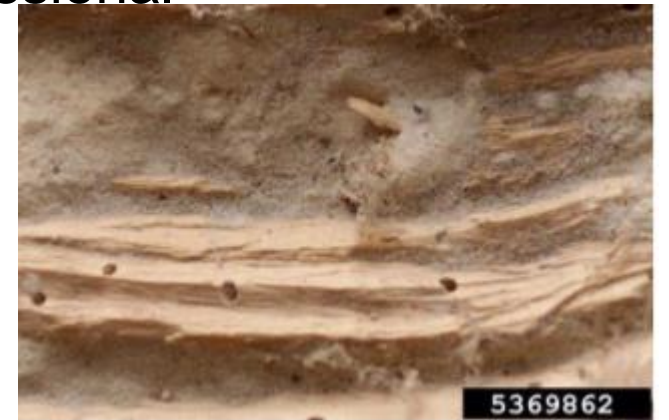


Carpenter Bees and Powder Post Beetles

- Bees bore ½ inch holes into wood to make a home for their young.
- Often the same nesting sites are used year after year, and the same tunnels are reused.
- Males are territorial and cannot sting
- Females can sting but rarely do
- They are important pollinators
- Well-painted ,finished wood is a deterrent
- If treatment with an insecticide is needed do it in early spring.
- If tunnels are plugged with live bees trapped inside, they will bore new openings.



- Larvae feed on wood and reduce it to a fine powder.
- Holes left by emerging beetles are about 1/8 inch in diameter and round
- Exit holes and sawdust from beetles burrowing out are often the first symptom noticed.
- Determine if infestation is active
- Determine extent of damage
- Consult a professional



Clothing Moths & Indian Meal Moths

- Feed on dry materials of animal origin
- Found in dark places
- Larvae cause holes or threadbare spots
- Produce silken feeding tubes or hard protective cases
- Infestations often in woolens if improperly stored
- Vacuum regularly to prevent lint, dust or hair from accumulating.



Life stages of a clothes moth:
larva (lower), pupa (upper), and adult (right).
Photo from Clemson University -
USDA Cooperative Extension Slide Series, Bugwood.org



Adult (length less than 1/2 inch).
Photo by Gary Alpert,
<http://www.insectimages.org/>



Larva (length about 1/2 inch).
Photo from Clemson University, USDA
Cooperative Extension Slide Series, Bugwood.org

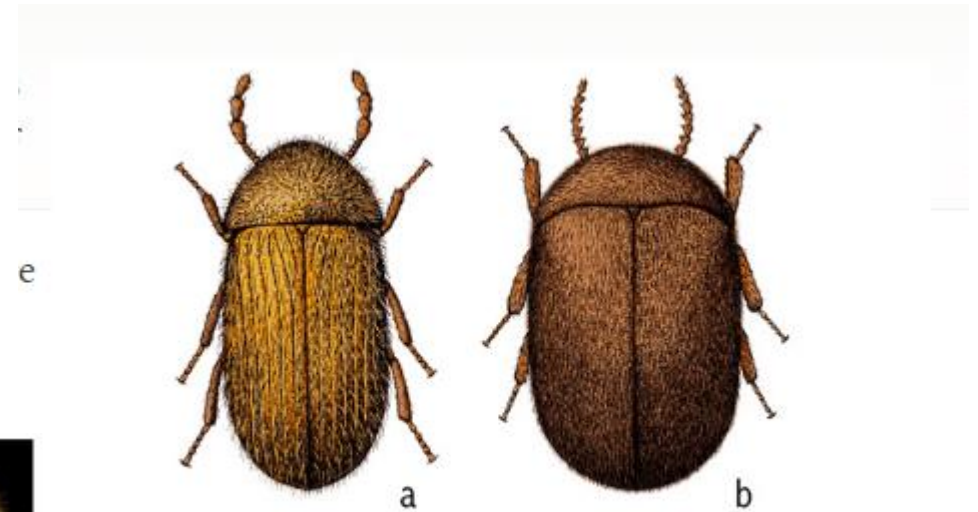
- Store clean articles in air-tight containers
- Cold (<40F) storage renders larvae inactive, but freezing kills them
- Pheromone traps are available for webbing moths
- Herb or scent based products are ineffective

- Larvae feed on flour and meal products, dried fruits, nuts, bird food, and dried pet foods
- Larvae spin a silken cocoon in products or on ceilings & corners



Cigarette and Carpet Beetles

- Cigarette beetles feed on tobacco products, dried yeast, seeds, dried botanical specimens, dried fish, leather goods, and even tapestry and upholstered furniture.
- Drugstore beetles feed anything of vegetable origin, including seeds, breakfast cereals etc. (It gets its name from the habit of feeding on almost all drugs found in pharmacies)
- They are often found infesting herbs and spices
- Scout for the beetles and fine powder left after feeding
- Store products in glass jars with tight lid
- Vacuum adults, discard infested products



The drugstore (a) and cigarette beetles are two of the most common stored product-infesting beetles.



Pests in Basements and Attics

Insects enter to get away from heat, cold or flooding

- Field & Camel Crickets
- Millipedes
- Springtails
- Silverfish
- Firebrats



- Some need a protected area to overwinter
- Enter structures in late summer or early fall
 - Under shingles, siding
 - In attics and wall voids
- Follow pipes, wires and vents inside
- Live off stored fat – need to stay dormant or will use up reserves



House, Field and Camel Crickets

- House crickets are $\frac{3}{4}$ - 1 “, light yellowish brown with three dark bands on the head. Found in any part of the home they reproduce indoors.



- Field crickets are black, $\frac{1}{2}$ to 1 $\frac{1}{4}$ “, usually found on lower floors and in basements.
- Both attracted to light at night
- Mostly annoying (chirping), little damage
- Practice good sanitation around the home exterior especially leaves, bricks, lumber
- Use sticky glue traps
- Vacuum and discard bag



- Camel Crickets are found in damp basements, garages, and crawl spaces.
- Often invade to overwinter or when it's too dry and hot outside.
- Soundless and wingless
- Adults are $\sim \frac{1}{2}$ –1 $\frac{1}{2}$ inches
- Feed on anything, breed year-round
- Control with exclusion
- Remove moist areas close to home
- Keep basements dry
- Use sticky glue traps
- Vacuum and discard bag



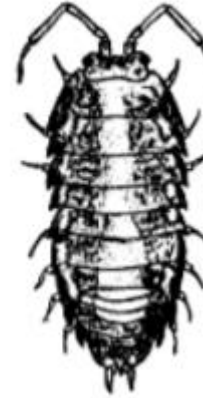
Silverfish & Firebrats, Many-legged Arthropods

Bristletails

- Wingless insects, active a night
- Run quickly when disturbed
- Feed on flour, cereals, dust, dead insects, cloth, paper, glues
- Silverfish prefer damp and cool places
- Firebrats prefer warm moist places
- Both indicate too much moisture
- Remove source of moisture and food
- Freeze articles e.g. cloth or paper
- Consider insecticides



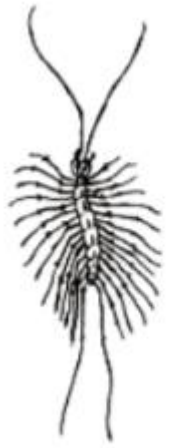
Millipede



Sowbug



Centipede



House Centipede

- Normally live outdoors
- primarily nocturnal, avoiding light
- Feed on decaying vegetation
- may be found in moist areas of the home
- Centipedes also feed on insects, spiders and other small animals and can bite
- Remove source of moisture and food
- Consider insecticides

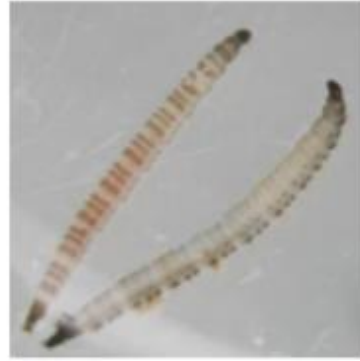


Drain Flies and Fruit Flies



Adult Drain fly.

Photo by Joseph Berger; from <http://Bugwood.org>



Two larvae (>1 cm, about 1/3 inch long) and a pupa (half that size).

Photos ©2013 IDL, Cornell.



- Aka Moth Flies
- Larvae feed on organic “gunk” that builds up in plumbing of homes.
- Thoroughly clean the drain of organic buildup.



- Found around overripe fruits & vegetables, especially fermenting.
- Attracted to baked goods with yeast, sweet beverages and vinegar.
- Larvae feed in the decaying food, pupate nearby on dry surfaces.
- Remove food source, monitor 10-15 days.
- Build home-made trap with a jar, bait and paper funnel. Discard or freeze trapped flies.



Fruit fly (adult).

Photo by M. El Damir, Pest Management; Bugwood.org



Larvae (maggots).

Photo by W. Cranshaw, Colorado State University; Bugwood.org



Vinegar fly (adult).

Photo by J. Berger; Bugwood.org



More Flies

- If the source is inside clean it up.
 - This may mean finding a dead bird in your chimney, taking your trash out more often, and making sure food is contained.
- For cluster and house flies, the source is often outside. Keep them out.
 - Well-fitting screens are essential!
 - Repair holes in screens.
 - Caulk cracks around windows.
 - Fix doors so they close tightly.
 - Use a screen door if you want the breeze.
 - Keep a flyswatter handy and use it.
 - If a bunch get in, hang sticky fly tape near where they hang out, or suck them up with a vacuum.
- Don't bother with bug zappers—flies ignore them. Besides, they often kill beneficial insects.



Blue bottle fly.
Photo by Gary Alpert, Env. Health and Safety, Harvard U.



Cluster fly.
Photo by Whitney Cranshaw, Colorado State University, Bugwood.org



Photo by



House fly. Photo by Gary Alpert, Env. Health and Safety, Harvard U.



More Annoying Indoor Pests

- Boxelder bug
- Clover mites
- Crickets
- Lady beetles
- Western conifer seed bug
- Brown marmorated stink bug



Exclusion:

Check attic or wall vents, chimneys and fireplaces

Eliminate or caulk gaps: doors, window frames, soffits, screens, windows, and weather stripping.



Indoor Pests That Bite

<https://nysipm.cornell.edu/whats-bugging-you/>

- Bedbugs
- Fleas
- Wasps
- Lice
- Mites
- Mosquitoes
- Spiders



[Home](#) / What's Bugging You?

How to deal with ... well, with most every pest that could get into your apartment or house. (At the end, a critter you'll find only outside; think of it as your bonus pest.)

We stress both the preventive steps that keep pests out and the curative steps for established problems. It's rare that you'll need a spray. If you do, *read the label*: the label is the law. Remember – kids are more at risk from pesticides than grown-ups are.

- Ticks may be found inside, but are usually acquired outdoors



Don't Get Ticked NY

<https://nysipm.cornell.edu/whats-bugging-you/ticks>

- Know the high risk season: mid-spring through summer.
- When there is a choice, avoid the places ticks live.
- Where possible, make changes to the area around where you live, work, and play to reduce ticks around you.
- Keep wildlife away.
- Permethrin is an insect repellent that can be used to treat clothing to kill ticks.
- Use EPA registered repellents & follow label directions.

[What's Bugging You?](#)

[Pest Identification Key](#)

[Bed Bugs](#)

Ticks

[What Do Ticks Look Like?](#)

[Why Should I Worry About Ticks?](#)

[Why Do I Have Ticks in My Yard?](#)

[How Do I Manage Ticks in the Landscape?](#)

[How Do I Protect Myself From Ticks?](#)

[Tick FAQs](#)

[Tick Infographic Posters](#)

[Ants](#)

[Bats](#)

[Birds](#)



Ticks

[Home](#) / [What's Bugging You?](#) / [Ticks](#)

Ticks and tick-borne diseases have become a significant public health issue in New York, with different tick species and diseases currently present and spreading within the state and region.



More ticks in more places also increases your risk of tick encounters. Changes in land use such as construction of new neighborhoods and

Learn More

Definitions

- Ectoparasite: a parasite that lives on the outside of its host
- Parasite: a living thing which feeds in or on another living thing

NYS IPM Program links

- [Frequently Asked Questions About Ticks](#)
- [Collection of Tick Infographic Posters](#)
- [Asian Longhorned Tick](#)
- [See tick-tagged blog_posts at Think IPM](#)
- [See tick-tagged blog_posts at The ABCs of School and Childcare Pest Management](#)
- [NYS IPM YouTube Playlist for Ticks](#)
- [NYS IPM Image Gallery - Ticks](#)

Related Links

- [ALERT! Longhorned tick found in](#)



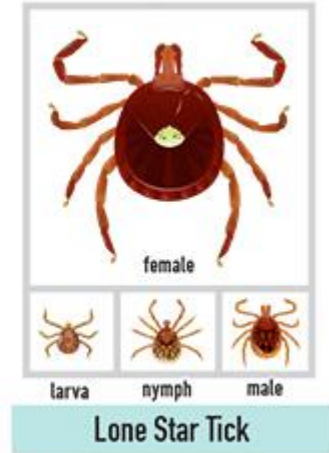
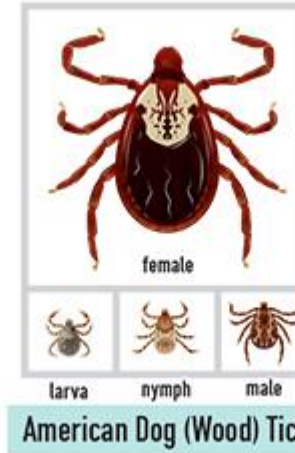
Cornell University
Cooperative Extension

Don't Get Ticked NY

<https://nysipm.cornell.edu/whats-bugging-you/ticks>

Two new tick species have been identified in our region

- Asian Longhorned tick which is of especially concern to livestock
- Gulf Coast tick which successfully established a population over the winter in Fairfield County, CT.



Asian Longhorned Tick

What You Need To Know



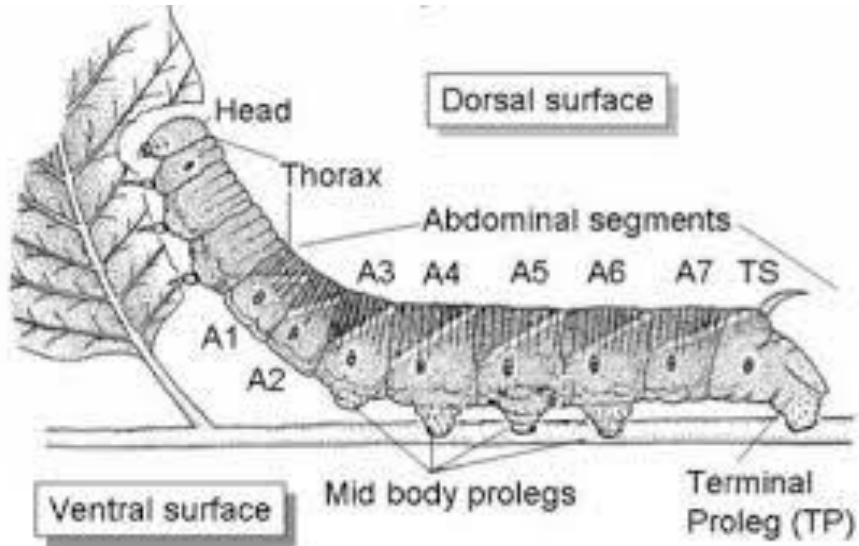
- Not normally found in the Western Hemisphere, these ticks were reported for the first time in the United States in 2017.
- Asian longhorned ticks have been found on pets, livestock, wildlife, and people.
- The female ticks can lay eggs and reproduce without mating.
- Up to thousands of ticks may be found at a time, or on an animal.

Asian Longhorned Tick

- Researchers are looking for these ticks to find out where they live and if they prefer wooded or more open areas.
- As of July 31, 2020, longhorned ticks have been found in Arkansas, Connecticut, Delaware, Kentucky, Maryland, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Rhode Island, Tennessee, Virginia, and West Virginia.
- Compared with well-known native ticks (such as the blacklegged tick, lone star tick and American dog tick), the Asian longhorned tick appears to be less attracted to human skin.
- In other countries, germs spread via bites from these ticks can make people and animals seriously ill. Research is underway in the US if they carry germs and if (enough) germs can be passed through a tick bite to cause an infection.



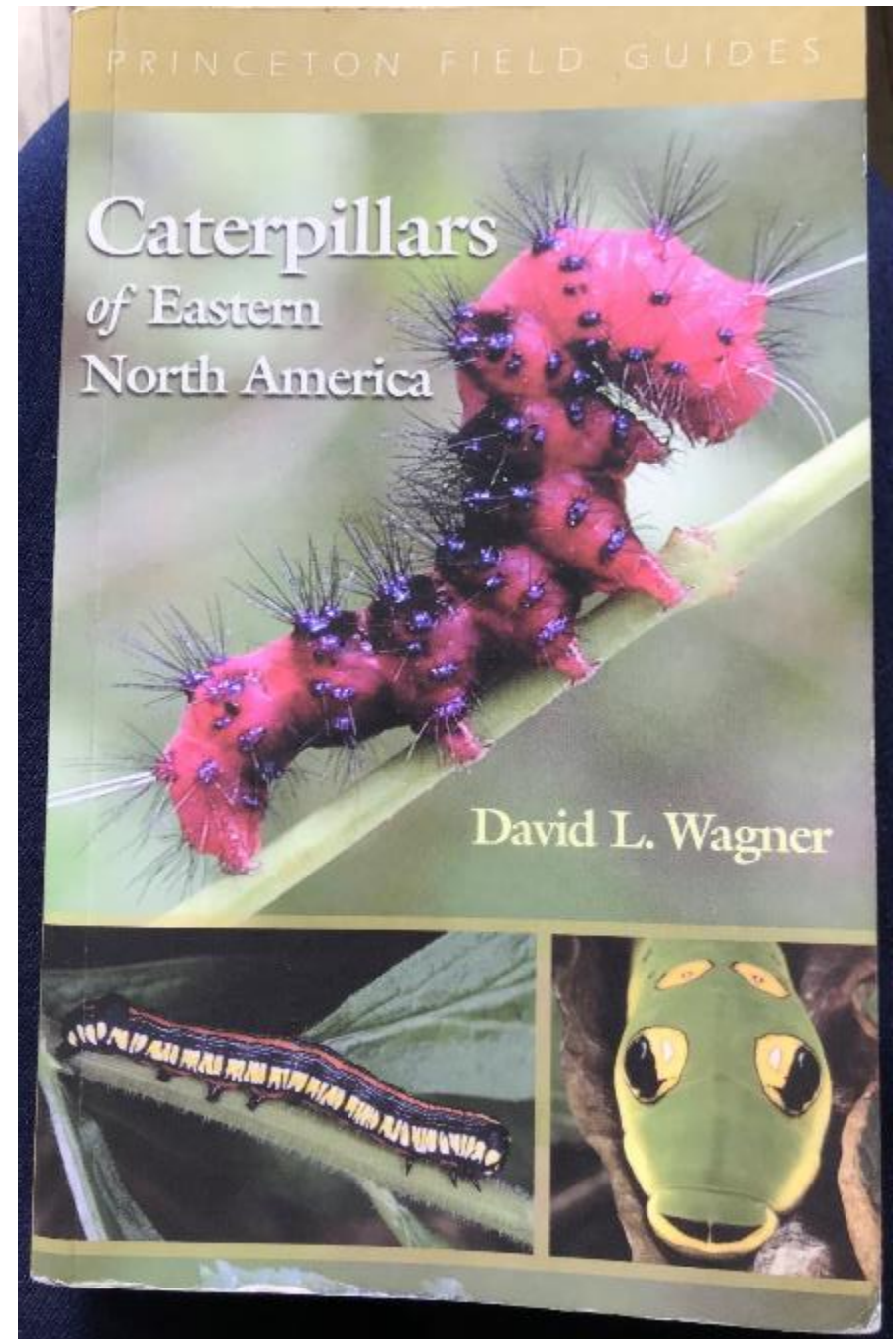
Caterpillars



Saddleback and Hickory Tussock caterpillars are venomous



Black and Giant Swallowtail caterpillars



Pests

- **Insects**
 - Chewing
 - Sucking
 - Stinging
 - Borers
- **Mites, Spiders & Ticks**
- **Wildlife**

Diseases

Any alteration in the physiological processes of a plant, caused by living organism or non-living agents, which negatively affect the plant.

Living Factors

- Fungi
- Bacteria
- Viruses
- Nematodes

Non-Living Factors

- Nutrient deficiencies
- Mineral toxicities
- Lack or excess of soil moisture & light
- Temperature extremes
- Soil pH

emailed



What are the questions?

Identification?

Pests of?

Diseases of?

This is a 50 year old hedge that is showing signs of a large die-off right in the middle of the hedge. I don't know if it's a fungus or some type of insect infestation.

Euonymus Scale (*Unaspis euonymi*): This is the most common and most serious pest found on euonymus. The protective armor covering of an adult female euonymus scale is dark, oyster-shaped and about $\frac{1}{16}$ -inch in length. Adult males are very small, winged insects that leave their narrow, white armored covering for mating. The eggs laid by the female are yellow and found beneath the female's covering. When the eggs hatch, the crawlers (immature forms) move around before forming their own protective covering. Males typically outnumber females. With a heavy infestation, clusters of white males can be easily seen on leaves and stems. Initial symptoms of euonymus scale infestation are yellow spots on leaves. With a heavy infestation, branches and possibly the entire plant may die.



Numerous white male euonymus scales (*Unaspis euonymi*) may almost cover the undersides of leaves. The females are larger and darker.

Karen Russ, ©2009 HGIC, Clemson Extension

What is wrong with this shrub?

Powdery Mildew



Colonies of *Erysiphe adunca* on *Salix*.





Leaf spots caused by a variety of fungi can occur on hydrangea. A common leaf spot disease in the northeast is caused by the fungus *Cercospora*. Tan spots with reddish brown borders form on the leaves. Infection can be reduced by minimizing leaf wetness. If needed, protectant fungicides can be applied prior to infection. This may be desirable for hydrangeas that had a lot of leaf spots the previous year and prior to wet weather. In addition, removal of infected leaves during or at the end of the season may help reduce inoculum the following season.

Hydrangea quercifolia and *Hydrangea paniculata*

Bug (sucking) perhaps four-lined plant bug or
aster leafhopper



Montauk daisy (*Leucanthemum X superbum*)



Aster 'Frikartii Monch',



Damaged *Pieris japonica*, Andromeda, with healthy shrubs on either side. Replaced same species in same spot with the same symptoms.

Disease	Symptoms	Pathogen/Cause	Management
Phytophthora root rot	Plants are stunted and then wilt, yellow, and die. Roots with few feeder roots die. Stem wood at the soil level has red-brown discoloration. No obvious fungal fruiting structures are formed.	<i>Phytophthora</i>	Purchase disease-free plants. Especially inspect southern-grown, containerized material before planting. Use clean, disinfested tools. Following a positive diagnosis, remove infected plants. Avoid overhead watering. Apply a fungicide to protect healthy plants.



Probably aphids



Not spider mites
Not winter damage
Not nutrient imbalance
Possible road salt

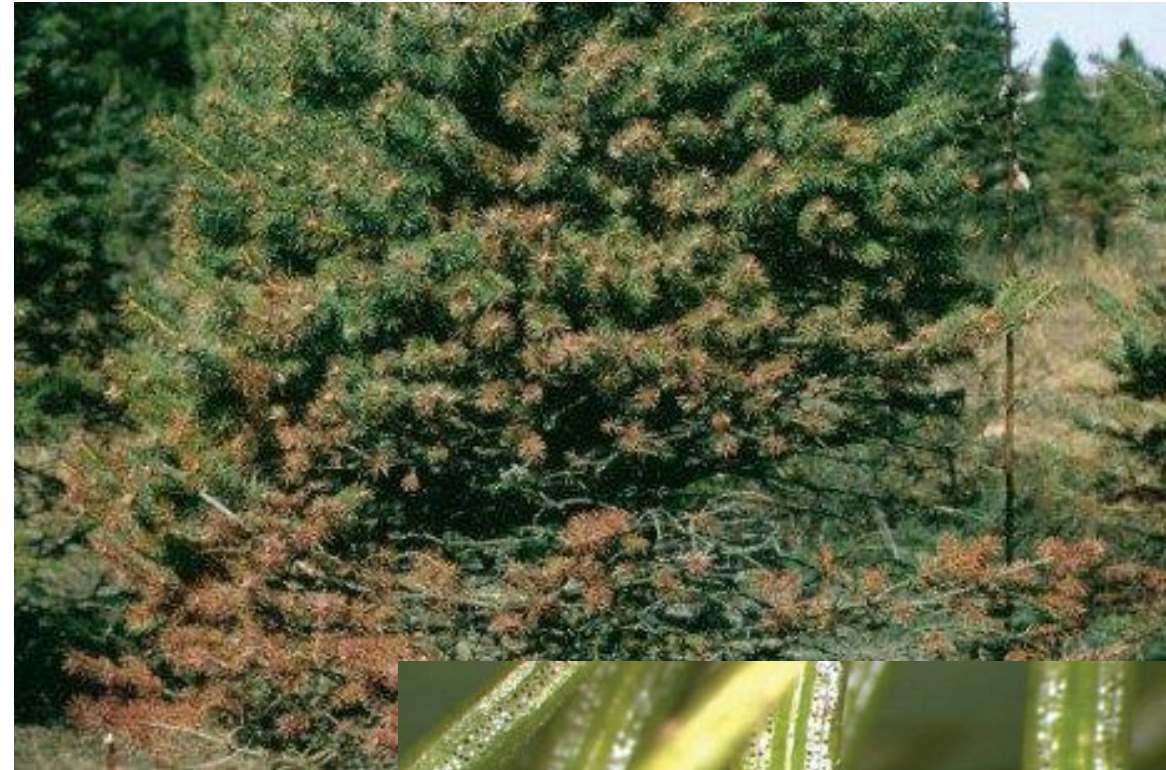


Norway Spruce



Rhizosphaera Needle Cast

- Early Spring (Before Bud Break)
 - Yellow needles turn brown or purple-brown; black fruiting bodies with white cap protruding from needle stomata develop
- Late Spring (After Bud Break)
 - Initial casting of previous year's infected needles
- Summer Through Early Fall
 - Casting of previous year's infected needles, leading to large bare areas on trees; severely diseased trees might only retain current-year needles



Rhizosphaera Needle Cast

- Rake up and discard fallen needles – it is where the pathogen overwinters
- Increase air circulation
 - Prune dead branches
 - Mow weeds
 - Remove nearby plants
- Chemical options
 - Apply an appropriate fungicide when new shoots are $\frac{3}{4}$ – $1\frac{1}{4}$ inches long (needles are half elongated) and a second spray 3 weeks later (needles are fully elongated).
 - Moderately infected trees may require 2 years of fungicide applications.
- In some areas, it may be necessary to make another application in mid-August to early September to prevent late summer infection.
- Maintaining tree health and vigor can help guard against severe *Rhizosphaera* needle cast infection.





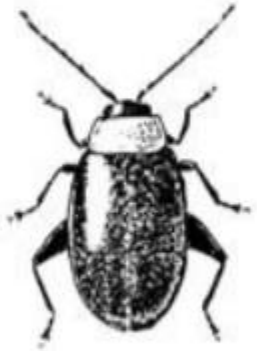
Cottony camellia or cottony maple scale on the underside of the leaves which is causing sooty mold elsewhere on the plant.



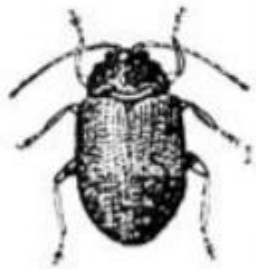


Flea Beetles

(various species, in the Family Chrysomelidae)



Spinach flea beetle



Potato flea beetle



Leaf damage and beetles on a potato leaf.

Photo by Whitney Cranshaw, Colorado State University, Bugwood.org

- Brush off into soapy water
- Floating Row covers
- Eliminate nearby weeds
- Insecticide

Striped Cucumber Beetle

Acalymma vittatum (Fabricius); Family: Chrysomelidae



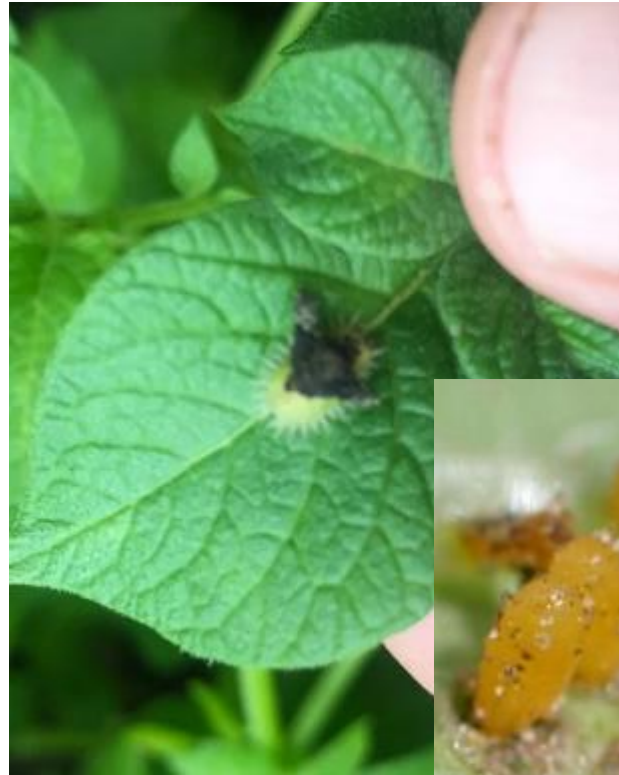
Photo from Clemson University,
USDA Cooperative Extension Slide Series, Bugwood.org

Striped cucumber beetles are carriers of bacterial wilt, a serious disease of cucurbits. As they feed they transmit the pathogen from one plant to another, and carry it over the winter when they hibernate. The following spring the beetles may infect new plants with the disease.

The larvae cause injury by burrowing into the stem, both above and below the ground. They may also feed on the underside of fruit when it lies on the ground. Adult beetles will feed on flowers and destroy them by eating off pistils. New broods of beetles may feed on the rinds of ripening fruits.

Hibernate under garden debris or soil.
Hand pick.
Exclusion e.g. floating row covers.
Insecticides.

From email



We found a remarkable insect or caterpillar thing on potato leaves. It has a sort of hard black shell and then a green body... Do you have any thoughts on what this might be?

Galls



Oak Apple Gall



Linden spindle gall

Gouty Oak Gall





What's infecting these green beans and what to do about resolving the issue.

Resources

- [Cornell Insect Diagnostic Lab Fact Sheets](#)
- [Plant Disease Diagnostic Clinic Fact sheets](#)
- [Pest Management around the Home: Cultural Methods](#)
- [Pest Identification Key for Household Pests in the Northeastern US](#)
- [Vegetable MD online](#)
- [NYS IPM “What’s Bugging You” website](#)
- [Don’t Get Ticked NY website](#)
- [BugGuide](#)



Stop the Spread: Scout for New Forest Pests

Citizen-Science Training



Joyce deVries Tomaselli,
CCE Dutchess County
June 2020



Fig. 1. Dark green bands are characteristic of beech leaf disease © Míra Vávrová



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LOWER
HUDSON
PRISM PARTNER

Stop the Spread: Scout for New Forest Pests

Citizen-Science Training



Joyce deVries Tomaselli,
CCE Dutchess County
June 2020



Fig. 1. Dark green bands are characteristic of beech leaf disease © Míra Vesnera



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Agriculture
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Conservation



Integrated Pest Management

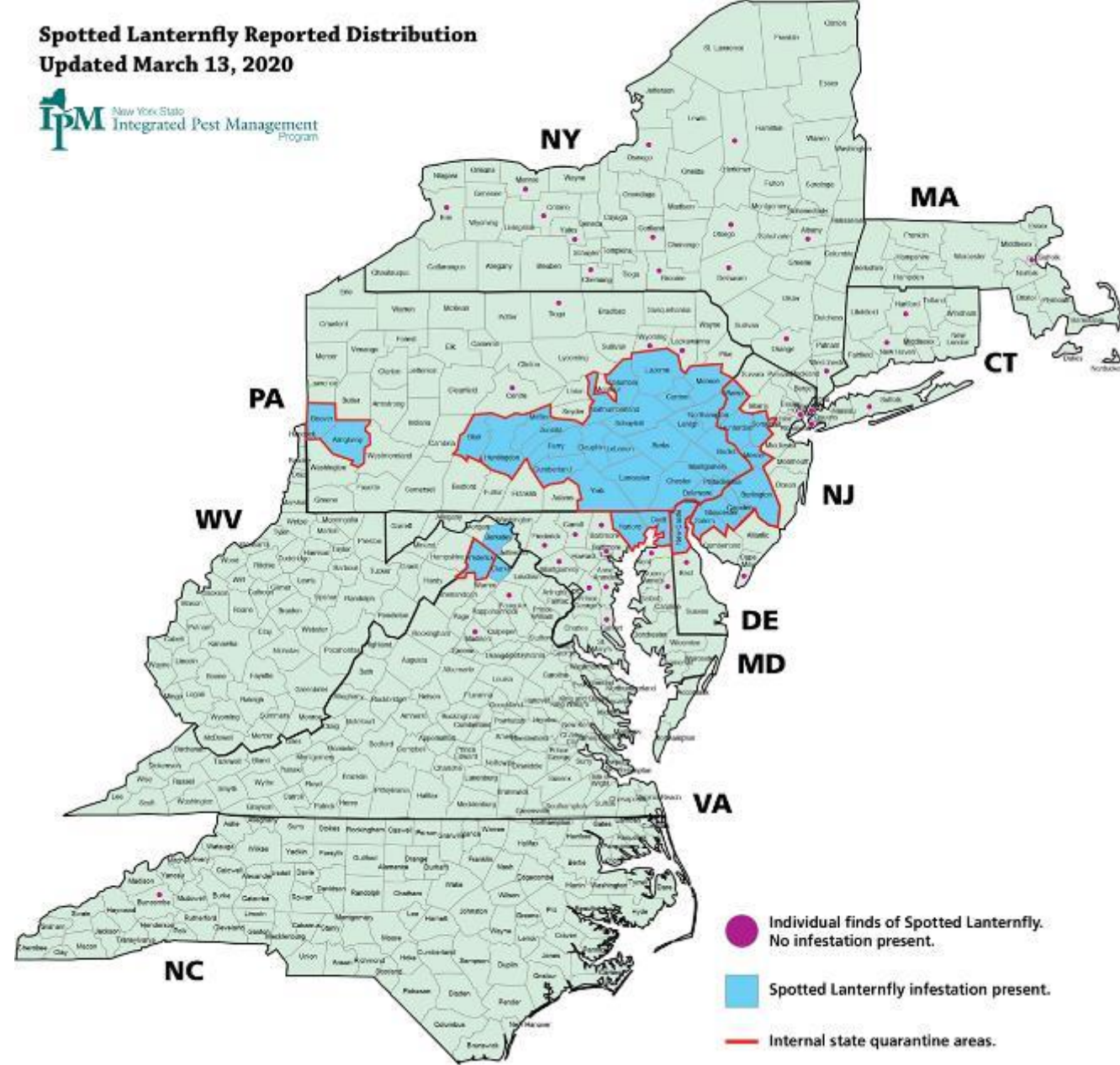
Invasive Planthopper

- Native to China and Vietnam
- Feeds on over 70 plant species in United States
- Preferred host is Tree of Heaven (*Ailanthus altissima*)
- Grapes, Hops and Apples are some of the preferred agronomic hosts
- Forest Products
- Silver Maple, Red Maple, Sugar Maple
- Black Walnut
- Other Shade trees



Spotted Lanternfly Distribution as of March 13, 2020

Spotted Lanternfly Reported Distribution
Updated March 13, 2020



- PA, VA, NJ, DE, NY, MD, CT
- Individuals found in NY Counties including:

Albany	New York (Manhattan)
Broome	Ontario
Chemung	Oswego
Cortland	Otsego
Delaware	Orange
Erie	Suffolk
Herkimer	Westchester
Kings (Brooklyn)	Yates
Monroe	

STILL NO POPULATION IN THE ENVIRONMENT IN NEW YORK.

- Individual finds of Spotted Lanternfly. No infestation present.
- Spotted Lanternfly infestation present.
- Internal state quarantine areas.



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Spotted lanternfly identification

- Planthopper
- Piercing sucking mouthparts (phloem feeders)
- **NYMPHS:** First three instars are black and white (1/8"~3/4" long)
- 4th instar acquires red pigment (~3/4")
- **ADULTS:** Pinkish tint, tent shaped, black spotted (approx. 1 inch long and 1/2 inch wide at rest; moth-like showing red hindwings when spread).



Adult female with 1/4 inch beak and lantern-like abdomen
Photo by K. Gardner 2014



Spotted lanternfly adults

Photos by New York State Integrated Pest Management (NYSIPM)



Spotted lanternfly nymphs: 1-3 instars black and white; 4th gains red pigment

Photos by L. Barringer, PA Dept Ag, Bugwood



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Spotted lanternfly egg masses

- Eggs laid in one inch long rows (30 to 60 eggs per mass)
- Usually covered by a putty-like substance that changes from white, to pink, to brown over a couple weeks
- Can be highly camouflaged depending on substrate eggs are laid on
- Waxy substance cracks during winter



Recently covered egg masses
Photo by NYSIPM

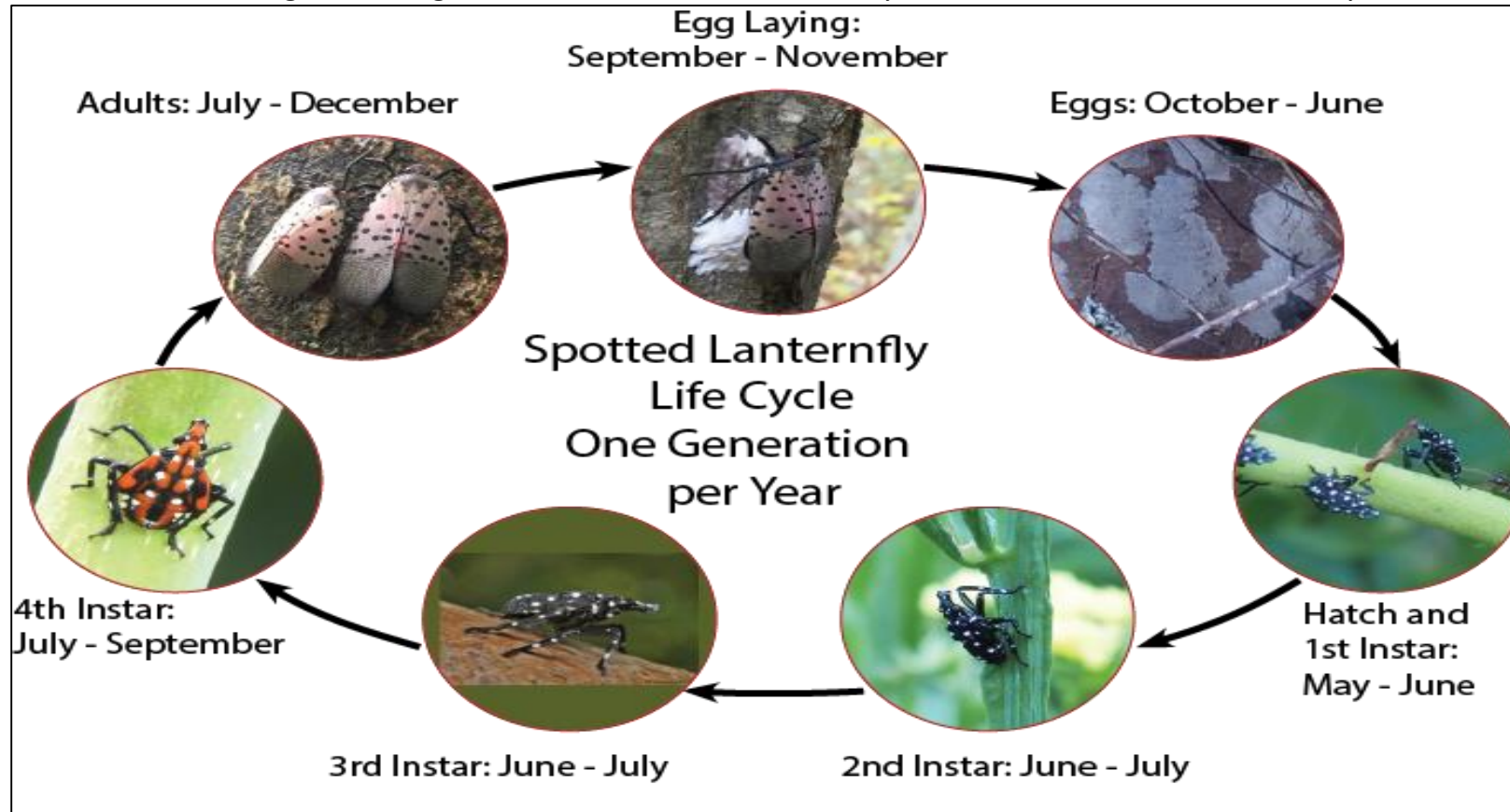


Older egg masses and covering exhibiting cracking during winter
Photo by Emelie Swackhamer, Penn State University.



Spotted lanternfly life cycle

*Timing of life stages varies with climate. This life cycle was from work done in Pennsylvania.



Credits:

Egg Laying, Hatch and 1st Instar, 2nd Instar, Adults: Emelie Swackhamer, Penn State University, Bugwood.org
Eggs: Lawrence Barringer, PA Dept. of Agriculture, Bugwood.org

3rd Instar: Dalton Ludwick, USDA-ARS/Virginia Tech
4th Instar: Richard Gardner, Bugwood.org



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Aren't all worms good?

- Stimulate microbial activity.
- Mix and aggregate soil.
- Increase infiltration
- Improve water-holding capacity.
- Provide channels for root growth.
- Bury and shred plant residue.
- And Darwin Said So!

THE FORMATION
OF
VEGETABLE MOULD,
THROUGH THE
ACTION OF WORMS,
WITH
OBSERVATIONS ON THEIR HABITS.

BY CHARLES DARWIN, LL.D., F.R.S.

WITH ILLUSTRATIONS

LONDON:
JOHN MURRAY, ALBEMARLE STREET.
1881.

The right of Translation is reserved.

Amyntas sp. Identification

Jumping Worms

- Reside in the top 2-4" of soil
- Have a shiny skin
- Milky white band (clitellum) is even with the body (not thicker), continuous and nearer to the head
- Move quickly with a slithering thrashing motion like a snake
- Have smooth body segments
- Leave "ground beef" castings
- Are most active and visible late June to hard frost.

Both

- Darkly pigmented
- Large in summer

Nightcrawlers

- Create deep vertical burrows in the soil
- Have a slimy skin
- Tan band (clitellum) is raised above the body and saddle-shaped, not a continuous band.
- Move slowly with an inch-worm motion
- Have more noticeable body segments
- Don't display visible soil disruption
- Are most active and visible in spring and fall in temperatures below 75F

How harmful are Jumping Worms?

- They infest forests, grasslands, agricultural/horticulture fields and home landscapes
- Their presence can lead to the rapid decay of forest leaf litter and organic mulches used on agricultural and horticultural plants
- Copious amounts of worm casts are produced - resulting “soil” can hinder seed germination, lead to increased erosion and nutrient runoff
- The worms reproduce very rapidly and are parthenogenetic
- Cocoons hatch at $>10\text{C}$ (50F) air temp, survive to -40C (-40F)
- Worms are killed at $< 5\text{C}$ (41F) and $> 32-40\text{C}$ ($90-105\text{F}$)
 - 3 days of sustained 104F has been researched to be effective.



How are they spread?

- By people
 - As live worms or worm cocoons
 - In soil, compost, containerized plants and transplanted trees
 - In soil on tires, hiking boots, and garden tools
 - By sharing plants
 - To home gardens, formal gardens, garden centers, lawns and golf courses and horticultural crops
- Average spread estimated to be 10 meters per year in place
- Although prohibited, might be sold as fishing worms and spread by careless dumping of bait



Limited Control Options are available.

- Bring to surface and hand pick
 - Look for piles of worm castings
 - Dissolve 1/4 cup (40 grams) ground mustard seed in 1 gallon of water.
 - Slowly pour the mustard solution over the soil so that it soaks in.
 - The worms rise to the surface.
 - Hand pick and destroy e.g. seal in plastic bag, solarize and discard.
- Solarize soil to eliminate before planting e.g. vegetables
 - Smooth soil, water and cover with clear plastic to build up heat.
 - Anchor edges.
 - Leave in place for 4-6 weeks depending on weather and sun strength.
 - Kills worms & weed seeds but also may harm other beneficial insects.
- Few pesticides are available for worms, none specific to Jumping Snake Worms.



Prevent the spread of Jumping Worms

- Educate yourself and others to recognize jumping worms.
- Watch for jumping worms and signs of their presence.
- Arrive clean, leave clean. Clean soil and debris from vehicles, equipment and personal gear before moving to and from a work or recreational area – they might contain jumping worms or their cocoons.
- Use, sell, plant, purchase or trade only landscape and gardening materials and plants that appear to be free of jumping worms.
- Sell, purchase or trade only compost and mulch that was heated to appropriate temperatures and duration following protocols that reduce pathogens.

Resources

- [Cornell Insect Diagnostic Lab Fact Sheets](#)
- [Plant Disease Diagnostic Clinic Fact sheets](#)
- [Pest Management around the Home: Cultural Methods](#)
- [Pest Identification Key for Household Pests in the Northeastern US](#)
- [Vegetable MD online](#)
- [NYS IPM “What’s Bugging You” website](#)
- [Don’t Get Ticked NY website](#)
- [BugGuide](#)

