

## Insects to Watch for in 2024

PJ Liesch  
 UW-Madison  
 Insect Diagnostic Lab  
[pliesch@wisc.edu](mailto:pliesch@wisc.edu)  
[@WiBugGuy](#)



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## Trending & Emerging Insect Pests

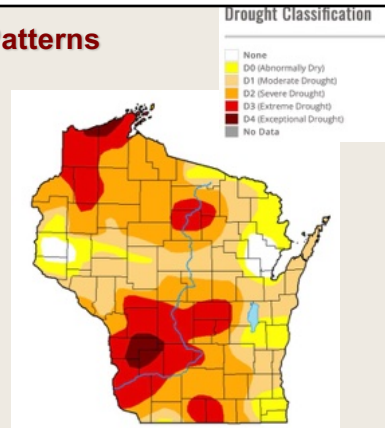
- Spongy moth
- Two lined chestnut borer
- Other borers: bronze birch borer, bark beetles, and other secondary borers
- Periodical Cicadas
- Updates on White Grubs in Wisconsin
- Update on invasive leaf beetles (viburnum leaf beetle & lily leaf beetle)
- Sucking pests common in 2022 & 2023
- Invasives to have on your radar



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## Wisconsin's Weather Patterns

- Many part of Wisconsin experienced dry conditions 2021, 2022, and 2023
- Dry conditions can directly favor or hinder certain arthropods
  - Spongy moth, spider mites, etc.
- Weather patterns can indirectly influence insects via impacts on landscape plants



September 5<sup>th</sup>, 2023. Map Source: US Drought Monitor 9

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## Spongy Moth (*Lymantria dispar*)

- Formerly known as the Gypsy Moth
- Invasive; native to Europe and northern Asia
  - Introduced in Massachusetts: 1860's
  - Range expanding west/south; outbreaks @ leading edge
- Feeds on a wide range of trees and shrubs



Spongy moth caterpillar



Adult (female) spongy moth w/egg mass

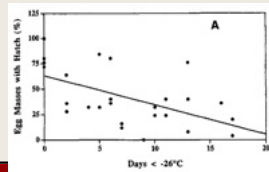


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### Spongy Moth Trends: 2020 – 2023+

- Populations have been on the rise for several years in Wisconsin
- Dry spring weather plays an important role
- Fungal disease** (*Entomophaga maimaiga*) causes high mortality if rainy
- Other factors such as heavy snow cover and mild winter temperatures can also increase survival of eggs

USFS: winter egg mortality  
48-72 hours at -20°F (-28°C)

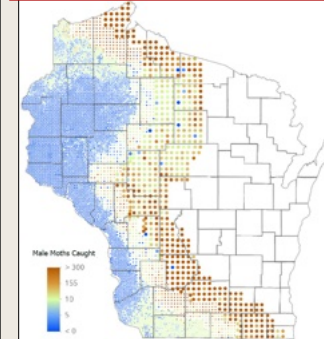


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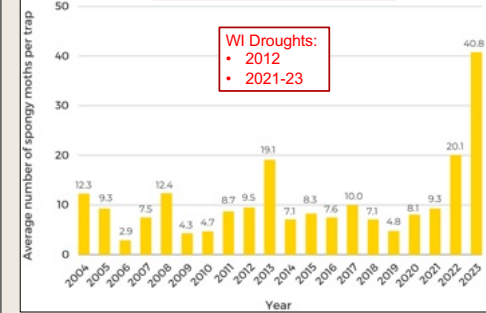
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### Spongy Moth Trends in Wisconsin

2023 Spongy Moth Trapping Survey (WI-DATCP)



2023 Spongy Moth Trap Counts



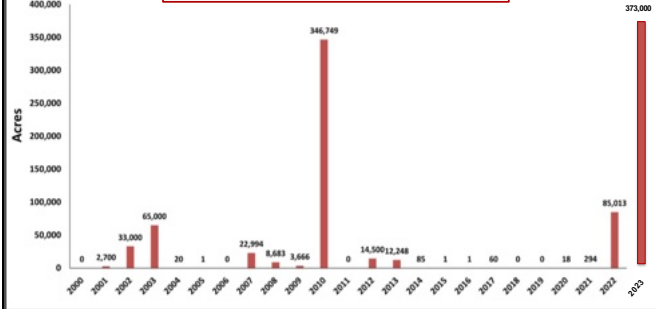
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Chart & Map Source: WI-DATCP

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### Spongy Moth Trends in Wisconsin

Acres Defoliated by Spongy Moth 2000 – 2023

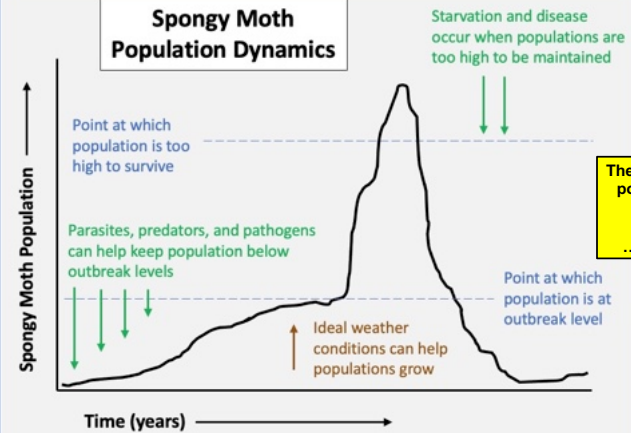


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Credit: WI-DNR

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### Spongy Moth Population Dynamics



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## Spongy Moth Caterpillars

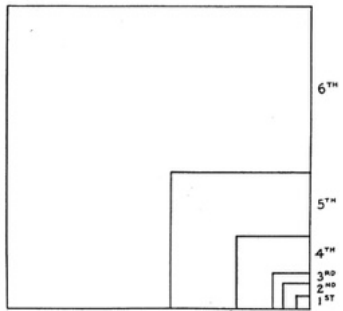
- Larvae (caterpillars) are the damaging life stage
  - Use chewing mouthparts to feed on foliage
- Pass through 5-6 larval sub-stages (instars)
  - **Small caterpillars** (1<sup>st</sup> & 2<sup>nd</sup> instar):
    - Dark w/pale spots; “shaggy” w/raised bumps
    - **Active day & night**
    - **Can disperse via ballooning**
  - **Large caterpillars** (3<sup>rd</sup> + instar)
    - Up to ~2” long
    - Grayish w/raised blue and red nodules
    - **Active at night**
    - **Most feeding damage caused by last two instars!**

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## Leaf Consumption by Caterpillars



- Later instars consume much more leaf area than younger larvae
- For spongy moth, 80-90% of feeding damage is caused by final two instars!
- This can give the impression of a sudden or overnight appearance of caterpillars


FIG. 3.—Graphic representation of the results obtained in the feeding experiments on *Lophyrus frugiperda* given in Table 6, showing the quantity eaten in each instar

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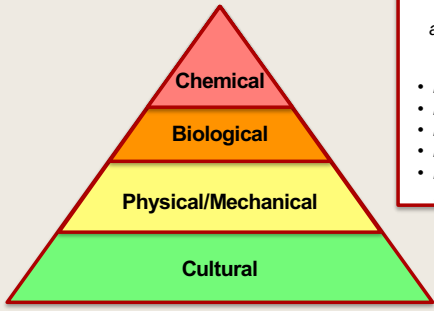
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## Management Approaches for Spongy Moth

Intervention



Prevention



**Integrated Pest Management Pyramid**

*Tailor these management approaches for your specific situation!*

- How large of an area?
- How many trees affected?
- How large are the affected trees?
- How much time do you have?
- Non-chemical preference?
- ...

Each management approach has strengths, weaknesses, and limitation



Awareness of this is important!

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## Cultural Approaches:

- Manipulation of the local environment to prevent pest problems or reduce the amount of damage; *planning & decision making*
- Regulatory control (quarantines, laws, etc.)
- Sanitation (elimination of hiding spots)
- Proper plant care (proper mulching/watering/tree-care, minimize stress, etc.)
- Tolerance of damage (**context important!**)




Two lined chestnut borer—a secondary pest of oaks

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### Physical (Mechanical) Approaches:

- Physical activities performed to help prevent or reduce pests
  - Scraping away egg masses
  - Crushing caterpillars/pupae/adults\*
  - Traps: sticky band, burlap, pheromone

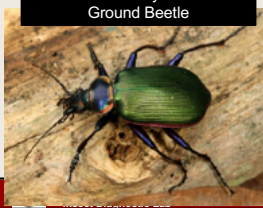


Sticky band (small caterpillars)
Burlap band (larger caterpillars)

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Trap photos courtesy of Andrea Diss-Torrance, WI-DNR

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### Biological Control:

- Use of natural enemies (beneficials) to reduce pest levels
  - Predators:** ground beetles & other insects, mice, birds
  - Parasites:** stingless wasps & flies
  - Pathogens:** entomopathogenic fungus and virus







Predator: "Fiery searcher" Ground Beetle
Predator: Mice
Parasite: Stingless Encyrtid wasps

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### An ace in the hole?...*Entomophaga maimaiga*

- Fungus from native range of spongy moths
- Purposefully introduced in 1910-11 & 1985-86—*deemed unsuccessful!*
- 1989 infected spongy moth caterpillars found
- Can kill caterpillars in a matter of days; additional spores produced
- Weather plays a key role...moisture/humidity is critical!**

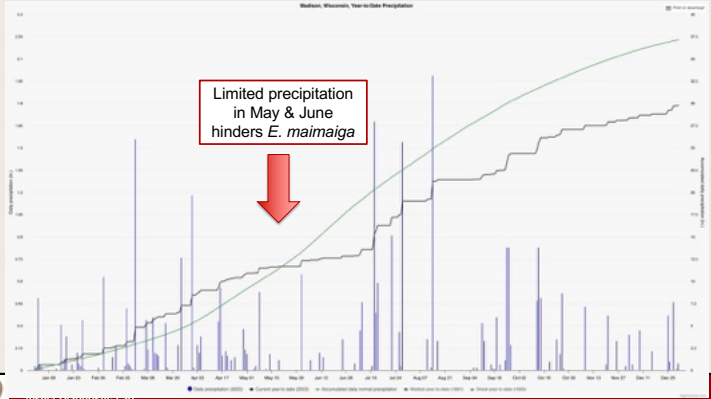



Overwintering fungal spores
Fig. 3. A. *Entomophaga maimaiga* has grown out of this dead gypsy moth larva and has spored conidia, which look like white sugar granules on the saws. Photo by Mark Duffiniller. B. *Entomophaga maimaiga* sporulates in an overcast, gassy moth population. Late instars killed by *E. maimaiga* often are oriented vertically with head downward, although this is not always the positioning of new larvae killed by *E. maimaiga*. Photo by Theophrastus. Credit: et al. 2016.

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### Madison Precipitation: 2023

Chart Source: WI State Climatology Office



Limited precipitation in May & June hinders *E. maimaiga*


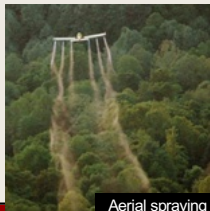

■ Daily precipitation 2023
■ Cumulative daily precipitation
■ Normalized daily normal precipitation
■ Historical mean 2011-2020
■ Precipitation data 2023


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### Chemical Control:

- **Conventional foliar sprays:** acephate, carbaryl, chlorantraniliprole, pyrethroids (lots!)
- **Lower risk foliar spray options:** *Bacillus thuringiensis kurstaki* (Btk), spinosad, azadirachtin, insecticidal soap, horticultural oils
- **Systemic options:** acephate, emamectin benzoate, clothianidin, dinotefuran,
- **Dormant treatment (egg masses):** Golden pest spray oil








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Aerial spraying  
with Btk





Golden Pest  
Spray Oil

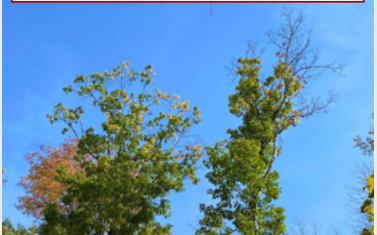
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### Two Lined Chestnut Borer (*Agrilus bilineatus*)

- Native metallic wood boring beetle (Buprestidae)
- Associated with stressed/compromised oaks; “secondary” borer
- *If warranted, treatments similar to EAB*





TLCB Symptoms:  
Discolored foliage (left) & thinning canopy (right)





Larvae & Galleries



Adults




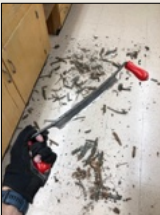

Photo credit for oak canopies: WI-DNR

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### Two Lined Chestnut Borer (*Agrilus bilineatus*)


- To confirm presence of two lined chestnut borer:
  - D-shaped exit holes
  - Peel bark to check for galleries & larvae

Year	Number of 2LCB Cases at UW-IDL
2019	10
2020	11
2021	16
2022	26
2023	48

**Tips for sending in oak samples to UW Diagnostic Lab:**

- Check UW Plant Disease Diagnostics Clinic website Re: oak wilt testing
- Send sufficient material; cut up to fit in a box, etc.
- Small diameter is good! (~ ½ - 1” works well to check for 2LCB)




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### Bronze Birch Borer (*Agrilus anxius*)

- Native metallic wood boring beetle (Buprestidae)
- Associated with stressed/compromised oaks; “secondary” borer
- *If warranted, treatments similar to EAB*








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## “Secondary” Bark Beetles

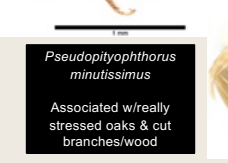


*Pityogenes hopkinsi*

Associated w/smooth barked portions of dead/dying white pines

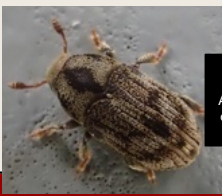


Many bark beetles show up to trees that are severely stressed or actively dying



*Pseudopityophthorus minutissimus*

Associated w/really stressed oaks & cut branches/wood




*Hylesinus aculeatus*

Associated w/dead, cut or seriously-weakened ash trees


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## Emerald Ash Borer



### Emerald Ash Borer Detections in Wisconsin



Although APHIS removed the federal domestic Emerald Ash Borer (EAB) quarantine regulations as of January 14, 2021, all wood and firewood movement within and outside Wisconsin may be restricted by other tribal and state regulations. Areas in yellow on the map have never had an EAB detection, making quarantined firewood movement from infested areas discouraged. EAB has been confirmed only within the municipal boundaries colored in green or on tribal lands colored in blue. By avoiding moving quarantined firewood long distances, we can continue to reduce artificial spread of EAB. Please visit [www.wisconsin.gov/dnr](http://www.wisconsin.gov/dnr) for more information.

- EAB Found
- EAB Found on Tribal Land
- No EAB Detections
- Tribal Land


Wisconsin Department of Agriculture, Trade and Consumer Protection

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## Periodical Cicadas

- Brood XIII 17-year periodical cicadas will emerge this year
- Last emerged in 2007






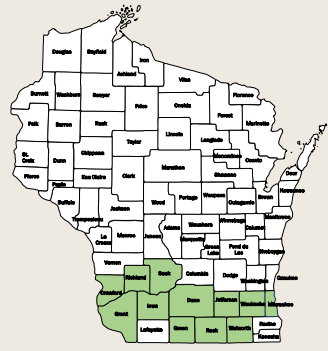
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## Where will we see periodical cicadas? When?



Active Periodical Cicada Broods of the United States



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### Will we see any impacts to landscape plants?

- Females use ovipositor to cut slits into twigs/branches



Female ovipositing

Slits in branch

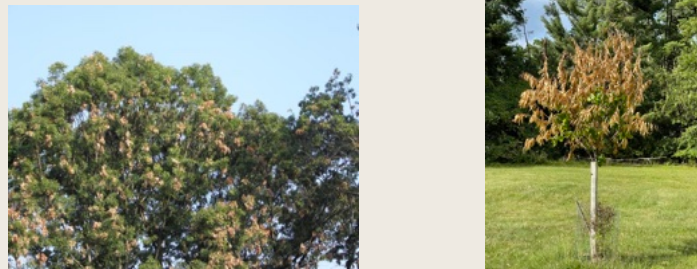
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Photo credits: Egg Laying Female (M. cassinii), 5 June 2021, Arlington Virginia. Photo credit: Martin Kalfatovic.

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### Will we see any potential impacts to landscape plants?

- Females use ovipositor to cut slits into twigs/branches
  - Large trees: damage mainly cosmetic; “flagging”
  - Small trees: damage can be more problematic—*consider mesh netting*



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Photo credits: CicadaMania website

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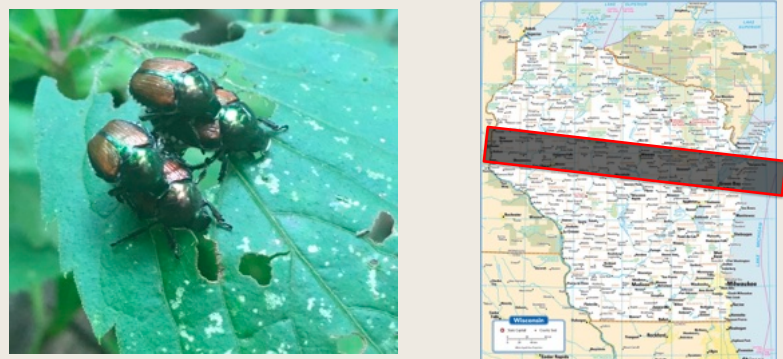
### Key Things to Know About Periodical Cicadas:

- Distribution is restricted to very specific spots on the map
  - Most of Wisconsin will not see these
- Site history is a key factor!
  - Were they present at a site in 2007? If not, you won't see them in 2024 either...
- Periodical cicadas are generally harmless and don't need to be managed
  - Small trees would be the exception

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### Japanese beetles





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### May/June Beetles


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### “New” Chafer & Grub Damage




Mased Chafer





European Chafer





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### Asiatic Garden Beetle

- First confirmed in 2021 (Dane Co.)
- Adults feed on landscape plants at night
  - Most active when temps > 70°F at night
  - Readily fly to lights
- Larvae can be associated w/poorly maintained lawns





Asiatic Garden Beetle  
updated July 2023


- AGH not yet reported
- AGH suspected
- AGH confirmed


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### Lily Leaf Beetle

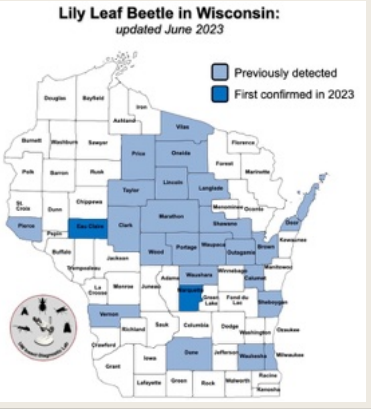
- First detected 2014 (Marathon Co.)
- Adults and larvae feed on true lilies
  - *Don't feed on daylilies*





Lily leaf beetle adult

Heavily-Infested  
Lily Plant



Lily Leaf Beetle in Wisconsin:  
updated June 2023

- Previously detected
- First confirmed in 2023


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### Viburnum Leaf Beetle

- First est. population found in 2014 (Ozaukee Co.)
- Adults and larvae feed on viburnums
  - Skeletonization damage




**Viburnum Leaf Beetle in Wisconsin:**  
updated June 2023

Legend:  
 [Light Blue Box] Previously detected  
 [Dark Blue Box] First confirmed in 2023



V.L.B. Larvae and "Skeletonization" Damage




Oviposition (egg-laying) pits


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### Sucking Insect Pests



Aphids



Thrips



Triozids (Serviceberry)

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### Sucking Pests: Spider Mites



Two-Spotted Spider Mite



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### Broad-Nosed Weevils



Strawberry Root Weevil



Imported Long-horned Weevil



Adults sneaking indoors

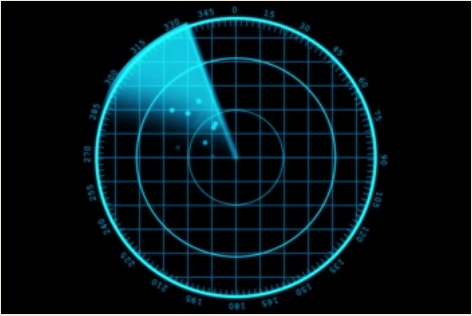


Damage to landscape plants


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### Landscape insect pests to have on your radar:



- Spotted lanternfly
- Box tree moth
- Elm zigzag sawfly
  
- Not yet in Wisconsin
- If you suspect any of these, **please report!**




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### Spotted Lanternfly


- Invasive Fulgorid planthopper from southeast Asia
  - Spread to Japan and Korea
  - Arrived in USA in 2014 (PA)
  - **Not yet in WI...**
- Eggs can easily be transported
- SLF feeds on 100+ plant species
  - **Tree of Heaven** (*Ailanthus altissima*)
  - Fruits: grapes & tree fruits
  - Hops
  - Landscape/forest trees (maple, walnut, poplar, willow, etc.)




SLF Adult



Early instar SLF Nymph



4th instar SLF Nymph

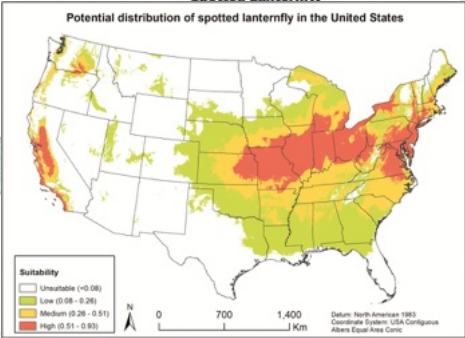


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Photo Credits: Lawrence Barringer, Pennsylvania Department of Agriculture, Bugwood.org

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### Current SLF Distribution & Potential Range



Suitability  
 Unsuitable (<math>0-0.08</math>)  
 Low (<math>0.08-0.26</math>)  
 Medium (<math>0.26-0.51</math>)  
 High (<math>0.51-0.93</math>)

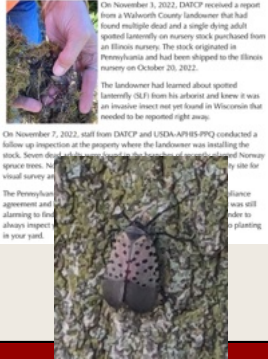
Scale: 0, 700, 1,400 Km  
 Datum: North American 1983  
 Coordinate System: USA Contiguous Albers Equal Area Conic


#### Dead Spotted Lanternflies Detected on Nursery Stock from Out-of-State

On November 3, 2022, DATCP received a report from a Walworth County landscaper that had found multiple dead and a single dying adult spotted lanternfly on nursery stock purchased from an Illinois nursery. The stock originated in Pennsylvania and had been shipped to the Illinois nursery on October 20, 2022.

The landscaper had learned about spotted lanternfly (SLF) from his arborist and knew it was an invasive insect not yet found in Wisconsin that needed to be reported right away.

On November 7, 2022, staff from DATCP and USDA-APHIS-PPQ conducted a follow up inspection at the property where the landscaper was installing the stock. Seven dead SLF were found on the lower half of several large Norway spruce trees, but no live SLF were found. The Pennsylvania agreement and plan to always inspect to your yard.






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Map Credit: New York State Integrated Pest Management Program & Google Maps

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### Damage




SLF nymphs on roses



Fungal Growth at Base of Tree



SLF adults covering tree trunk



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Photo Credits: Lawrence Barringer, Pennsylvania Department of Agriculture, Bugwood.org

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### Box Tree Moth

- Invasive sawfly; native to Asia
  - Also a problem in Europe
- Host: Boxwoods
- Found in:
  - Canada (Toronto) – 2018
  - New York – 2021
  - Michigan – 2022




Typical color form adult      Dark color form adult

Insect Diagnostic | Credit: Szabolcs Saffán, University of West Hungary, Bugwood.org

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### Box Tree Moth

- Damage caused by caterpillars
  - Use chewing mouthparts
  - Consume foliage
  - Create silken webbing

Extensive webbing

Caterpillar with silken webbing


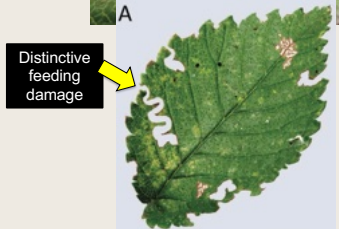
Significant damage (Europe)

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### Elm Zigzag Sawfly

- Invasive sawfly; native to Asia
  - Also an invasive pest in Europe
- Host: elms
- Found in:
  - Quebec, Canada – 2020
  - VA – 2021
  - NC, MD, PA, NY – 2022
  - VT, MA, OH – 2023

Elm zigzag sawfly larva



Distinctive feeding damage

Photo source: First records of elm zigzag sawfly (Hymenoptera: Argidae) in the United States. 2023. K. Oten, et. Al.

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### Elm Zigzag Sawfly

- Damage caused by larvae
  - Use chewing mouthparts
  - Chew zigzag notches out of leaves
  - Complete defoliation can occur

Damage on individual elm leaf

Defoliation from heavy population

Species	Common name	Location (state)
<i>Ulmus americana</i>	American elm	PA, NC, MD, NY
<i>Ulmus alata</i>	winged elm	NC
<i>Ulmus parvifolia</i>	Chinese elm	VA
<i>Ulmus procera</i>	English elm	VA
<i>Ulmus pumila</i>	Siberian elm	VA
<i>Ulmus rubra</i>	slippery elm	MD
<i>Ulmus</i> × "Cathedral"	Japanese × Siberian hybrid	VA


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Photo source: First records of elm zigzag sawfly (Hymenoptera: Argidae) in the United States. 2023. K. Oten, et. Al.

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## The UW Insect Diagnostic Lab



**Key Info:**

- 1) Your contact info
- 2) Location (State/County/Town)
- 3) Where/when the specimen was found, what it was doing, size of the specimen, and any other relevant notes



Submission template for physical samples

[insectlab.russell.wisc.edu](http://insectlab.russell.wisc.edu)

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## Questions?

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