Wisconsin's Trending & Emerging Landscape Insect Pests

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The UW Insect Diagnostic Lab

- Lab established in 1978 to serve as a resource for Extension colleagues
  - Managed by Phil Pellitteri for 35 years
  - Currently in its 47th year
- Main service: arthropod diagnostics
  - Receive ~2,500 diagnostic requests annually
  - Samples from: general public, Extension, farmers, businesses, medical/public health, gov't, etc.
- Other services: pest management consults, outreach, teaching, *providing context*

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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

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Wisconsin's Weather Patterns

- Weather patterns can indirectly influence insects via impacts on landscape plants
- Wisconsin's 2024 weather was warm, wet, and wavering, leading to the **warmest year on record** and **precipitation ping-pong between record dry and record wet months**
  –WI State Climatology Annual Report
- Winter of 2023-24 mild due to El Niño conditions

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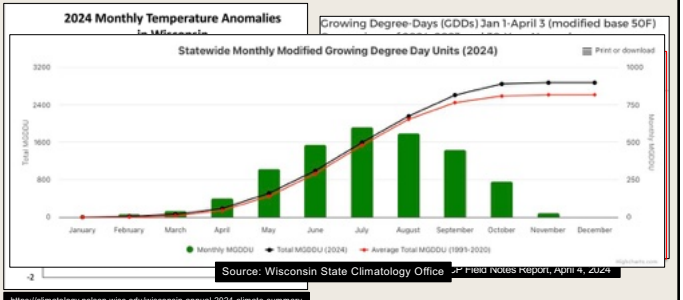
Wisconsin's Weather: Temperature



Source: Wisconsin State Climatology Office

https://climatology.nelson.wisc.edu/wisconsin-annual-2024-climate-summary

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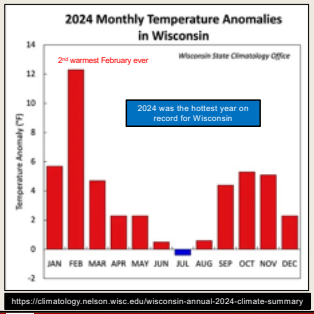
Wisconsin's Weather: Temperature



Growing Degree-Days (GDDs) Jan 1-April 3 (modified base 50F)
Comparison of 2024, 2023 and 30-Year Normals

	GDDs April 3 2024	GDDs April 3 2023	GDDs April 3 Normal	GDDs per Day on April 3	Calendar Days Ahead of 2023	Calendar Days Ahead of Normal
Dubuque	129	21	65	3	32	24
Beloit	111	21	66	3	30	17
Madison	87	12	59	3	25	11
Hartford	67	4	46	2	32	13
Green Bay	60	3	34	2	29	15
Hancock	73	5	44	2	34	17
La Crosse	94	10	64	3	28	12
Eau Claire	72	4	44	2	23	11
Cumberland	36	0	26	2	36	14
Wausau	43	0	34	1	22	7
Bayfield	18	0	16	1	18	2

Source: WI-DATCP Field Notes Report, April 4, 2024

https://climatology.nelson.wisc.edu/wisconsin-annual-2024-climate-summary

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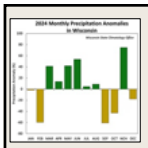
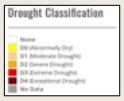
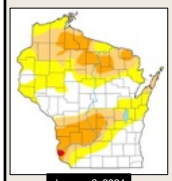
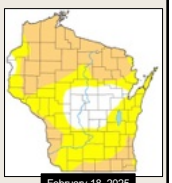
Wisconsin's Weather: Precipitation









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Map Source: US Drought Monitor

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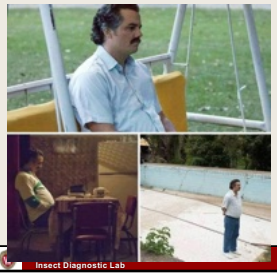
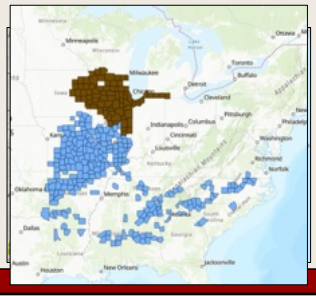
Periodical Cicadas (*Magicicada* spp.)

- Historical double emergence of broods XIII (17-year) and XIX (13-year)
  - Last emerged together in 1803





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Dog-Day Cicadas

- *Neotiobicen* spp.
- **Appearance**: large (1.25 - 1.5"); black and greenish w/ dark eyes
- **Life cycle**: 2-5 years, but some appear every year ("annual" cicadas)
- **Distribution**: across US
- **When & How Many**: mid-late summer, small numbers

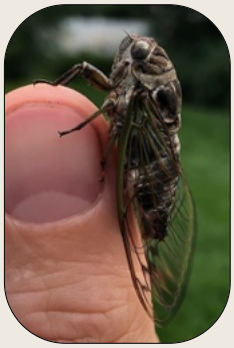

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Photo credit: PJ Liesch, UW-Entomology

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Periodical Cicadas

- *Magicicada* spp.
- **Appearance**: large (1 - 1.25"); Black body, orange legs & wings ("W"); red eyes
- **Life cycle**: 17 or 13 years (hence "periodical")
- **Distribution**: only eastern US; location differs for each brood
- **When & How Many**: spring, tremendous numbers

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Photo credit: (Top) PJ Liesch, UW-Entomology, (Bottom) JanetandPhil Gallagher via Flickr, used by CC by 2.0 DEED

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Pharoah Cicada: *Magicicada septendecim*

- Our commonest species in WI
- Roughly 1.25" long
- Reddish patch behind eye
- Song described as "Pha-roah" or "Fay-roah"

Periodical cicada specimens from the Wisconsin Insect Research Collection

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Photo credits: (Left) PJ Liesch, UW-Entomology; (Right) Judy Gallagher, via Flickr under Creative Commons License

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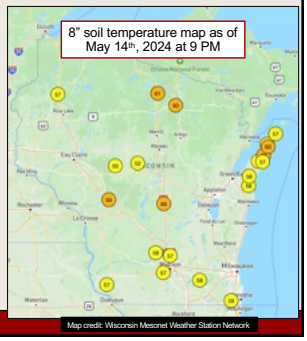
The Big Emergence: When?

- Influenced by soil temperature and weather:
  - Soil temperature exceed 64˚F at depth of 8"
  - Rain helps trigger emergence as well
- In Wisconsin, periodical cicadas have historically emerged in late May & June
- Cicadas create exit tunnels a few weeks before emerging

Emergence Holes



Map credit: Wisconsin Mesonet Weather Station Network

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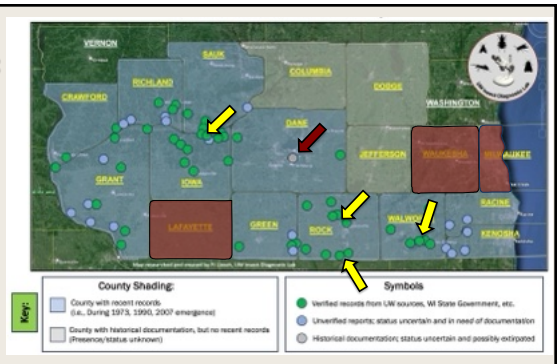
The Big Emergence: Where?



Map credit: PJ Liesch, UW-Entomology

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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*


Female ovipositing


"Flagging" injury


Mesh netting to protect small plants

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Flagging Injury Up-Close

Wisconsin won't see an emergence again until 2041!

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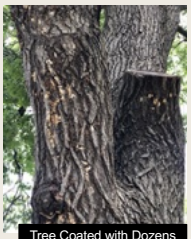
Spongy Moth (*Lymantria dispar*)

- 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


Spongy Moth Female & Egg Mass


Tree Coated with Dozens of Egg Masses

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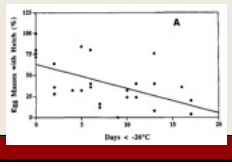
Spongy Moth Trends: 2020 – 2024+

- Populations have been on the rise for several years in Wisconsin
- Dry spring weather plays an important role
- **Entomopathogens** can causes high mortality *if conditions are right*
- 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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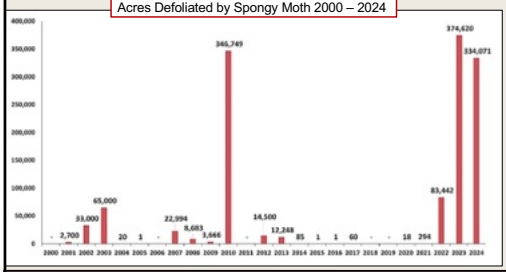
Spongy Moth Trends in Wisconsin

Acres Defoliated by Spongy Moth 2000 – 2024



Credit: Wisconsin-DNR Forest Health Annual Report (2024)

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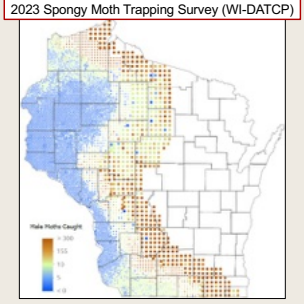
Spongy Moth Trends in Wisconsin

2023 Spongy Moth Trapping Survey (WI-DATCP)



2024 Spongy Moth Trapping Survey (WI-DATCP)

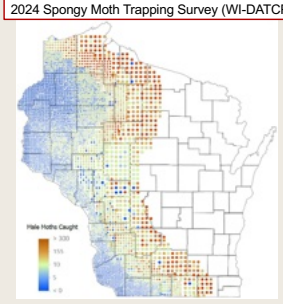


Chart & Map Source: WI-DATCP

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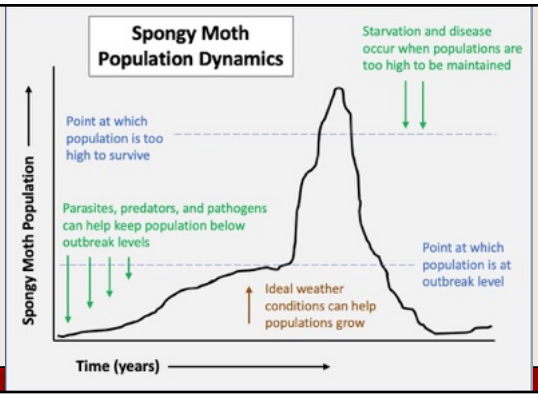

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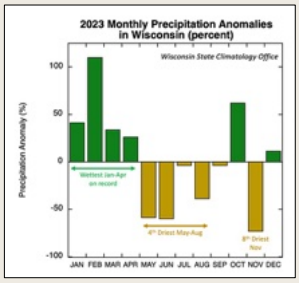
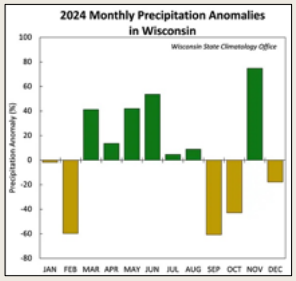
2024: Entomopathogens Kick In





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2024: Entomopathogens Kick In

Spongy moth caterpillars killed by the fungus *Entomophaga maimaiga* tend to hang straight down

Caterpillars killed by the Nucleopolyhedrosis Virus tend to hang downwards in an inverted "V" shape

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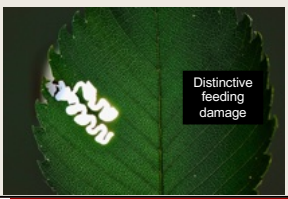
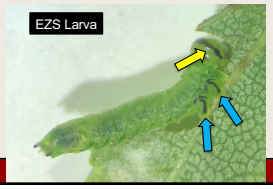
Elm Zigzag Sawfly (EZS)

- *Aproceros leucopoda* (Hymenoptera: Argidae)
- Invasive sawfly (Asia); feed on elm foliage
  - Also an invasive pest in Europe
  - First NA detection: Canada 2020





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EZS as an Effective Invader:

- Several factors help EZS rapidly build populations & spread:
  1. Populations consist *entirely of females*, which can reproduce asexually
  2. Potential exists for multiple generations each year
  3. Adults are capable of long-distance dispersal: 28-56 miles (45-90 km) per year
  4. Cocoons can occur on man-made items such as vehicles

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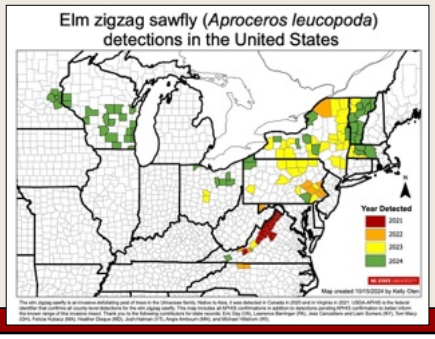
Elm Zigzag Sawfly: Invasion History

- North America (Quebec, CA) : 2020
- US: 2021
- WI: 2024 (early July)



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Elm Zigzag Sawfly

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

Table 1. Documented host species of EZS in the United States

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

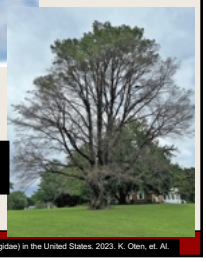

Photo source: First records of elm zigzag sawfly (Hymenoptera: Argidae) in the United States. 2023. K. Oten, et. Al.

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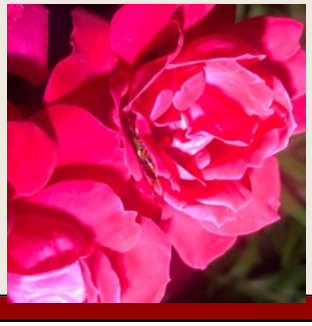
European Earwigs



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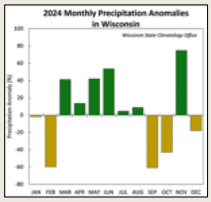
Slugs



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Hammerhead Worms

- Non-native land planarian
- Attacks earthworms
- If found, please report

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Aphids


Aphids on Rose Stem


Honeydew


Hover fly larva attacking aphids

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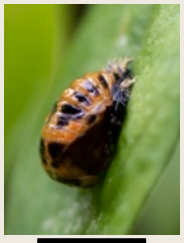
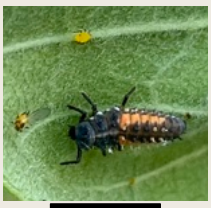
Multicolored Asian Lady Beetles

Adults (Indoors)



Pupa (Outdoors)



Larva (Outdoors)

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Commonest Broad-Nosed Weevils

Black Vine Weevil
(Taxus Weevil)

Strawberry
Root Weevil

BVW

SRW

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Broad-Nosed Weevils (Curculionidae: Entiminae)

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Two-Banded Japanese Weevil

- Non-native (Japan) broad-nosed weevil
- Feed on a wide range of landscape plants
- Females can reproduce asexually

Adult Weevil

Notching damage
caused by adults

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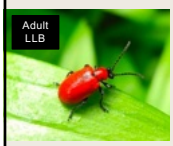
Lily Leaf Beetle



Adult
LLB

Heavily-Infested
Lily Plant

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Viburnum Leaf Beetle

VLB Larvae and
"Skeletonization" Damage

Oviposition (egg-laying) pits

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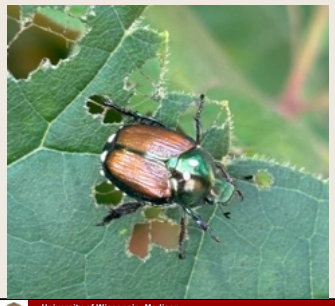
Japanese Beetle



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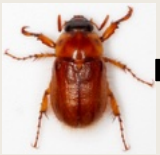
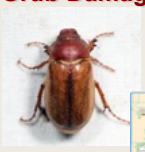
"New" Chafers & Grub Damage



Mased Chafer



European Chafer

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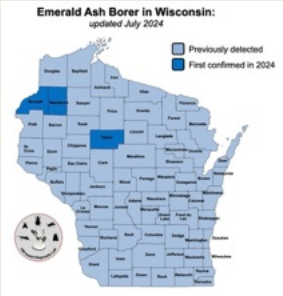
Emerald Ash Borer Update



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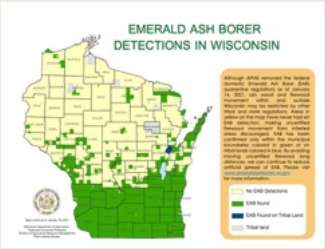
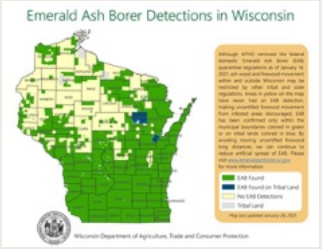
Emerald Ash Borer Update





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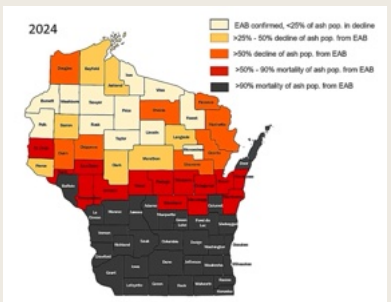
Emerald Ash Borer: Current Status of Damage



Map Source: 2024 Wisconsin DNR Forest Health Annual Report

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Emerald Ash Borer: What's the Endgame?

- Ash trees will remain part of the forest ecosystem
  - *Regeneration occurring; seeds produced*
  - New ash trees will likely be smaller in size
- Biocontrol releases ongoing
  - Evidence of persistence in Wisconsin
- Future of insecticide treatments?

Photo: 2024 Wisconsin DNR Forest Health Annual Report

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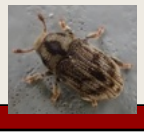
Secondary Borers

- Typically, spare trees that are “happy & healthy”
- Opportunistically attack stressed/weakened trees

Two Lined Chestnut Borer (Oaks)

Bronze Birch Borer (Birches)

Bark Beetles (Most trees)



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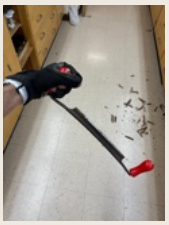
Submitting Samples for Borer Check

- Send sufficient material to check for borers
- Branches are ideally fresh
- Diameter 2” or less



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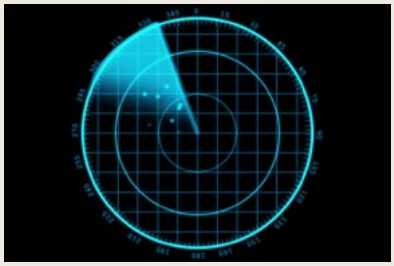
New Arrivals & Pests to Watch for:



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New Leafhopper (*Tautoneura polymitusa*)

- Detected in WI: fall 024 (La Crosse)
- Leafhopper native to Korea
- Associated with elms
- No damage observed to plants
- Potential to be a minor structural pest

Photo source: Toth et al. 2017. Zootaxa 4311(1): 137-144.

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Report!

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*)

SLF Adult

Early instar SLF Nymph

4th instar SLF Nymph

SLF adults covering tree trunk

SLF Egg Mass

Photo Credits: Pennsylvania Department of Agriculture, Bugwood.org

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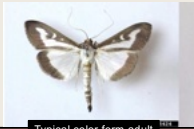
Report!

Box Tree Moth

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

Caterpillar with silken webbing



Typical color form adult

Dark color form adult

Plant Damage

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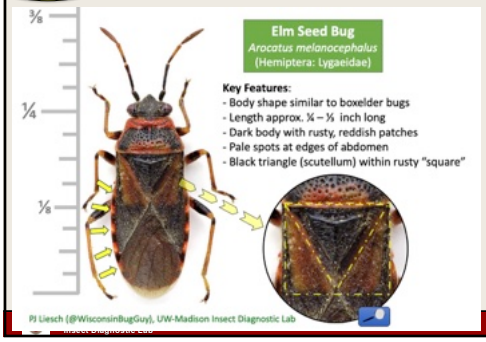
Reports Encouraged!

Elm Seed Bug



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Questions?

insectlab.russell.wisc.edu

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