



Emerging pests: Scales and Adelgids in Christmas trees

Bill Lindberg





Overview

- Balsam woolly adelgid
- Elongated hemlock scale
- Cryptomeria scale
 - New MI, but not other Christmas tree regions!

Status

Damage

Life Cycle

Treatment
options



What is an adelgid?

- “Aphid-like” pest
 - Very small insect
 - Conifers only
 - Lay eggs vs. live birth (aphids)
 - **Form galls or woolly masses**
- Common MI examples:
 - Eastern spruce gall adelgid
 - Cooley spruce gall adelgid





Balsam woolly adelgid

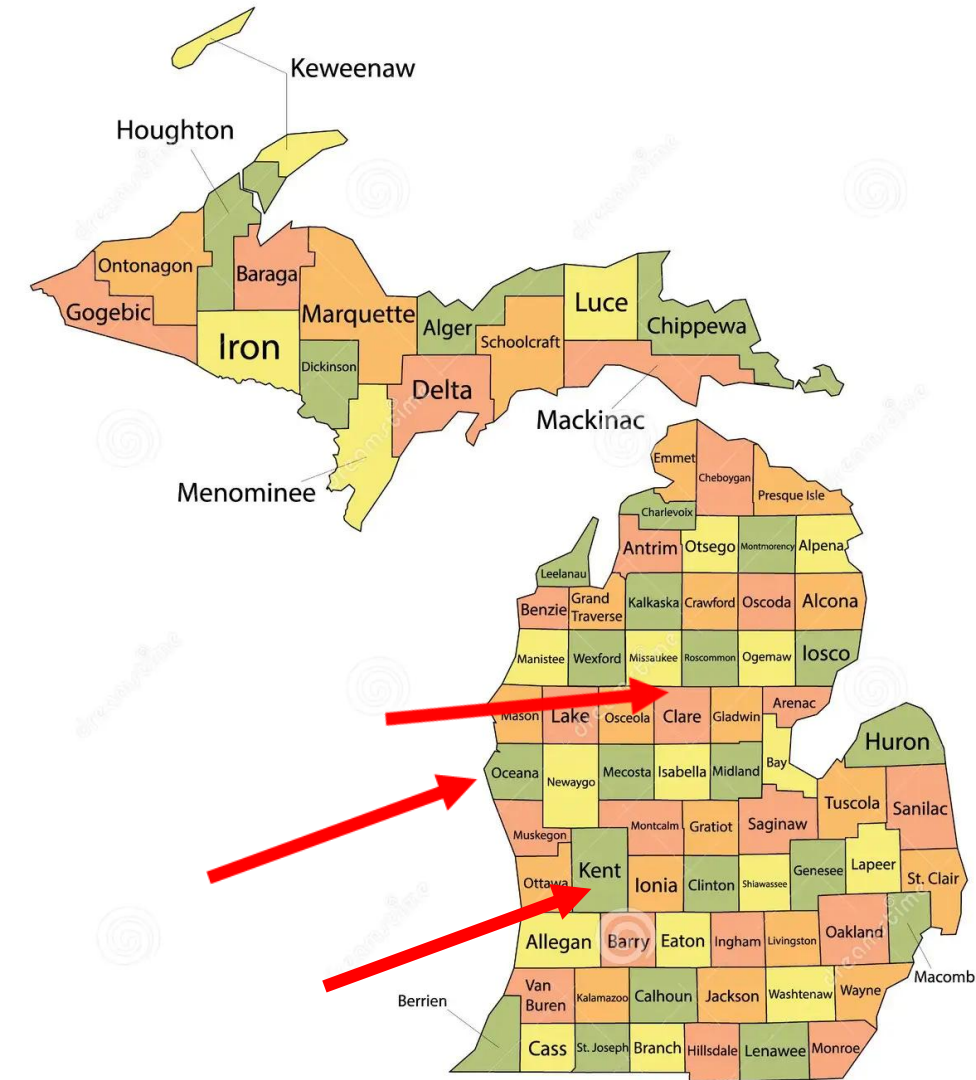
- Native to Europe
 - Introduced US early 1900's.
- Current distribution: NE, NW, SE, US
- Damage: All true firs, any size/age tree
 - European silver fir resistance
 - Fraser fir **highly sensitive**
 - Concolor fir moderately sensitive





MI BWA Status?

- 2021: Landscape trees
 - Trees destroyed, surveying found no other BWA
- 2023: Christmas tree farm
 - Infected trees and adjacent removed
 - Subsequent years, more BWA trees found/destroyed, decreasing trend
 - Likely introduced at planting, seedlings (Idaho)
- 2023: Missaukee/Clare counties: forested areas
 - MDARD grant remove/kill infested fir trees



BWA Signs

- Abnormal gouting/swelling shoots
- Loss tree vigor/growth
- Branch flagging/dieback
- Abnormal leader growth
- White cottony mass- Bark
- Breakdown internal transportation-
appear drought stressed
- **Tree death in 10 years**
 - 3-6 years under high pressure







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Balsam Fir Range Map



BWA lifecycle

- Overwinters: Immature nymph
- Spring: Feed/mature adult
- Adults lay eggs, 2-4 weeks hatch
- Crawlers (**mobile**) stage
- Progress instar stages, then adult
- 2 or 3 generations?
- **Stages NOT synchronized**
 - Crawlers emerging summer/fall



Treatment

- Prevention
- Scouting
- Spray coverage > spray product
 - High pressure sprayers-N. Carolina
 - Hundreds of gallons water per acre
- Crawler or early instar
 - Most vulnerable spray, no/low wax



Crawler(Juvenile) on a Woolly Mass

Continuing BWA research

- Dr. McCullough investigating BWA MI lifecycle
 - Preliminary research-
- Expect future research updates findings
 - Efficacy different insecticides
 - Number generations
 - Low temp. induced kill off



Balsam woolly adelgid

- Questions?





What's a scale?

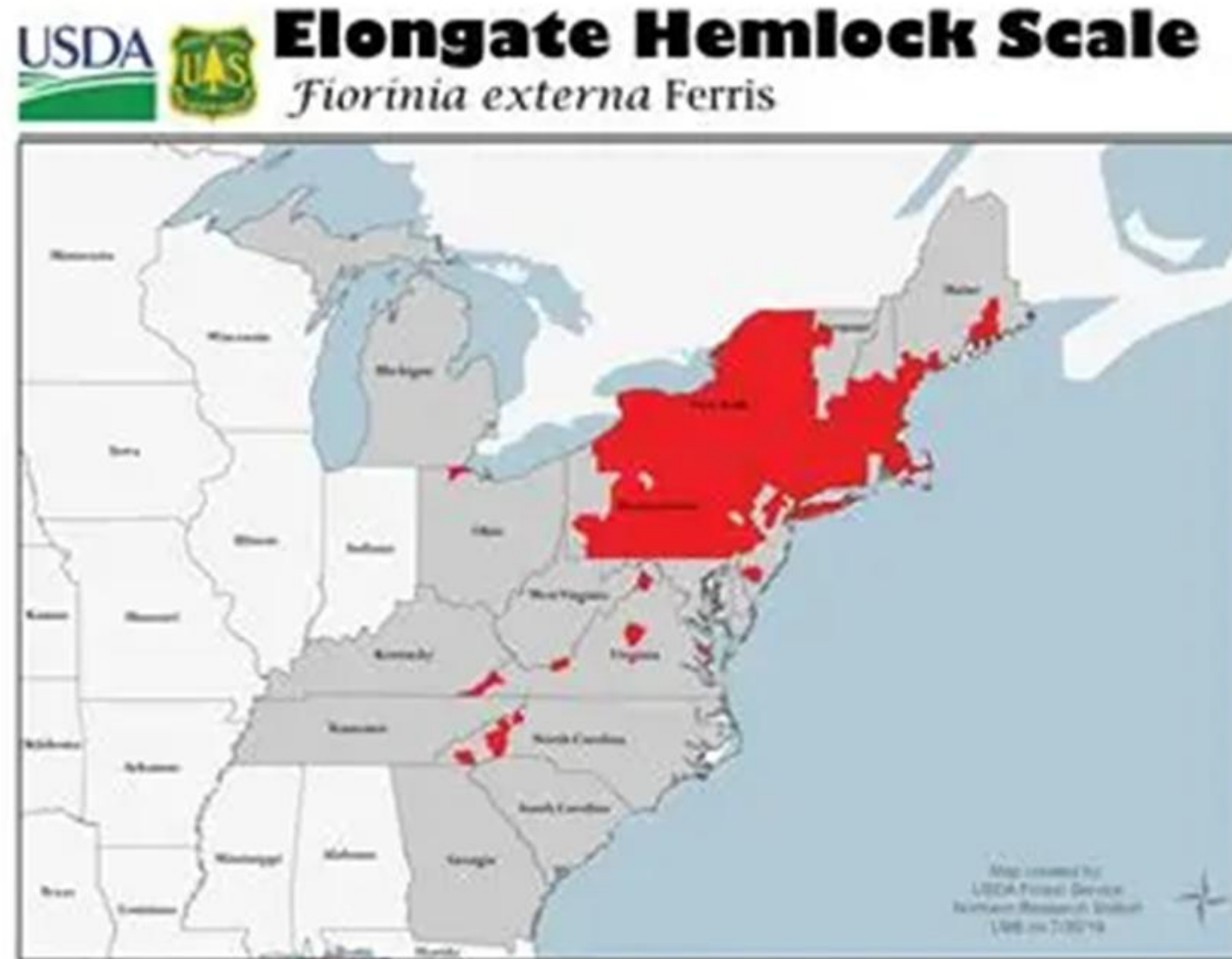
- Small insect
- Cover with wax
 - Appear “fish scale”
 - Soft or (hard) armored scale
- Soft scale: produce honeydew, sooty mold
 - Pine tortoise scale
- Armored scale:
 - smaller size
 - no honeydew
 - EHS and Cryptomeria



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- Invasive pest Asia
 - NY early 1900's
- 1970's expanded many states in Eastern/SE US.
- First found MI 2010.
 - Infested nursery stock
- Spread along lakeshore counties
- 2025: First confirmed cases MI Christmas tree fields





EHS facts

- 1/20th inch
 - Longer than wide (elongated)
- Female: yellow beneath the brown/orange waxy cover.
- Males: Smaller, white covering scale
- Preferred Host sites: Hemlock
 - Will also use: True fir, Spruce
 - Least preferred: Cedar, Douglas-fir, Pine





EHS Lifecycle

- Eggs hatch early spring
- Crawlers find new feeding site.
- Feeding, progress adults
- Males/females mate. Egg lays 6-8 weeks. (Males winged stage)
- Multiple generations/life stages found concurrently





EHS Damage

- Yellow splotches needles, poor tree growth
 - Insect sucking out energy tree
- Degraded tree appearance
- Regulatory restrictions
 - Eggs/crawlers/female EHS,
 - Alive 13 weeks post harvest





EHS Damage

- White wax from males- mid/late summer





EHS Treatments

- Prevention
- Don't over apply N fertilizer
- Tristar, Safari, and Talus most consistent/long lasting control,
 - Targeting crawlers in June
- Difficulty in control?
 - Underside needles
 - Protective wax coating
 - Non-synchronized development





EHS Questions



THE PURDUE LANDSCAPE REPORT

Cryptomeria scale on Christmas trees

By: Alicia Kelley, ajkelley@purdue.edu

Christmas tree growers have been struggling with an invasive scale pest called Cryptomeria scale (*Aspidiotus cryptomeriae*), which is a serious pest of conifers. The scales infest the undersides of the needles and extract plant juices with their piercing-sucking mouthparts. Economic losses are due to the unsightly yellow discoloration and needle drop that occurs from the insect feeding (Fig. 1).



Fig. 1. Yellowing mottling damage due to scale feeding. Image:

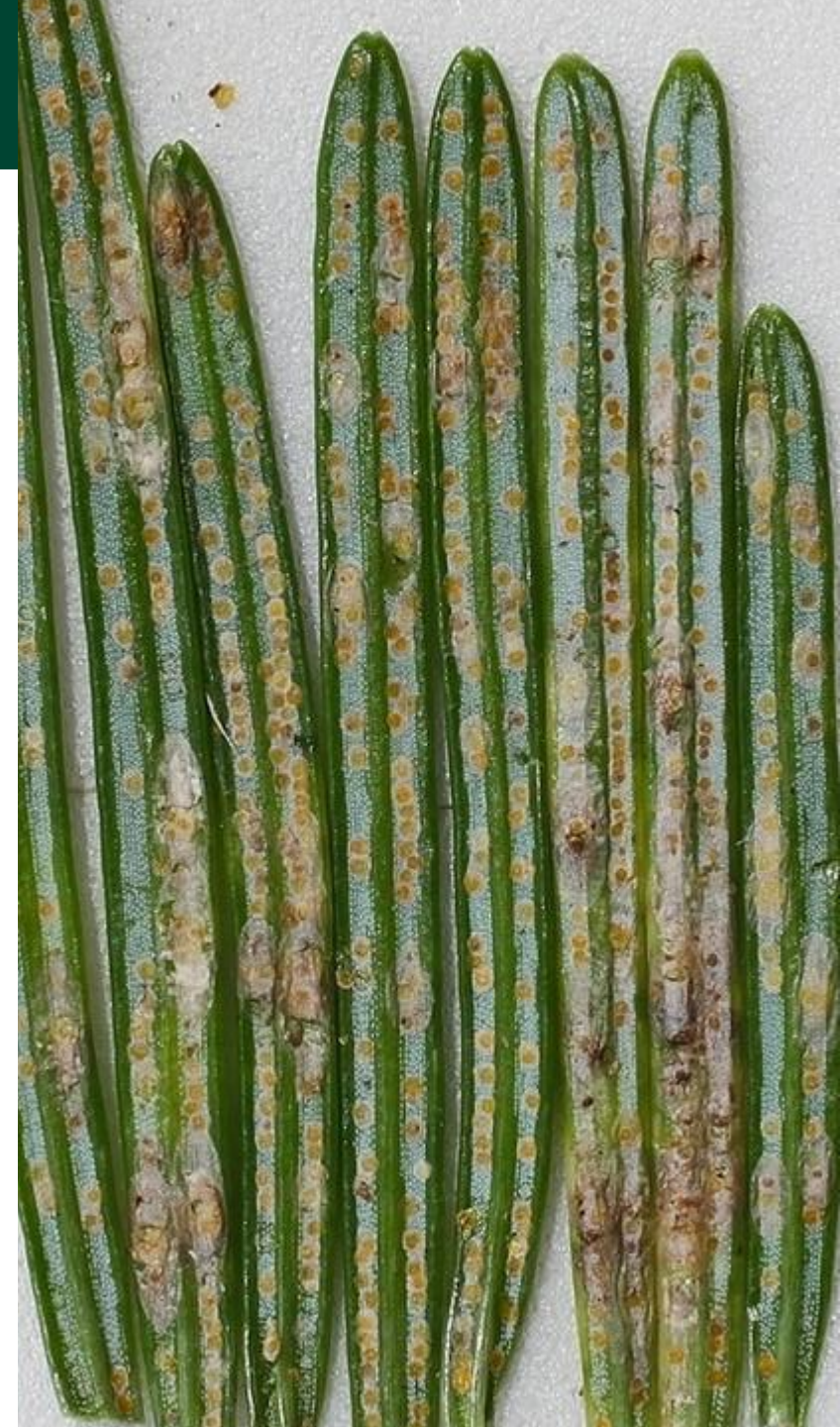
overwinter until the following spring.



Fig. 2. Adult female Cryptomeria scale. Image: United States

Cryptomeria scale

- Invasive, armored scale
 - Native to Japan
- Feed on: Conifers, junipers, firs, spruces, pines, yews, and hemlocks
- Range: NC, VA, IN, PA, MA
- Premature needle drop
- Degrade tree appearance



Status in MI

- Found in Berrien County (SW MI)
 - 2022
 - Forested setting
- Research group for HWA and EHS
- Not widespread...yet.





Damage

- Loss tree vigor
- Premature needle drop
- Mottling of needles
- Branch dieback



Cryptomeria life cycle

- Overwinter eggs
- In spring, eggs hatch into crawlers that migrate to new feeding sites.
- After a few days, the crawlers settle, insert their mouthparts to feed, and begin secreting their shields.
- Adult female armored scales remain covered their entire life.
- Adult males emerge and fly to find mates.





Lifecycle cryptomeria scale

- Cryptomeria two generations with crawlers appearing in June and August
 - Not sure MI same
- Treatment options:
 - Dormant oil in late winter before bud break.
 - Bifenthrin in May or Dinotefuran basal bark spray budbreak
- 600-800 GDD's (1st generation crawlers);
- 1750-2130 GDD's (2nd generation crawlers),
Source: Cornell Cooperative Extension

Summary

- Difficult control
 - Life cycle, protective covering, location needle
- IPM
 - Prevention
 - Dormant oils- Prior budbreak
 - In-season: Target crawlers/early instars

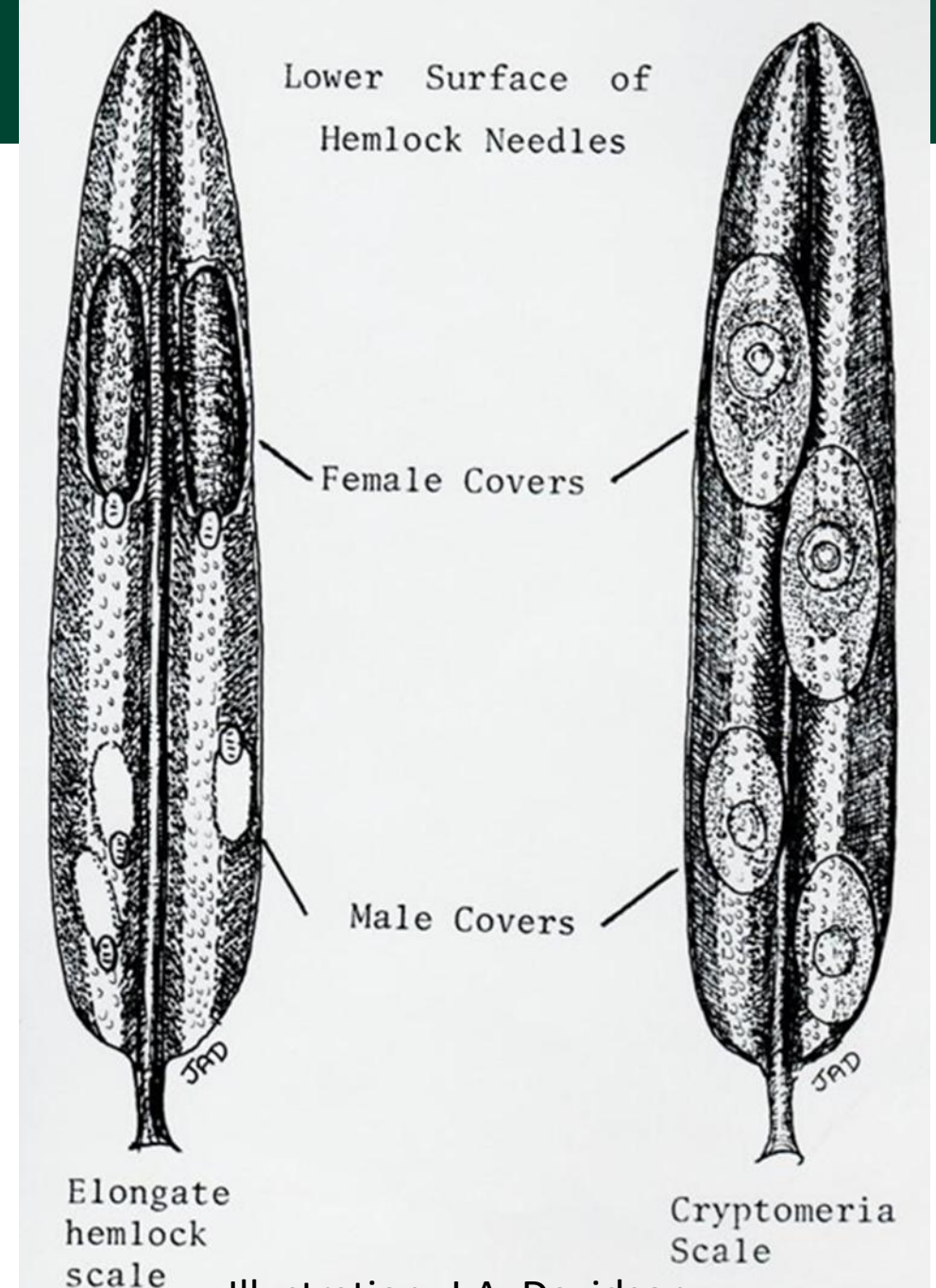


Illustration: J.A. Davidson

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Questions?

- Bill Lindberg
- lindbe35@msu.edu
- 616-438-2738