

Hemlock Woolly Adelgid

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Eastern Hemlock

- ▶ Michigan is home to roughly 176 million hemlocks
- ▶ Functions
 - ▶ Habitat
 - ▶ Dune stabilization
 - ▶ Temperature regulation in cold water streams
 - ▶ Aesthetic



What is Hemlock Woolly Adelgid (HWA)?

- First introduced to the eastern US in the 1950's from Japan
- Has devastated eastern hemlock forests along the east coast and Appalachia
- Sucking insect about the size of a flake of pepper - flightless



Crawler (first-stage nymph) (Michael Montgovery, USDA Forest Service, Bugwood.org)



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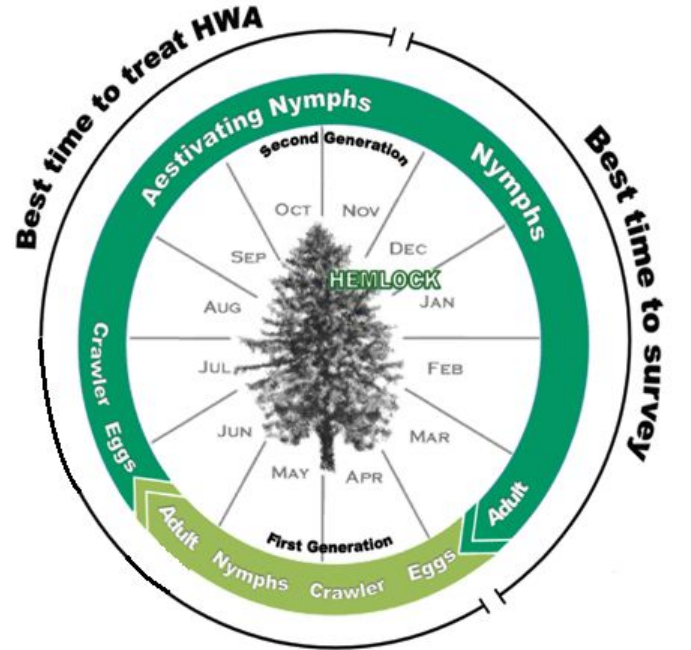
What is Hemlock Woolly Adelgid (HWA)?

- Identified by its ovisacs - looks like small cotton balls on the underside of hemlock needles
- Starves tree of nutrients



Hemlock Woolly Adelgid

- ▶ 2 generations per year
- ▶ Crawlers are present in ~April and July
 - ▶ Mobile
 - ▶ Tiny
 - ▶ Spread easily on the wind or hitchhike unseen on birds, animals and humans.



Elongate Hemlock Scale



Elongate Hemlock Scale

Armored scale insect
pest of hemlock
(also invasive!)
Causes premature
needle drop, limb
dieback, overall decline
or death

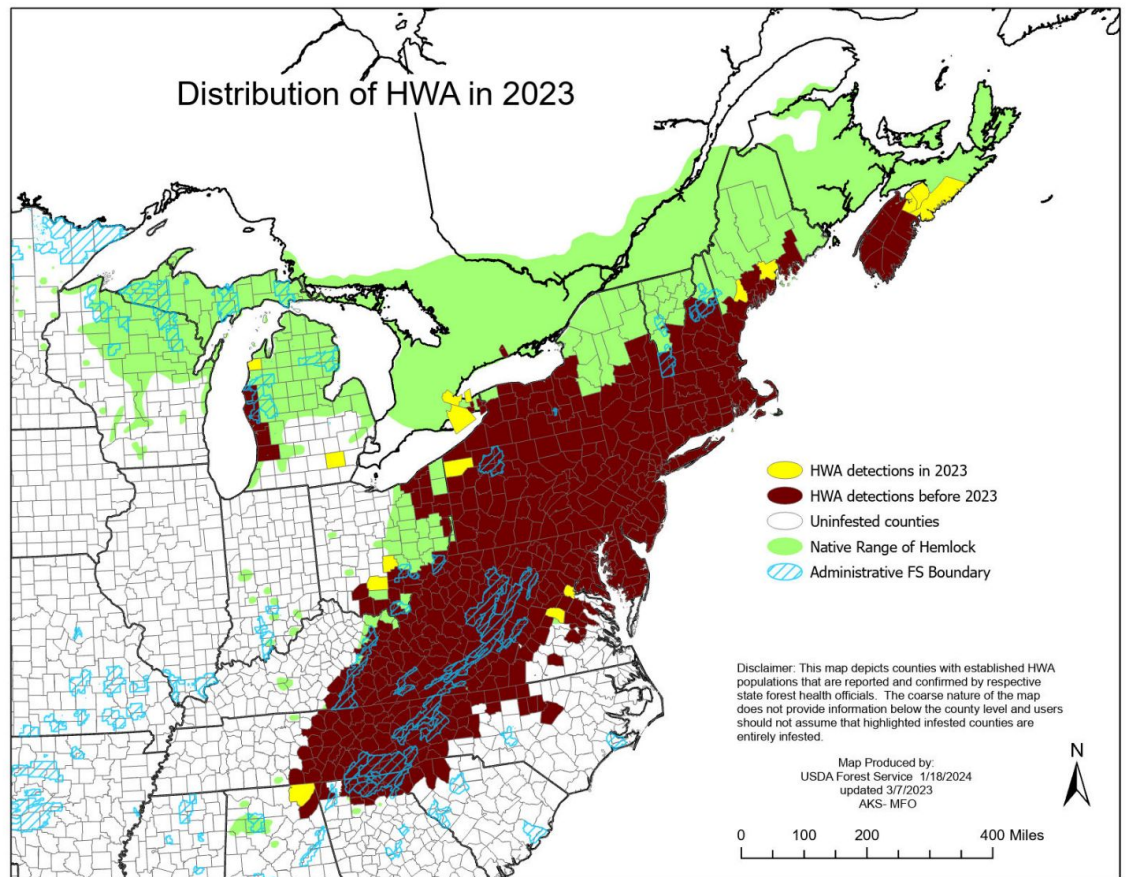


Main Symptoms:
Yellowing needles
Stunted needle growth

Other Lookalikes



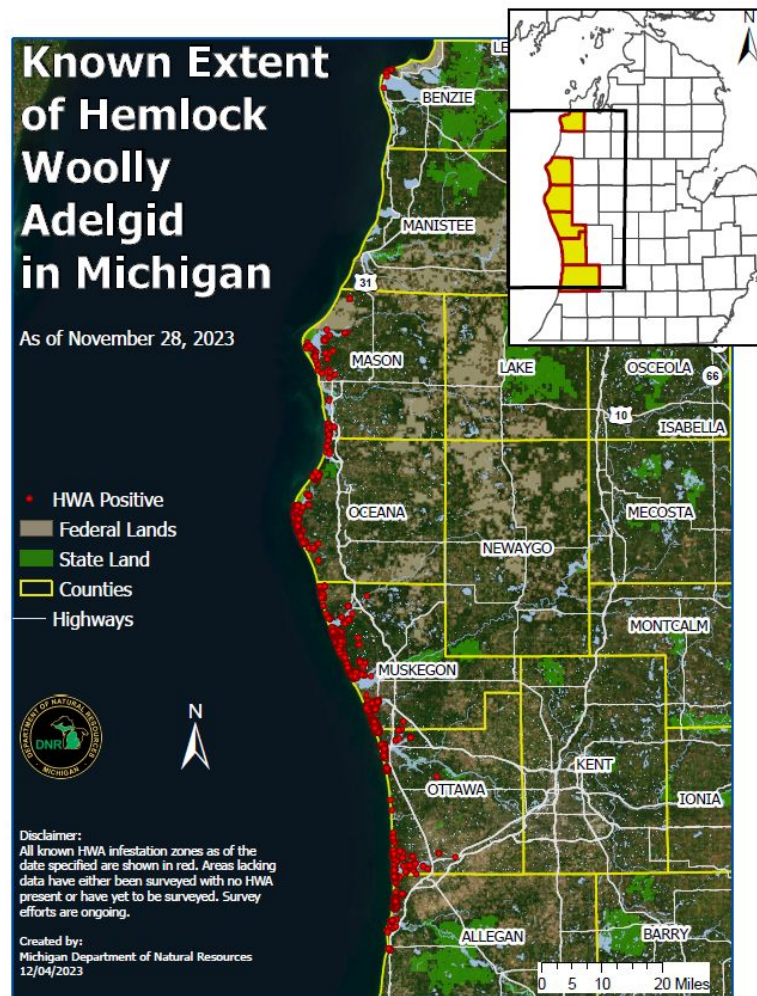
Hemlock Woolly Adelgid in MI



Current Statewide HWA Infestation

New Infestations in 2024

- Antrim County
- Benzie County Spread
- Sleeping Bear Dunes

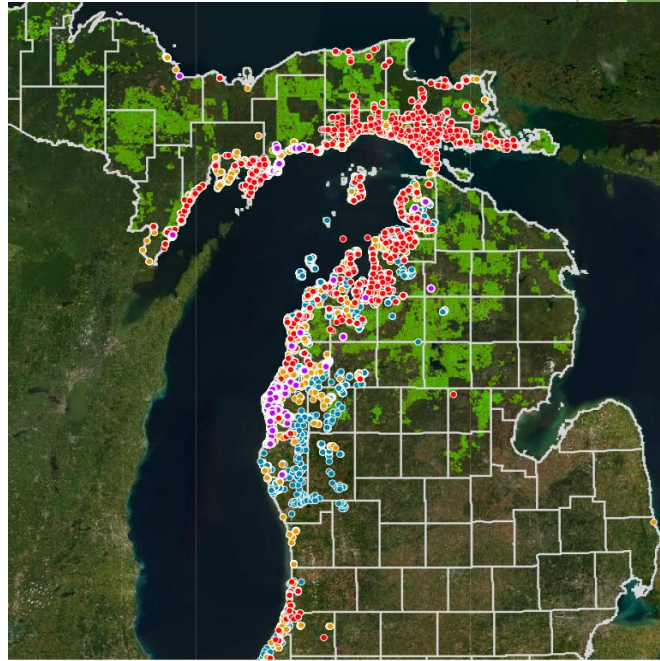


HWA Treatment

The background features abstract, overlapping geometric shapes in various shades of green, ranging from light lime to dark forest green. These shapes are primarily located on the right side of the slide, creating a modern, layered effect. The text 'HWA Treatment' is positioned on the left side of the slide in a clean, sans-serif font.

State Land Treatment

- ▶ State Parks
- ▶ State Game Areas
- ▶ Federal Lands



Treatment Options

- ▶ Chemical
 - ▶ Imidacloprid & Dinotefuran
- ▶ Methods
 - ▶ Injections
 - ▶ Basal Bark
 - ▶ Soil Drench
 - ▶ Tablets
- ▶ OTC products
 - ▶ Chemical options
 - ▶ Insecticidal soaps and horticultural oils

Chemicals

- ▶ Imidacloprid
 - ▶ Slow acting, control in roughly one year
 - ▶ Lasts 5-7 years depending on treatment rates
 - ▶ Cheaper
- ▶ Dinotefuran
 - ▶ Fast acting, control in roughly two weeks
 - ▶ Lasts roughly 12-18 months
 - ▶ Expensive

Methods

- ▶ Injections
 - ▶ Plugged vs pluggless
 - ▶ No max application rates
- ▶ Basal Bark
 - ▶ Max application rates
- ▶ Soil Drench
 - ▶ Max application rates
- ▶ CoreTect Tablets
 - ▶ Breakdown over time, can use double max application rate
 - ▶ Easy transport

Injections



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EQJECT™ SYSTEM & TREEAZIN® SYSTEM INSECTICIDE USER MANUAL



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OTC Products

- ▶ Chemical products
 - ▶ Diluted and concentrated
 - ▶ Micro-injections
- ▶ Insecticidal soaps and horticultural oils



Injections

- ▶ 2 mL/DBH inch
 - ▶ 10% concentration
- ▶ No max application rate
- ▶ Inches/liter
 - ▶ 1,000 mL/2 mL
 - ▶ 500 inches



Basal Barks

- ▶ Mix rate: 16.8 oz/gal
- ▶ App rate: 1.5 oz/inch
- ▶ Max app: 1.6 pints/acre



Basal Bark

- ▶ Inches/gal mixture
 - ▶ 128 oz/1.5 gal
 - ▶ 85.33 inch/gal mixture
- ▶ Inches/acre
 - ▶ 1.6 pint=25.6 oz
 - ▶ 25.6 oz/16.8 gal
 - ▶ 1.52 gal mixture
 - ▶ 1.52 gal x 85.33 inch
 - ▶ 129.7 inch/acre/year



Chemical Concentration

LESCO® Bandit™ 2F Insecticide

For foliar and systemic insect control in turfgrass (including sod farms), landscape ornamentals, fruit and nut trees and interior plantscapes.

ACTIVE INGREDIENT:

Imidacloprid, 1-[(6-Chloro-3-pyridinyl)methyl]-N-nitro-2-imidazolidinimine 21.4%
 OTHER INGREDIENTS 78.6%
 100.0%

Contains 2 pounds of imidacloprid per gallon.

SHAKE WELL BEFORE USING

EPA Reg. No. 432-1312 EPA Est.No. 432-TX-1

NET CONTENTS: 40 oz

STOP - Read the label before use.
 Keep out of reach of children.

CAUTION

PARA EL USUARIO: Si usted no lee o entiende inglés, no use este producto hasta que le hayan explicado completamente las instrucciones que figuras en la etiqueta.

(TO THE USER: If you cannot read or understand English, do not use this product until the label has been fully explained to you.)

Bayer Environmental Science
 A Business Group of Bayer CropScience LP
 2 T. W. Alexander Drive
 Research Triangle Park, NC 27709
 www.BackedByBayer.com

79020368
 79051212 060922B

{BOOKLET FRONT PANEL LANGUAGE}

GROUP 3A INSECTICIDE

COMPARE-N-SAVE™ INDOOR/OUTDOOR INSECT CONCENTRATE

[Alternate Brand Names: HDX™ Indoor/Outdoor Insect Control; Farm General™ Indoor/Outdoor Insect Concentrate; FarmWorks® Indoor/Outdoor Insect Concentrate; FarmWorks® Indoor/Outdoor Insect Control]

For use to control listed insect pests and mites indoors, in interiorscapes and outdoors on ornamentals and lawns in landscaped areas around residential, institutional, public, commercial, and industrial buildings, parks, recreational areas and athletic fields.

ACTIVE INGREDIENT:

Bifenoxin™ 7.9%
 OTHER INGREDIENTS 92.1%
 TOTAL: 100.0%

By Wt.

NOTIFICATI



IMICIDE® Hp

SYSTEMIC INSECTICIDE

FOR TREE INJECTION USE IN LIQUID LOADABLE INJECTORS

ACTIVE INGREDIENT:

Imidacloprid (110.7 mg/mL)
 1 [(6-Chloro-3-pyridinyl)methyl]-N-nitro-2-imidazolidinimine 10.0%
 OTHER INGREDIENTS: 90.0%
 Total 100.0%

KEEP OUT OF REACH OF CHILDREN
CAUTION



Systemic Insecticide
 for Micro-Infusion®

SYSTEMIC INSECTICIDE

Micro-injectable Systemic Insecticide for use with the Arborjet Injection System in the Management of Specific Insect Pests of Forests, Trees, Landscape Ornamentals and Interior Plantscapes.

ACTIVE INGREDIENT:

Imidacloprid 1 [(6-chloro-3-pyridinyl)methyl]-N-nitro-2-imidazolidinimine 5.0%
 OTHER INGREDIENTS 95.0%
 TOTAL 100.0%

Net Contents: See Individual Container

EPA Reg No. 74578-1 • EPA Est. No. 74578 - MA-001

KEEP OUT OF REACH OF CHILDREN
CAUTION!

STOP - READ THE ENTIRE LABEL BEFORE USE

Precaución al usuario: Si usted no puede leer o entender inglés, no use este producto hasta que la etiqueta le haya sido explicada ampliamente. To the user: if you cannot read or understand English, do not use this product until the label has been fully explained to you.

Manufactured by ARBORJET INC. • 781-935-9070 • 99 Blueberry Hill Road, Woburn, MA 01801

**Imidacloprid 2F
(or 2SC)**

	2F/2SC per gallon mix	water per gallon mix	Inches DBH Treated per gallon mix	A.I. oz.	A.I gram s	A.I. grams per inch DBH
1.5 fl oz mix per inch DBH	16.8 fl oz	111.2 fl oz	85.33	4.2	119.1	1.4
2.0 fl oz mix per inch DBH	16.8 fl oz	111.2 fl oz	64	4.2	119.1	1.86

For trees <15" cumulative DBH apply 1.5 fl. oz. of
mix per inch DBH

For trees >15" cumulative DBH apply 2.0 fl. oz. of
mix per inch DBH

**Dinotefuran
20SG**

	20SG per gallon mix	gallon mix	Inches DBH Treated per gallon mix	A.I. oz.	A.I gram s	A.I. grams per inch DBH
1.5 fl oz mix per inch DBH	21 oz	1	85.33	4.2	119.1	1.4
2.0 fl oz mix per inch DBH	21 oz	1	64	4.2	119.1	1.86

For trees <15" cumulative DBH apply 1.5 fl. oz. of
mix per inch DBH

For trees >15" cumulative DBH apply 2.0 fl. oz. of
mix per inch DBH

Addressing a Property

- ▶ Inject all trees with a 5-inch DBH and up
- ▶ Basal bark all trees less than a 5-inch DBH
- ▶ Retreatments???



Biocontrol

- ▶ Research is ongoing and we are monitoring progress
- ▶ Michigan has not yet pursued biocontrol options

