



An Overview of Insect Pest Priorities for NJ's Forests

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Crazy Snake Worm



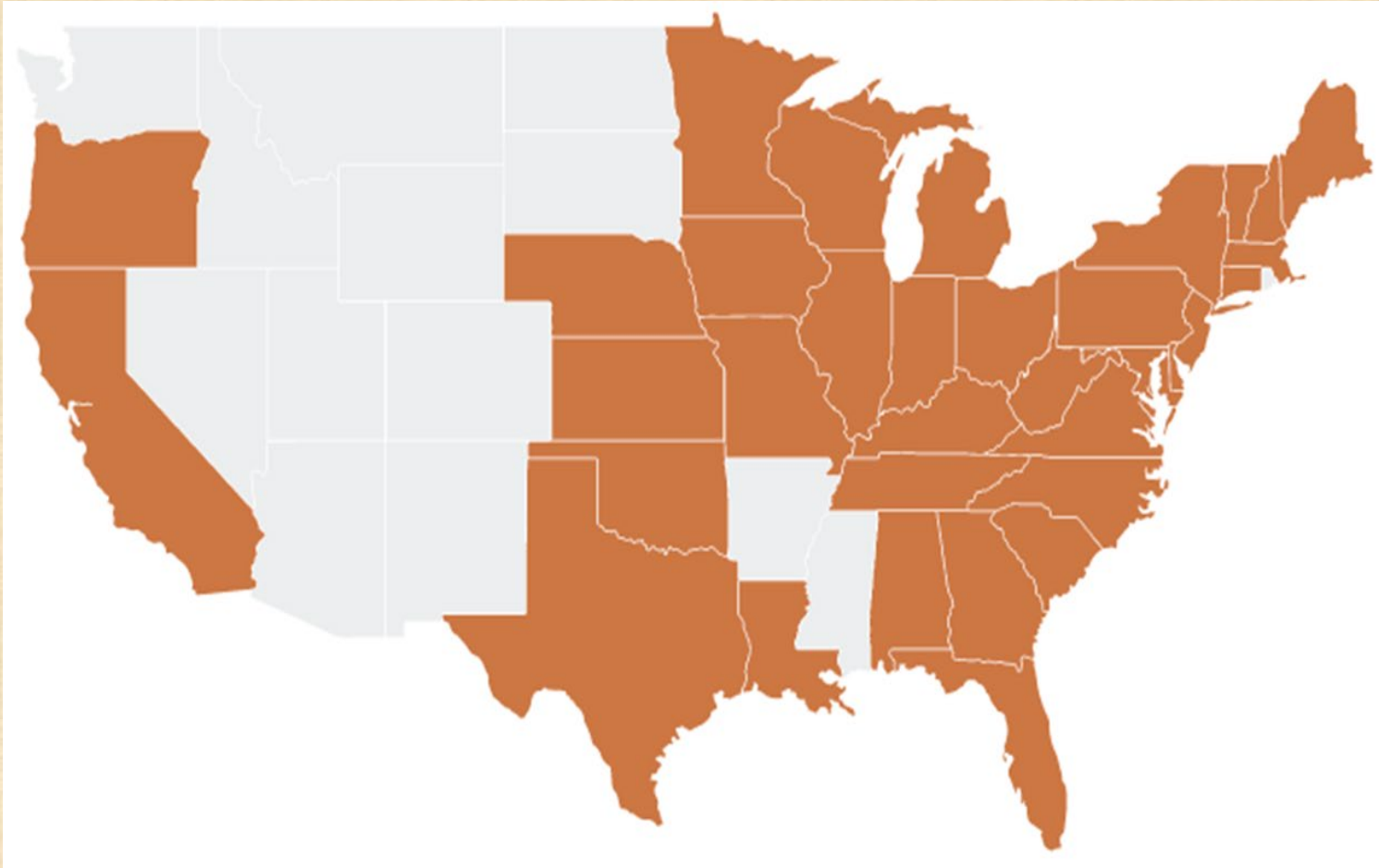
Crazy Snake Worm

- *Amyntas agrestis*, *Amyntas tokioensis** and *Metaphire hilgendorfi*
- Parthenogenic
- Complete lifecycle in 60 days
- Higher density than European EW
- Prefer grassland prairie habitats



- Asian crazy worms—also known as Alabama jumpers or Jersey Wrigglers for their speed and snakelike agility—first turned up in the United States more than a century ago when they were accidentally imported with ornamental plants.
- But their real damage occurs when the worms or their cocoons spread from home gardens into the wild.
- Asian worms eat up all the leaf litter and other organic matter they can find, leaving no nutrients for the forest's plants to consume.

Asian Earthworm Distribution



Asian Earthworms

- Asian earthworms were first identified in the United States in the 1870s in California.
- Anecdotal reports suggest they migrated to the East Coast with Washington DC's famed cherry trees.
- Then were detected in Baltimore and then Massachusetts in the 1930s and to New York, near Albany, in the 1940s.





- Their “poop,” called castings, contains calcium carbonate, and in great enough amounts it can change the chemistry of the soil, making it more alkaline and less welcoming to certain kinds of plants, such as azaleas and oaks.
- Leaf litter declined by **95%** in forested study areas, and the Asian worms left behind residue that was almost pebbly in consistency -- grainy little balls of dirt that may make it hard for the seeds of native plants to germinate.

Crazy Snake Worm

- Crazy snake worms also cycle nutrients so quickly and so superficially—aboveground, not below—that erosion and rain often wash away all the good nutrients before the plants can make use of it.
- This is especially problematic for ecosystems in areas of the Northeast and upper Midwest, where glaciers once scoured the land.
- For tens of thousands of years in the NE and MW, forests there evolved in the absence of worms.

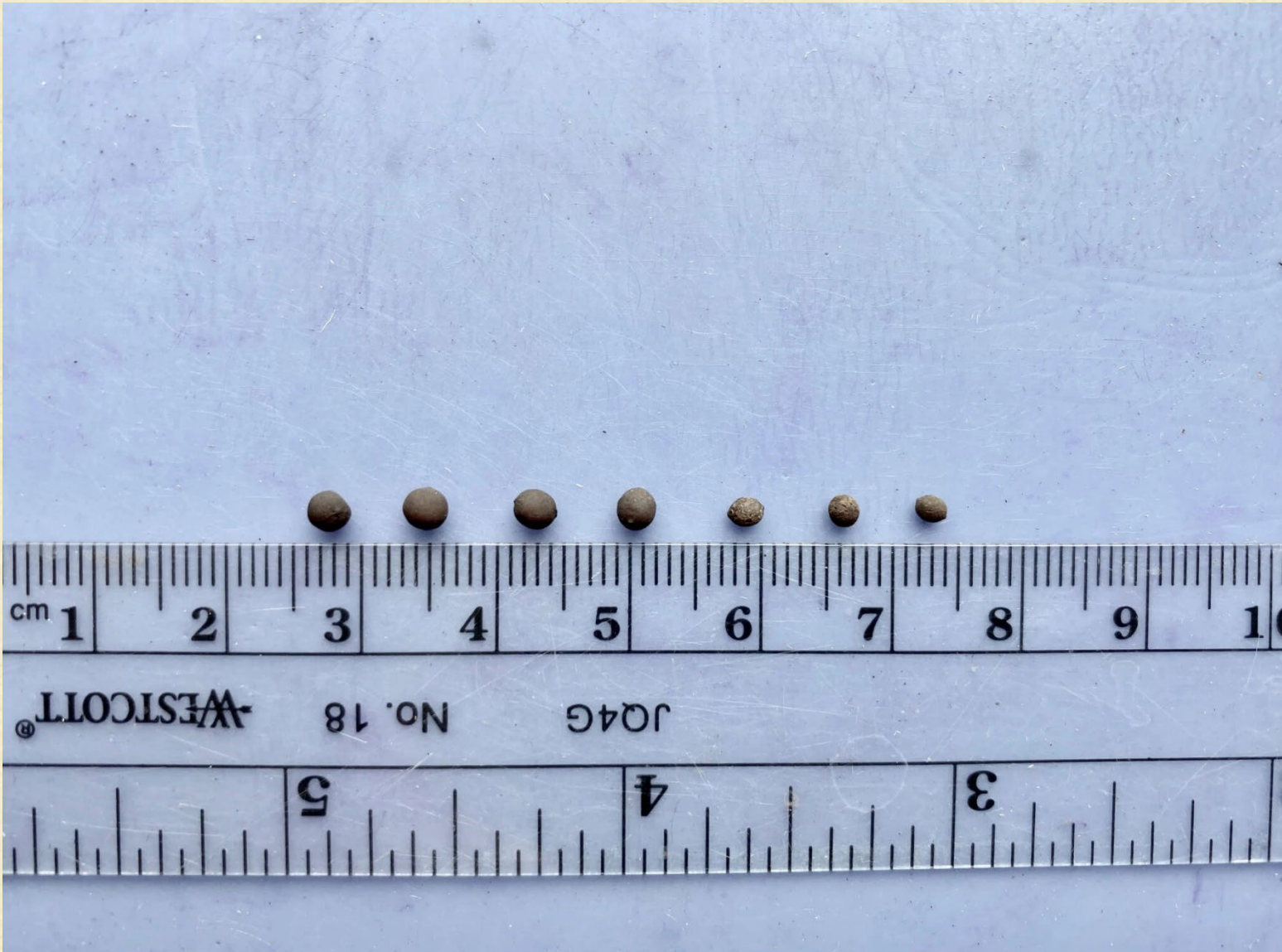


Crazy Snake Worm

- Native wildlife species are impacted from the activity of crazy snake worms as well.
- Seedlings and wildflowers have a tough time taking root in the depleted, dry, and loose soil the worms create.
- Then invasive weeds choke out wildflowers and other natives while altering the soil's moisture and pH content—more transformations to which native species will have to adjust.
- The resulting absence of vegetation can not only exacerbate erosion but also rob ground-nesting birds, salamanders, and insects of hiding places. *Millipedes



Crazy Snake Worm



Cocoons

The worms hatch from tiny, almost invisible cocoons deposited in the soil, reaching adulthood and dying in a single season. The cocoons, however, can overwinter for multiple years, making them difficult to control.

Credit...Maryam Nouri-Aiin, Plant and Soil Science Department, University of Vermont

Control



- There are no approved pesticides for worms (and spraying every inch of forest is out of the question financially).
- The egg casings of crazy snake worms are also capable of surviving temperatures as low as -12 degrees Fahrenheit.
- A 2015 study found that prescribed burns don't effectively kill off many adult worms—though they did reduce the number of cocoons that hatched later.
- Fire, the researchers suggest, might also indirectly kill many surviving hatchlings simply by burning up the soil nutrients they rely on for food.

Control



- **Solarization**

- To suppress the population he should collect any adult worms he finds (drop them in a plastic bag and solarize them) to prevent them from shedding further cocoons.
- Tarp the compost which will increase the heat. We know 104 degrees kills the cocoons so while it may not reach that temperature completely through the pile it will be reached internally greatly decreasing the number of viable cocoons.

- **Steam**

- Steam heat is something nursery's are using to control both the worms and cocoons.

Control



- **Fire ***(Use with Caution)**
 - Using a propane torch in a sweeping fashion across bare soil (the heat kills the cocoons).
- **Saponins**
 - Alfalfa, quinoa and even natural soap are high in saponins.
 - Homeowners using Alfalfa meal and planting plants which are naturally high in saponins as a deterrent.
- ***Beauveria bassiana***
 - Entomopathogenic fungi

Control?



Susan Day/UW–Madison Arboretum

What can you do?

And if you're game, you can try the same saponin experiment Dr. Görres is conducting in his home garden in Vermont:

Using a low-concentration soap solution, he is drenching small areas where he finds adult worms — perhaps a tablespoon of natural, plant-based soap in three or four gallons of water.

(Just be sure to avoid areas close to water; saponins should not be used near streams.)

<https://www.nytimes.com/2020/07/22/realestate/invasive-jumping-worm-garden-summer.html>

Beech Leaf Disease (BLD)

- First detected in Ohio in 2012.
- Found in several US states and Ontario.
- BLD is believed that it affects the tree's ability to photosynthesize.
- BLD appears to spread very quickly, and spread does not appear to be influenced by slope, aspect, or soil conditions.
- Where established, nearly 100% of American beech trees show symptoms (Pogacnik & Macy, 2016).
- Infected trees also seem to show symptoms of other pathogens, such as beech blight aphid, European beech scale, erineum patches, and other leaf fungi like anthracnose.



Beech Leaf Disease (BLD)

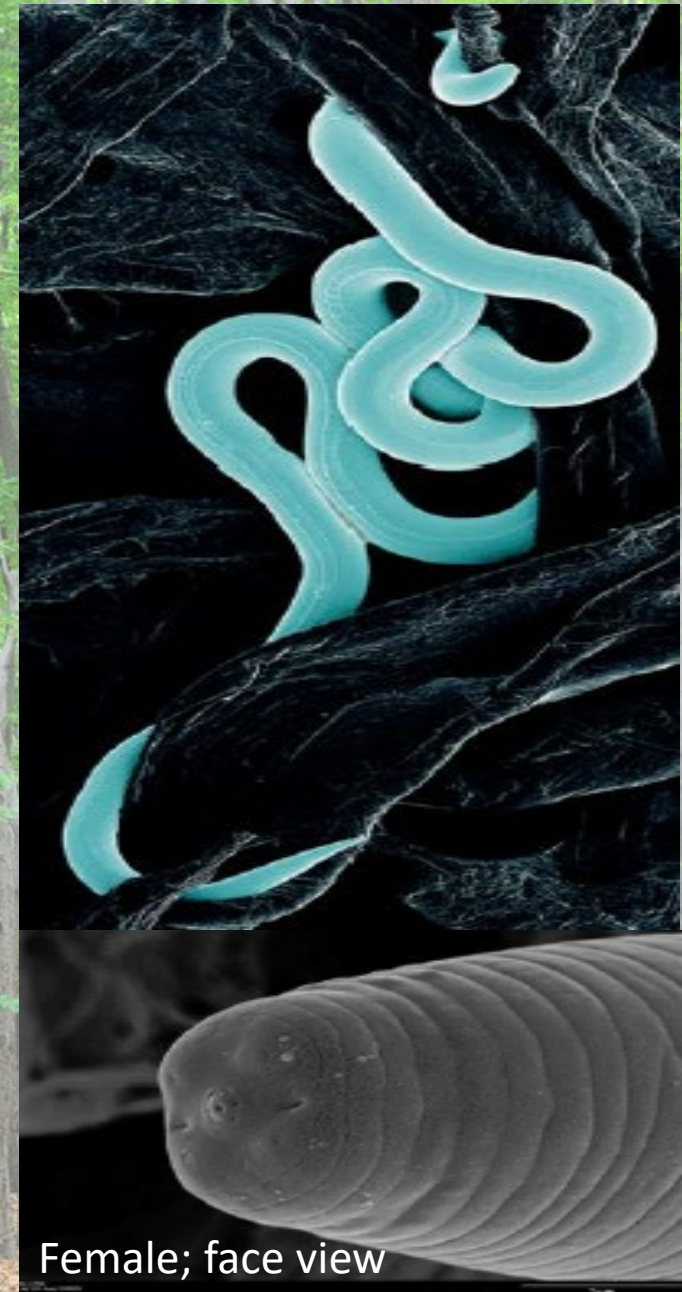
- BLD is found mainly on the American beech (*Fagus grandifolia*), the only beech species native to North America.
- The disease has also been reported on European (*Fagus sylvatica*) and ornamental beeches in nurseries in the United States. This indicates that the risk of the disease may extend beyond a single species.
- Can kill mature trees (6-10), younger trees die more quickly.



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Beech Leaf Disease (BLD)

- Bacterial disease?
- Vectored by a foliar nematode.
- Nematode possibly vectored by birds.
- •No definitive causal agent identified, but growing evidence nematode *Litylenchus crenatae* most likely involved.
- •*L. crenatae* recently described on Japanese beech in Japan

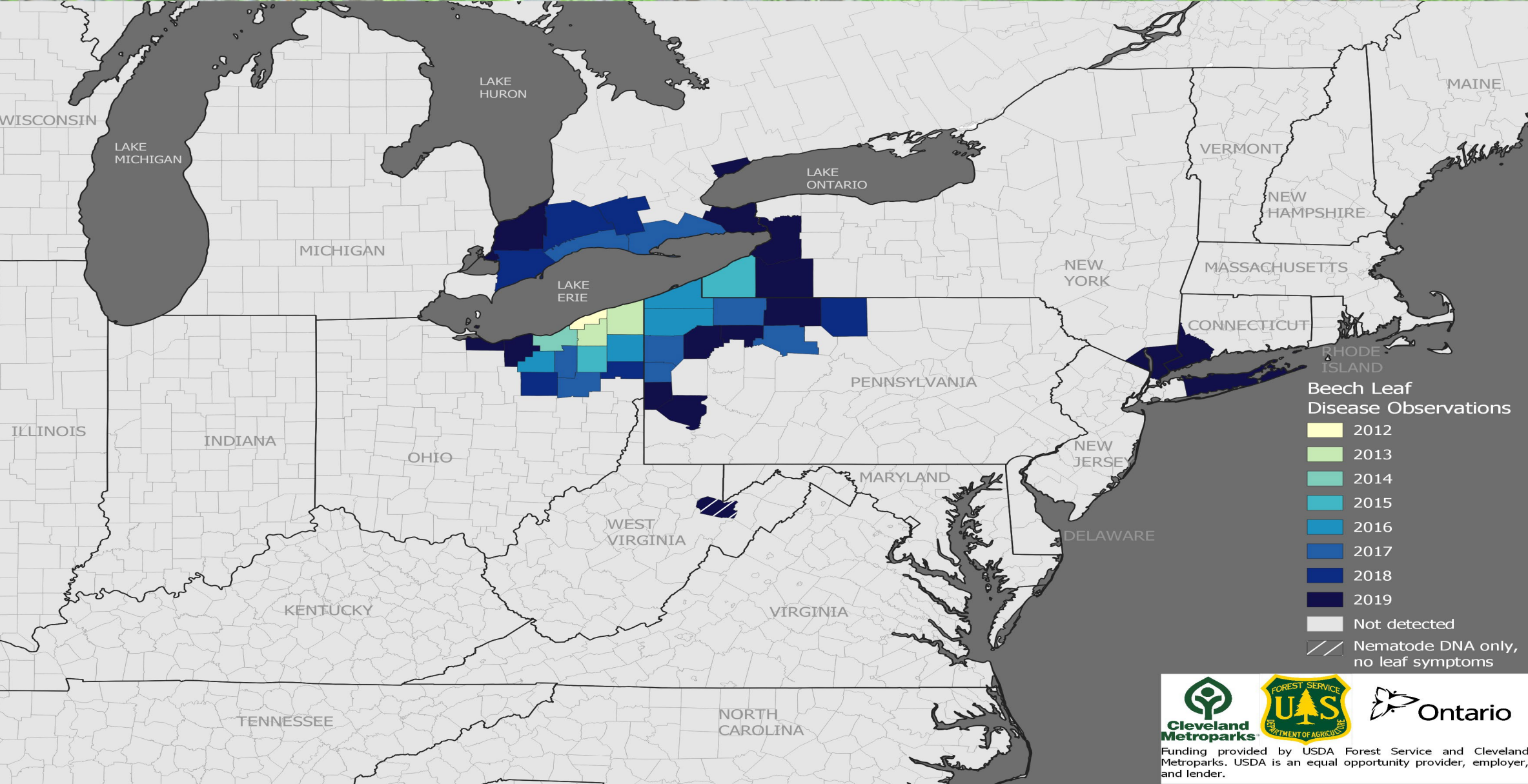


Beech Leaf Disease (BLD)

- *Litlilenchus crenatae mccannii* a foliar-feeding nematode.
- This nematode has an egg stage, several juvenile stages, and an adult stage where both male and female nematodes are present.
- infests leaf tissue, where it causes gall-like growths between the leaf veins.
- Damage appears to occur while the leaf tissue is in the bud.
- Adults of *L. crenatae* penetrate wounded leaf buds, and overwinter in buds as adults and eggs

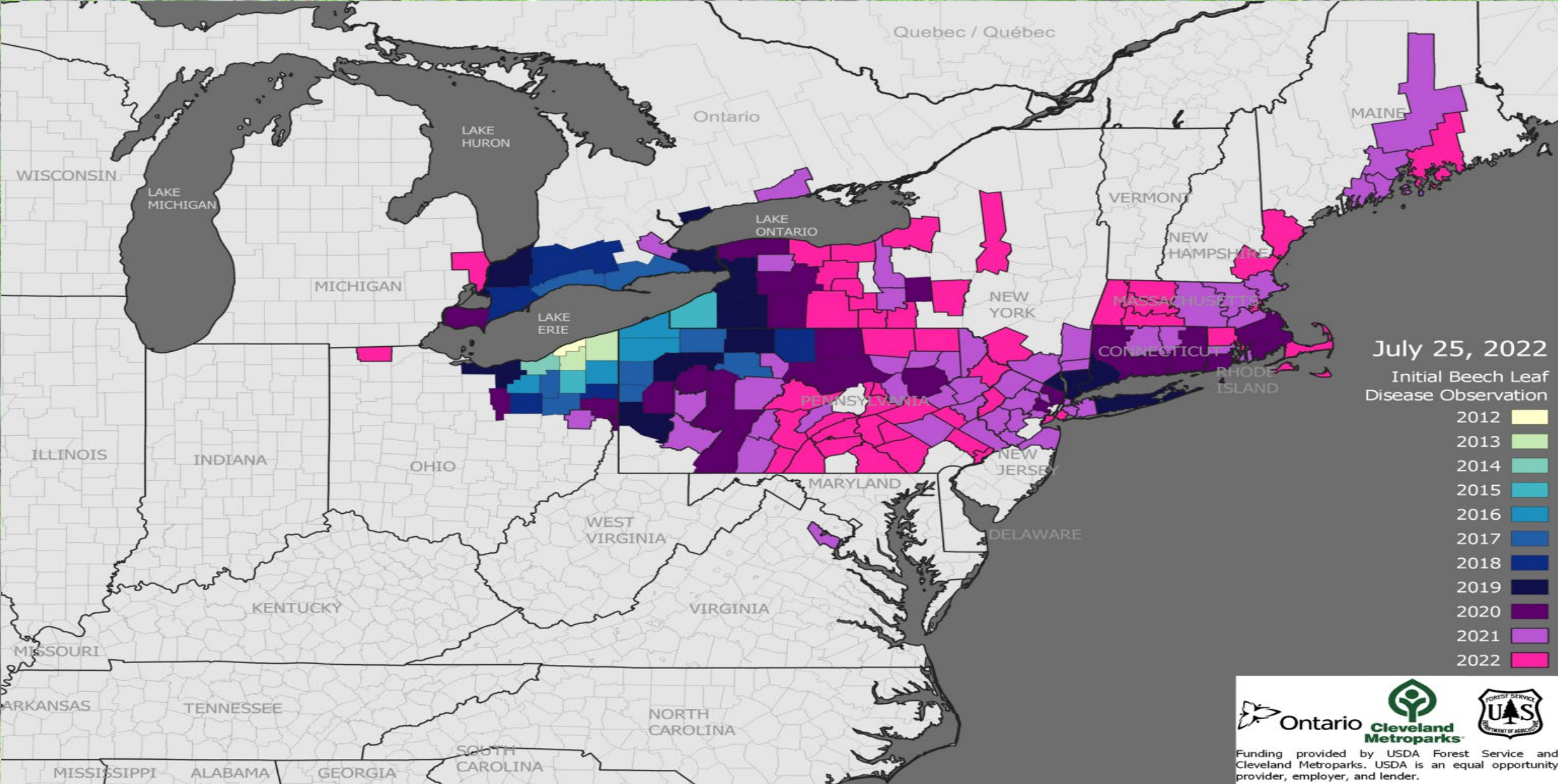


BLD 2020



Funding provided by USDA Forest Service and Cleveland Metroparks. USDA is an equal opportunity provider, employer, and lender.

BLD 2022

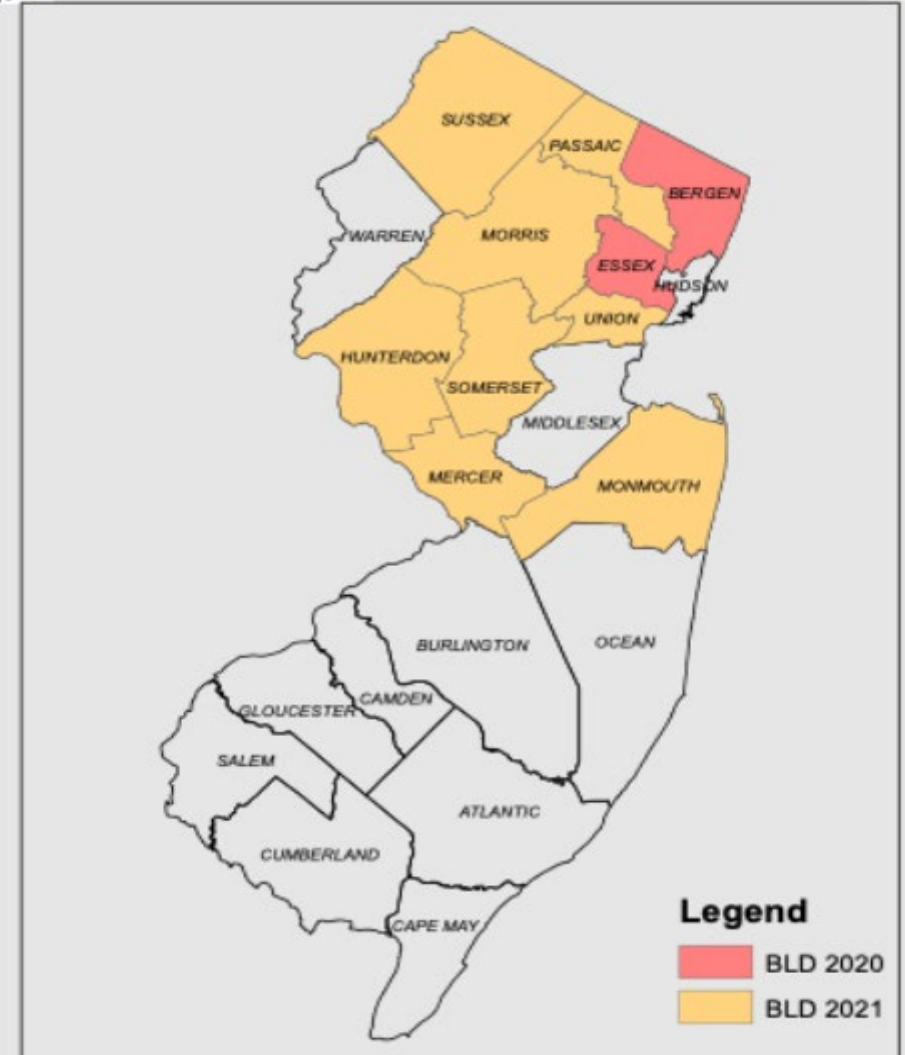


July 25, 2022
Initial Beech Leaf
Disease Observation

Range of BLD in NJ



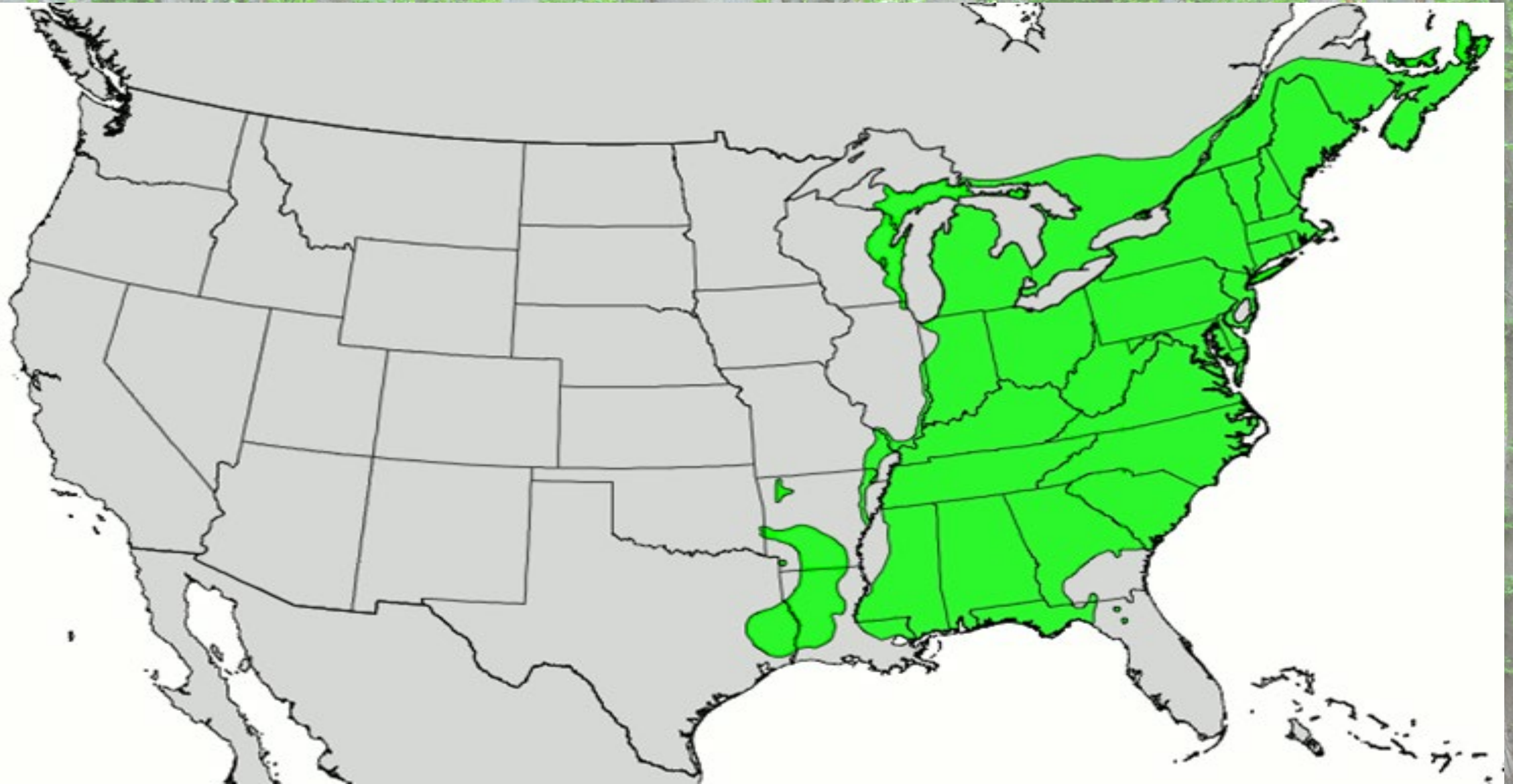
Beech Leaf Disease Detection Map



0 5 10 20 30 40
Miles

NJ Forest Service
Forest Health
August 12, 2021

Range of Beech in North America



2011

2016



Photos: Cleveland Metroparks

- **Causing widespread mortality of American beech understory.**
- **Canopy trees severely impacted.**

What Does BLD Look Like?



Striped Leaf

More severely striped leaves

Reduced leaf-out and branch diebacks

Late flush of non-symptomatic leaves



What Does BLD Look Like?

- Typically progresses from the bottom of the canopy upward.
- Early symptoms include distinct striping between the leaf veins.
- From the top of the leaves, the interveinal discoloration will appear cupped or puckered in appearance.
- After successive years of being infested, leaves will become deformed, chlorotic, and have a thickened, almost leathery texture.
- Photosynthetic capacity is reduced



What Does BLD Look Like?

- These symptoms may be visible from leaf out in May until leaves fall off in October.
- Reduced leaf and bud production may also occur.
- A single tree can contain both heavily infected and unaffected branches.
- Symptoms can be confused with leaf galls.
- Eventually, affected leaves wither, dry, and yellow.



Redbay Ambrosia Beetle/Laurel Wilt Disease

Xyleborus glabratus



Raffaelea lauricola



Distribution of Counties with Laurel Wilt Disease* by year of Initial Detection

December 3, 2020

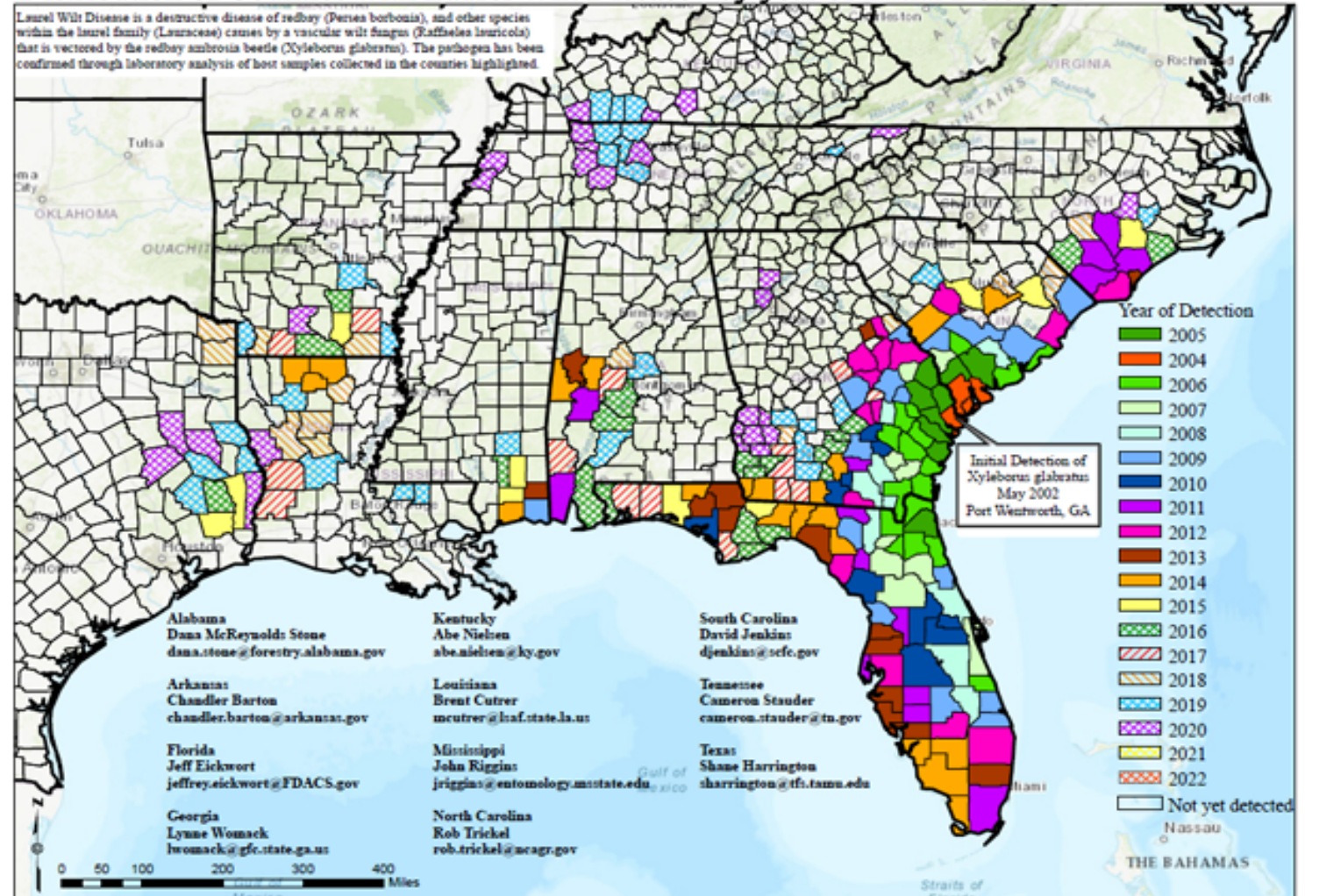


Figure 2. Distribution of counties with laurel wilt by year of initial detection updated December 3, 2020. (Available online: <https://www.fs.usda.gov/main/r8/forest-grasslandhealth> accessed on 29 January 2021).

Redbay Ambrosia Beetle

- *Xyleborus glabratus* is native to India, Japan, Myanmar and Taiwan (Rabaglia 2008).
- In the U.S., *Xyleborus glabratus* was first detected in a survey trap near Port Wentworth, Georgia in 2002 (Rabaglia 2008).
- The pest continues to expand rapidly to new areas posing a threat to redbay and avocado trees in the U.S. and in the countries of Central and South America.



Redbay Ambrosia Beetle

- Redbay ambrosia beetles reproduce best in wood that's dead or dying.
- Beetle and fungus life cycles are perfectly synchronized into a deadly nutritional symbiosis.
- The fungus consumes and grows on the wood, the beetle larvae eat a fungal mycelium called ambrosia.
- The adult beetles go, they carry the fungus along in specialized mouth-pouches called mycangia.



Laurel Wilt Disease (LWD)

- Vascular disease that is caused by the fungal symbiont *Raffaelea lauricola*, which is transmitted by the invasive redbay ambrosia beetle, *Xyleborus glabratus*.
- The disease affects and kills members of the Laurel family (*Lauraceae*).
- The complex is considered a very high risk invasive disease pest complex having potential equal to that of Dutch elm disease or chestnut blight (Global Invasive Species Database 2010).



Laurel Wilt Disease

- Sassafras is why the disease keeps advancing northward, where it is the only known brood host.
- Potential host plants in the Eastern USA will likely include all members of the Lauraceae family such as Asian spicebush , yellow litsea and the threatened and endangered native species pondspice and pondberry.
- Avocados are the commercial tree of concern.



Questions?



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