

GOT WORMS?

Introduction to Invasive Asian Earthworms

Forest-Pest Identification & Management Course

16 January 2019 Canton, NY

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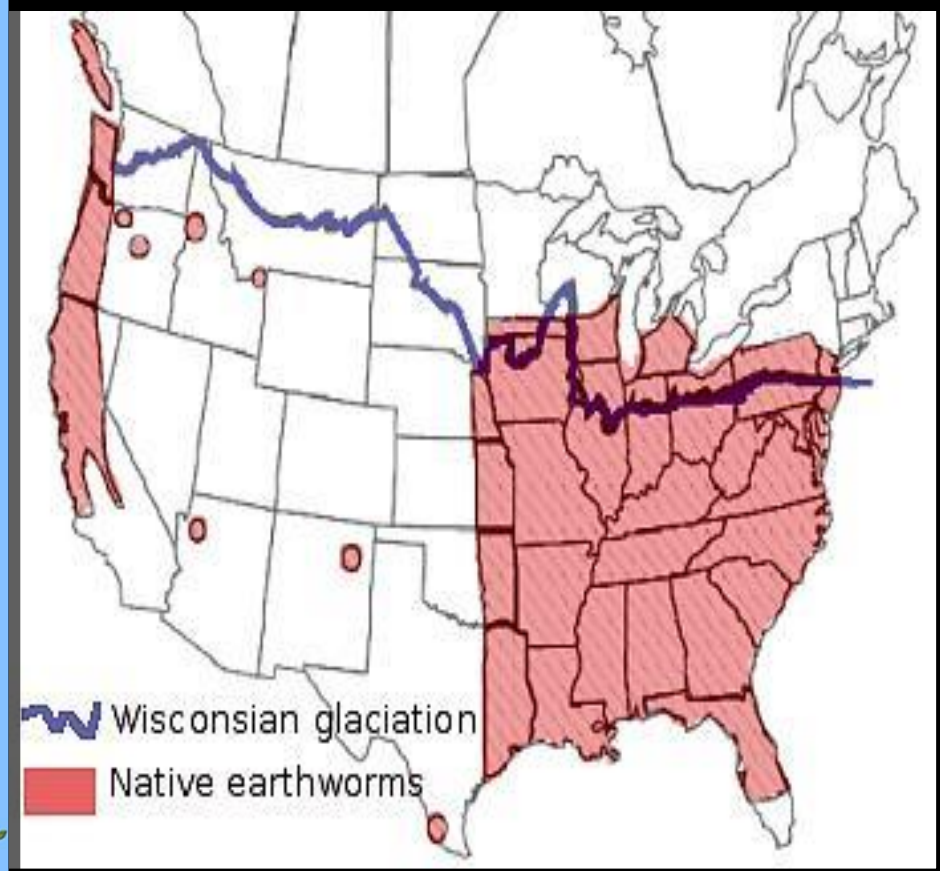
Special thanks to:

**Bernie Williams
Forest Health Specialist
WI Division of Forestry**

There are certain Invasive Species so aggressive, they've actually changed the world as we know it!



Few native earthworms exist in the northern-most reaches of the continental United States. Most species were forced south in the last major glaciation, which ended 10,000 years ago.



SO WHY ARE EARTHWORMS A PROBLEM?



They can be very damaging



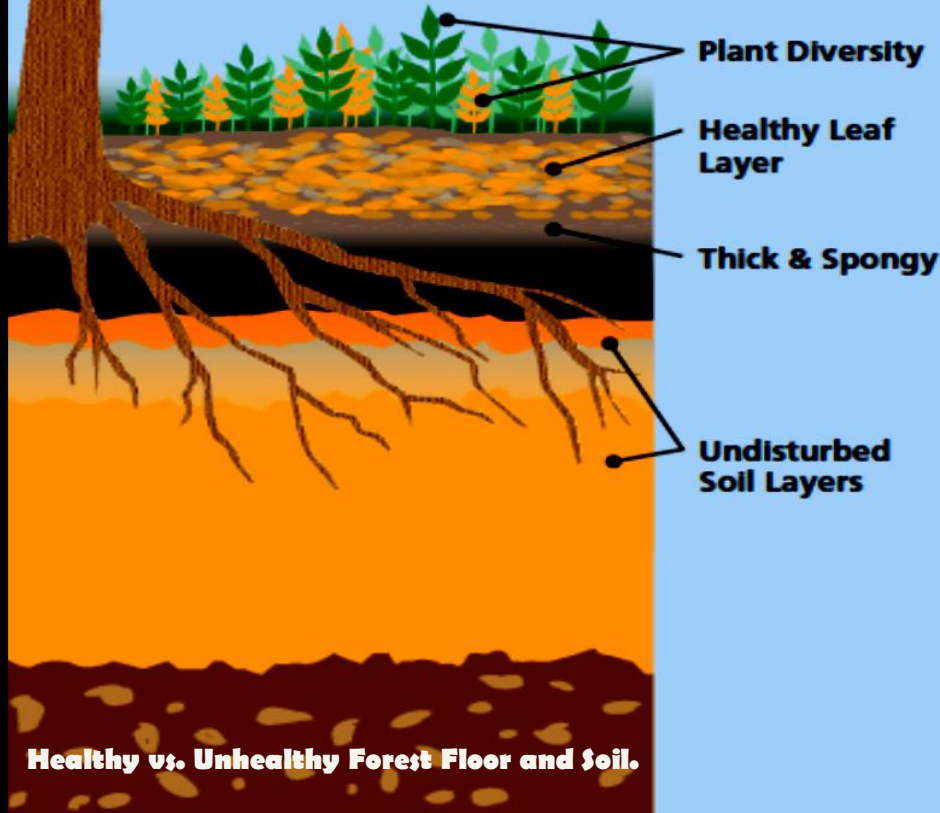
- Loss of the duff layer is the most important impact in sugar maple forests
- Earthworm droppings denser than the native soils compacting the forest floor rather than aerate it.
- Research shows degraded root structures and fewer native seedlings in forests infested with earthworms.



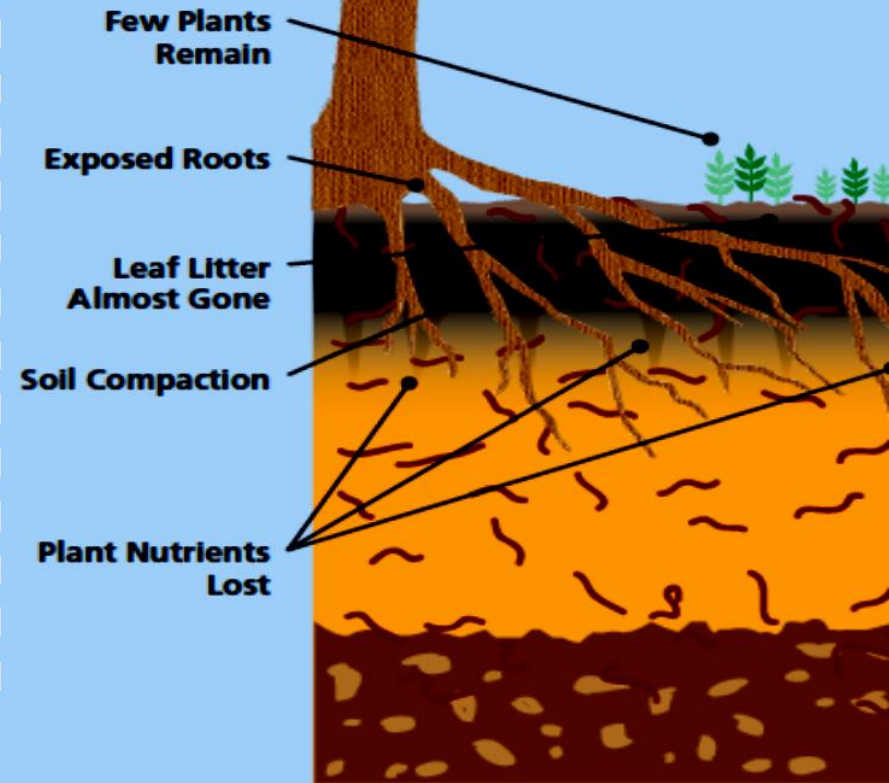
Healthy undisturbed forests are dynamic ecosystems anchored in a complex soil structure that teems with macro- and microscopic life. The key to healthy forests is rich, fungal-based soils where organic matter decomposes slowly

What Happens to the Woods?

Lightly Infested



Heavily Infested



Earthworms have considerable capacity to change the nature of their environment to suit their survival. Ecological requirements (moisture, temperature, and food supply) greatly influence the rates of reproduction and growth.



**What about those
OTHER worms...**

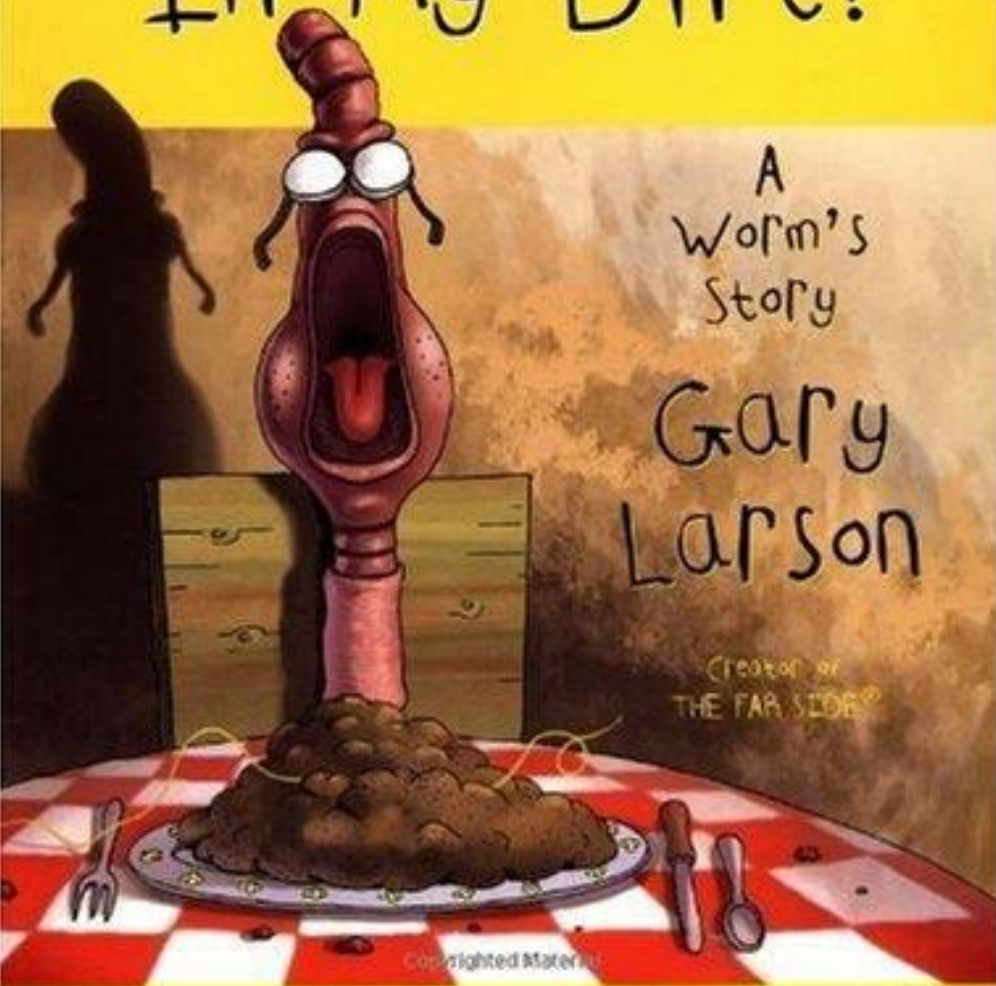
THE NEW YORK TIMES BESTSELLER

There's A HAIR In My Dirt!

A
Worm's
Story

Gary
Larson

Creator of
THE FAR SIDE®



Most worms feed
within the soil layers.

Asian earthworms are
detritivores, **feeding
on leaf litter on top
of the soil.**

Amyntas and Metaphire spp.

(4 *Amyntas*, 1 *Metaphire*)

A.K.A. Asian Jumping Worm, Crazy Worm, Snake Worm,
Alabama/ Georgia Jumper, etc. etc.

PROHIBITED species in New York State under the ECL.

The 1st population in northern forests = Wisconsin, 2013.

First confirmation in NYS Northern Tier = 2018 (St. Lawrence Co.)

This secondary invasion of Asian species
has not been studied until recently, and is
not at all well understood.

WHERE ARE THEY?

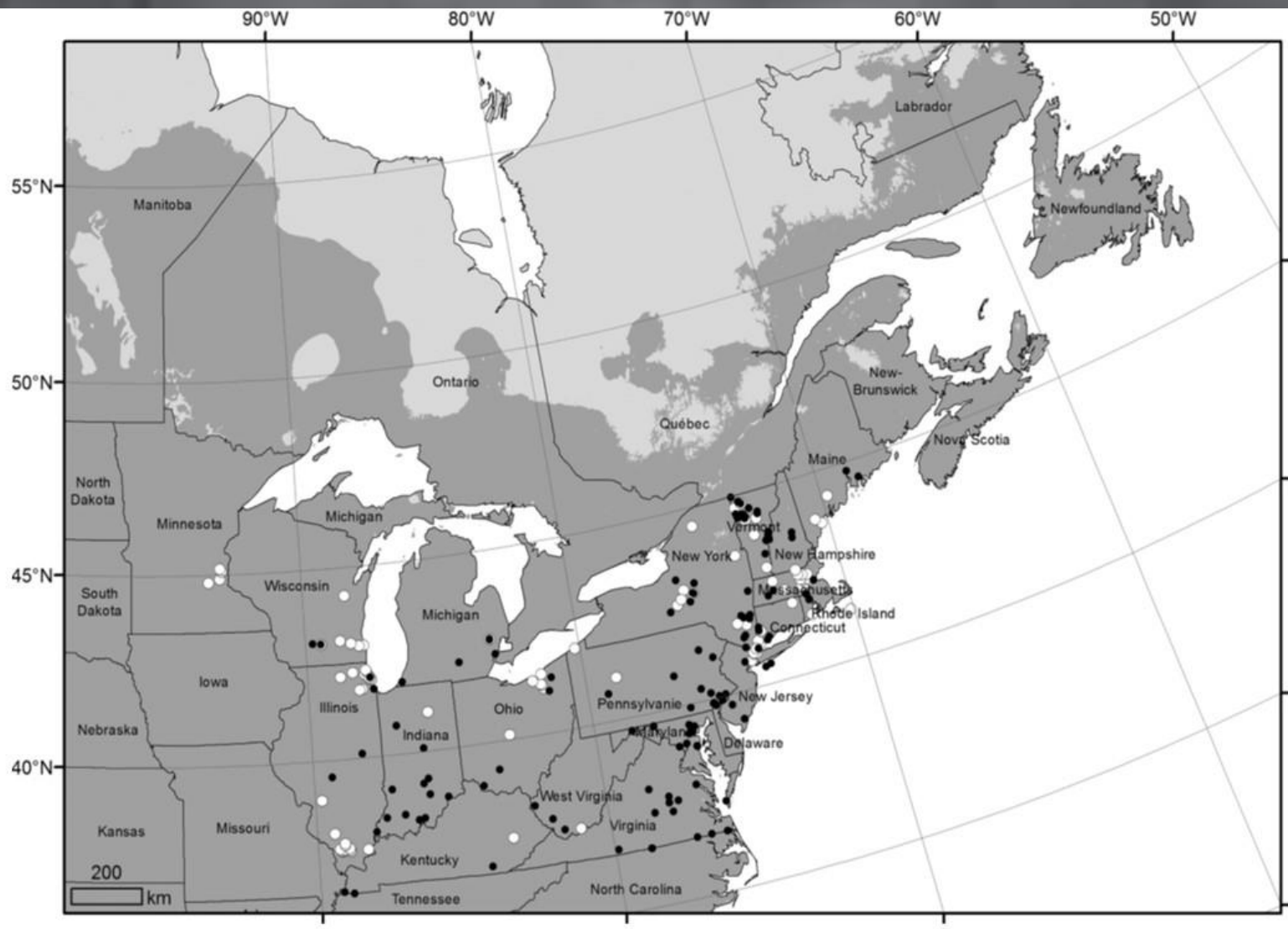
“Asian earthworms are present in all NE US states. Their distribution has now reached the Canadian border, particularly along the Michigan–Ontario, New York–Ontario, Maine–New Brunswick, and Vermont–Quebec frontiers. Only one report has come from Canada, in Ontario.

Climate and soils in much of eastern Canada are conducive to a further northward expansion.”

—Jean-David Moore

Asian jumping worms are invading areas around the globe, including North & Central America, Europe, and now WI, NY, VT, NH, ME





ARTICLE: “Exotic Asian pheretimoid earthworms (*Amyntas* spp., *Metaphire* spp.): Potential for colonisation of south-eastern Canada and effects on forest ecosystems”

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5 spp. of Asian worms known in NY State



OUR NEW FRIENDS

Color photographs of live individuals of
(A) *Amyntas agrestis*, (B) *Amyntas corticis*,
(D) *Amyntas hupeiensis*, (G) *Amyntas*
tokioensis, (I) *Metaphire hilgendorfi*,

IDENTIFICATION

- Overall dark, almost gray
- Glossy smooth skin
- Clitellum **light; flush** to body
- Very **animated**: thrash, jump
- Large adult size: 20 cm./ 8"
- **Snake-like, remains on surface**
- Sheds tail when handled







Check your property for Asian worms using a dilute mustard solution. Mix 4 L. of water with 40 g. of ground yellow mustard seed, & pour slowly into the soil. This will drive any worms to the surface. If you have jumping worms, report it and avoid moving plants or soil from your yard.

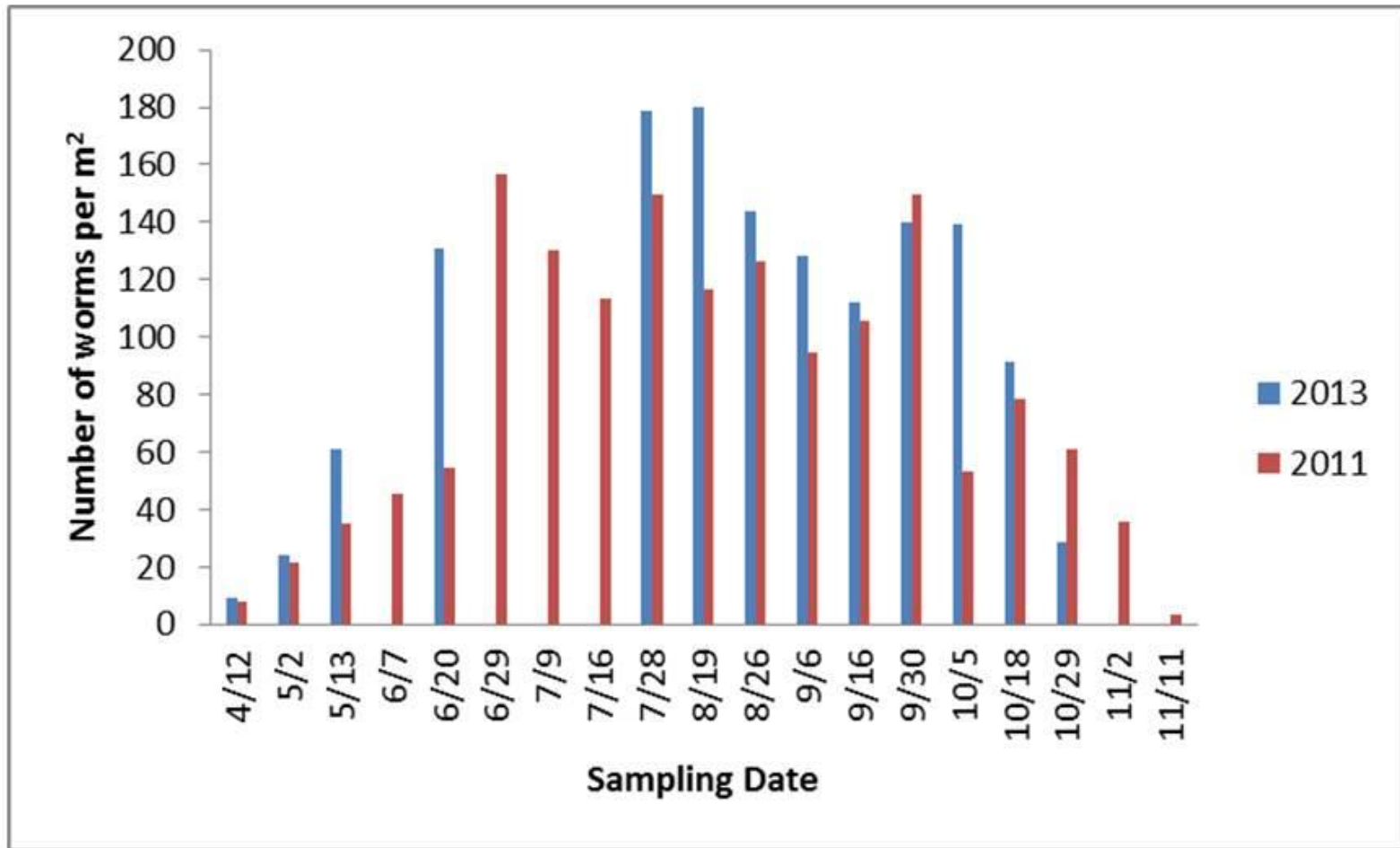
What do they do?

- Mature in 60 days, 2x faster than Lumbricidae spp. = 2 (3) hatches/ season.
- Voracious appetites –remove duff layer down to mineral soil.
- Cocoons winter over, cold-hardy to at least -40 C/F
- Adaptive to varied habitats and temperature regimes.
- Eliminate other earthworm spp., other invertebrates.
- Produce unique soil signature = more erosion & compaction
- Rob the soil seed bank, inhibiting normal regeneration.
- Eliminate ground-nesting birds.
- Eliminate native ground cover, setting the stage for invasive plants.
- Parthenogenic – asexual reproduction—it only takes one to start a family.

Another Fun Fact: They're Toxic.

- **Asian worm species kill off all other species of earthworms. The mechanism is not known.**
- **Salamander health deteriorates in the presence of Asian worms.**
- **Many amphibians, some birds will spit out Asian worms, or at least not eat a second helping.**
- **Make soil less hospitable to mycorrhizae, critical for forest health.**

Seasonal Population Dynamics



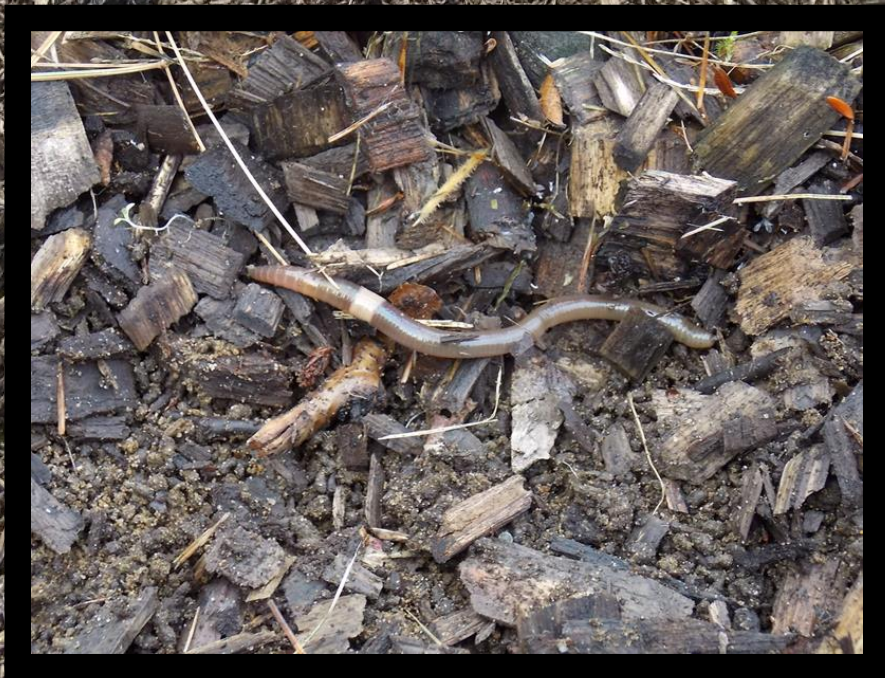
HOW ARE THEY SPREADING?

Asian earthworms are closely intertwined with horticulture.





HARDWOOD MULCH











Moving soil from one place to another, the horticultural trade can facilitate the passive spread of invasive earthworms.

A single Asian worm stowed away in a potted plant can go home with a customer and start a new infestation.

Dispose of bait responsibly!



Dispose of Bait Worms in the Trash

Contain Your CRAWLERS!

[/invasives](http://invasives)

WHO IS IMPACTED?

- Farmers
- Foresters
- Gardeners
- Homeowners
- Commercial composting operations
- Landscapers
- Nurseries
- Cities, Towns, Municipalities
- EVERYONE

WHAT CAN WE DO?

Best Management Practices (BMPs) & Reasonable Precautions

Reasonable precautions = taking actions which prevent or minimize the transport, introduction, or possession of invasive species. Includes but is not limited to **BMPs** for invasive species.

Reasonable Precautions

- Educate yourself and others to recognize Asian worms and their signs.
- Arrive clean, leave clean: If possible, power-wash trucks & equipment between sites.
- Check site: turn over a few stones, logs—Asian worms are active June-November
- Seedlings for reforestation should be bare-root. Check shipping media carefully.
- Check nursery plants before you purchase
- Know the origin of any topsoil, mulch, and compost you purchase.

BMPs for the nursery trade

- **Inspect all incoming plant material, place in quarantine area before moving it onsite.**
- **Heel B&B stock in gravel, properly composted material, or wrap balls in plastic.**
- **All plants should be stored and held using an air gap between soil and plant/container or on a surface barrier preventing soil contact.**
- **Inspect all plants before shipping offsite.**

Does anything eat them?



The early bird
ate too many worms
and died



Be nice to moles!



CAN WE KILL THEM?

Still working on that...

Research indicates that tea seed meal, a natural by-product of tea oil manufacture, and containing natural surfactants called saponins, is effective for expelling earthworms. The mode of action is similar to that of mowrah meal, a mainstay for managing earthworms on golf courses a century ago. Tea seed meal has been formulated into an organic fertilizer (Early Bird™ 3-0-1) suitable for use on fairways and putting greens.



Closing Thoughts

Questions?

