Introduction to Invasive Jumping Worms

Ohio MGV Lunch and Learn

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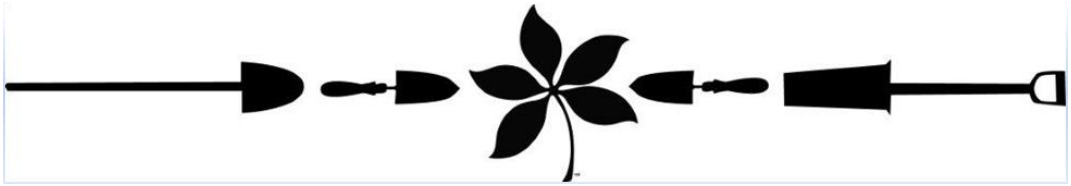
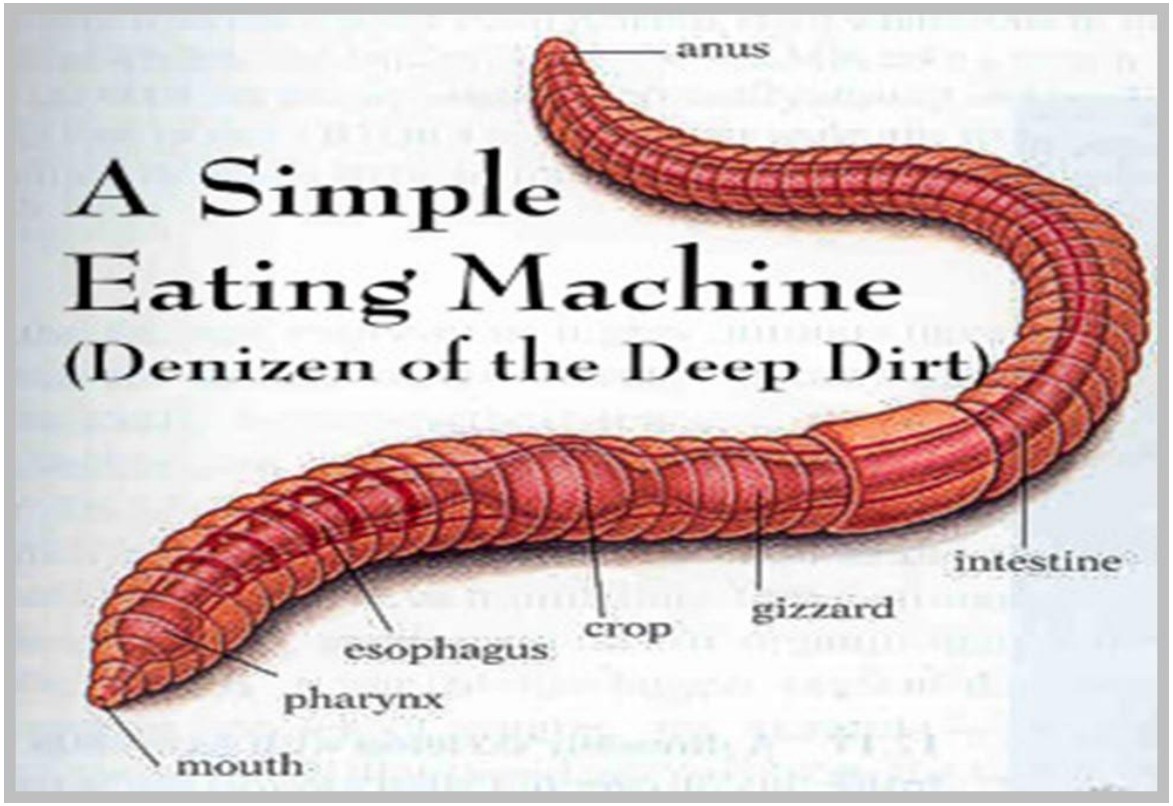


- Not an expert on Jumping Worms
- Learned about them in 2020 from:
  - -Franklin County MGV Joanne Dole
  - -Brad Herrick, University of Wisconsin Arboretum

Arboretum
UNIVERSITY OF WISCONSIN–MADISON

Earthworm Biology



Earthworm Functional Groups

- Epigeic – litter dweller
- Endogeic – topsoil dweller
- Anesic – subsoil dweller

Changes to the Soil Environment

Earthworms influence the physical, chemical, and biological properties of the soil through:

- Burrowing
- Casting
- Feeding
- Mucus secretion
  Death/decomposition

The effects of the above depends on the functional group of earthworms.

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<u>Physical</u>

- Mixing of the soil profile
- Incorporation of organic materials
- Water infiltration & holding capacity
- Soil aeration
- Soil erosion
- Soil structure & aggregate formation

<u>Chemical</u>

- Nutrient pools and dynamics
- Change soil cation-exchange capacity

<u>Biological</u>

- Micro/Macro organisms
- Nematodes
- Food source for birds and mammals
- Plant productivity

Amynthas spp. (Jumping worm)

- Native to Asia; commonly found in grasslands
- Hundreds of species and affiliated genera worldwide
- Three most common species that co-occur in upper Midwest include:
  - *A. tokioensis*
  - *A. agrestis*
  - *M. hilgendorfi*
- All three are epi-endogeic and parthenogenic

Amynthas

Lumbricus rubellus

	Amynthas	*Lumbricus rubellus*
Length:	**7 to 20 cm**	**2 to 8 cm**
Life Cycle:	**Annual; over-winters as cocoon**	**Burrows into soil during winter**
Skin:	**Darker dorsally than ventrally, slightly rigid**	**Reddish-brown**
Clitellum:	**Milky white, annular, smooth**	**Raised, pink/red, "saddle" shape**
Clitellum from segments 14-16		**Clitellum from segments 26-32**
Behavior:	**Very active, snake like**	**Less active, "wiggly"**
Casts:	**"Coffee grounds" soil signature**	**Dispersed casts**
Loses its tail when handled roughly		**Will not drop tail**

Earthworm Comparison

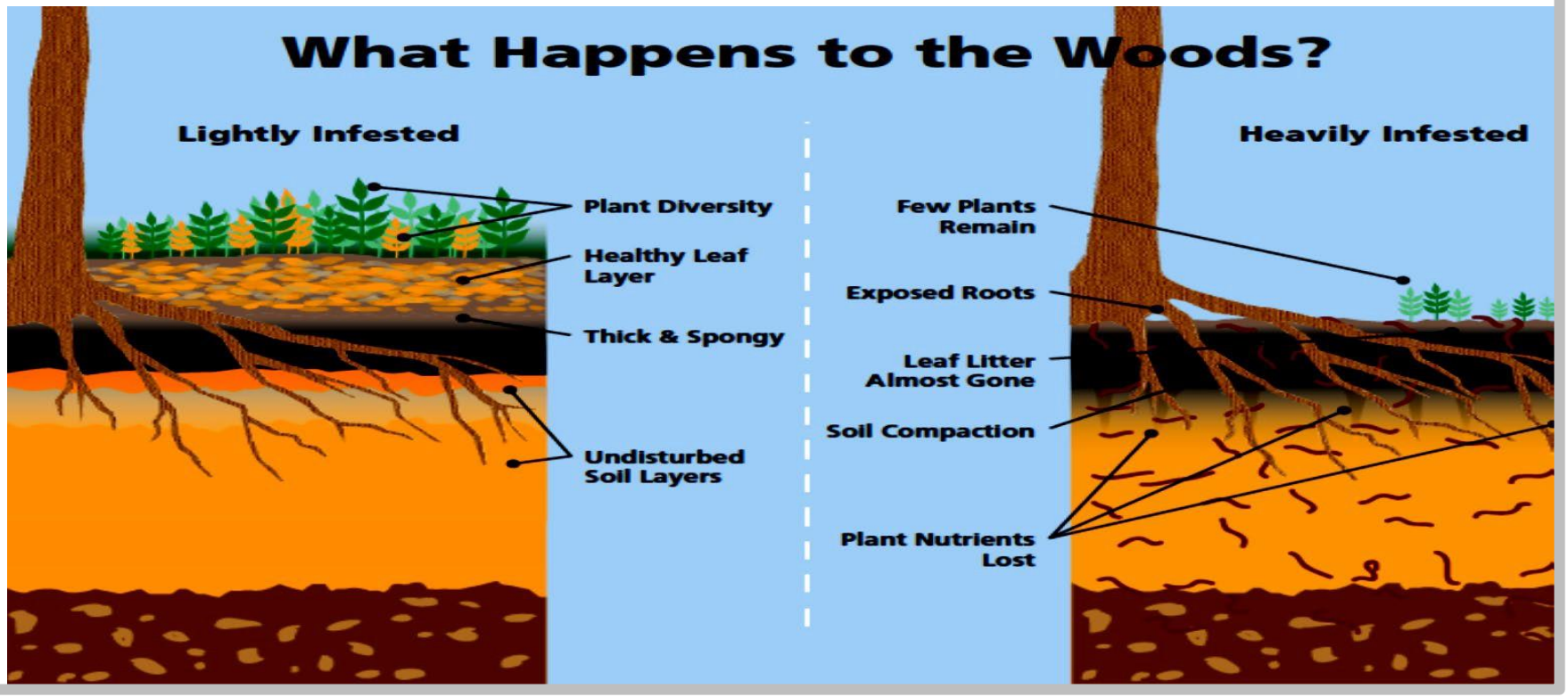

Asian Jumping Worms
Joanne Dole©


Closeup of Clitellum
Asian Jumping Worm
Mike Hogan, OSU Extension©


IN GOD WE TRUST
LIBERTY
1983


Westcott
MADE IN ENGLAND

Giant Gippsland Earthworm


What Happens to the Woods?
Lightly Infested
Heavily Infested
Plant Diversity
Healthy Leaf Layer
Thick & Spongy
Undisturbed Soil Layers
Few Plants Remain
Exposed Roots
Leaf Litter Almost Gone
Soil Compaction
Plant Nutrients Lost

Why Should We Be Concerned?
Effects of Earthworms on Forest Ecosystems:

- Significant reduction in litter layer in deciduous forest
- Loss of native plant diversity
- Increase in non-native invasive species
- Soil nutrient dynamics

The thinking is that the effects of Jumping Worms will be even more pronounced

Why should we be concerned?

But wait, aren't earthworms good for my garden?

Why should we be concerned?

Answer: Yes and no…

- Urban gardens and large scale agriculture often have compacted soil that need amendments.
- Deep dwelling earthworms like common night crawlers, create tunnels. These tunnels allow air and water to reach roots

Why should we be concerned?

- Earthworms eat organic matter, such as dead leaves, grass clippings, and even soil. After they digest their meal, they produce excrement called castings that helps enrich the soil further.

- These castings helps gardens grow because they’re rich in phosphorus, calcium, nitrogen, and magnesium. These are all important nutrients for plant growth.

Why should we be concerned?

However,

- Jumping worms live under the leaf litter and in the top few centimeters of soil, thus they are not effective at aerating the soil.
- They may create too much pore space, thus drying out the soil.
- Jumping worms can create very loose top soil which is highly erodible (castings).

Why should we be concerned?

- Soil may become too loose for plant roots to establish, or established plants may decline in health.
- Jumping worms can turn over nutrients too fast, like a quick release fertilizer.
- At high abundance jumping worms can destroy turf grass.

- In some instances jumping worms will eat plant roots.

How do they spread?

How do they spread?

How do they spread?

How do they spread?

How do they spread?

How do they spread?

How do they spread?

How do they spread?

What can we do?

Best Management Practices (BMP's)

1. Watch for jumping worms and signs of their presence.

2. Educate yourself and others to recognize jumping worms.

3. Only use, sell, plant, purchase, trade landscape and gardening materials and plants that appear to be free of jumping worms.

4. Only sell, purchase or trade compost that was heated to appropriate temperatures and duration following protocols for reduction in pathogens.

5. Arrive clean, leave clean. Clean soil and debris from vehicles, equipment and personal gear before moving to and from a work or recreational area.

Stop the Spread!

What can we do?

Earthworm Sampling

- Mix 1/3 cup dry mustard powder with 1 gallon of water.
- Remove leaves and other litter from soil surface.
- Pour half of the solution over 1 square foot of soil.
- Wait for a few minutes, then pour the other half.
- Collect earthworms as they come to the surface.

What can we do?

- Recent research shows that jumping worm cocoons will not survive 40°C (104° F) (Johnston and Herrick, 2019)
- Commercial composters are required to heat piles to at least 55°C (131°F) for at least 3 days.
- Fire significantly reduced viability of jumping worm cocoons (Ikeda et al., 2015)

What can we do?

- Consider reducing the amount of wood mulch applied to your garden.
    - Purchase mulch from a reputable source. Nurseries should know about the jumping worm.
- Experiment with pine needles, hay, or native grass mulch
- Experiment with heat applications (solarization, steam, torch, etc)

What can we do?

- Report finds in Ohio: go.osu.edu/asianjumpingworms
- Great Lakes Early Detection Network
- iNaturalist

Resources

Wisconsin Department of Natural Resources

http://dnr.wi.gov/topic/Invasives/fact/jumpingworm/ind ex.html

UW-Madison Arboretum (Land Stewardship; Research)

https://arboretum.wisc.edu/

Great Lakes Worm Watch

http://greatlakeswormwatch.org/

www.youtube.com/watch?v=tlfbNuegJO

Questions?