

All About Jumping Worms



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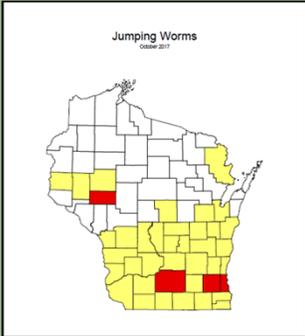


What Are Jumping Worms?

- They are an invasive non-native species of earthworm from Asia
- Thought to have arrived in infested plant material
- Are also found in other states
- The first population was identified in 2013 in Dane County
- They are called jumping worms because jump and thrash around when disturbed
- Other species of earthworms we commonly see in the area are also not native (they are European) but are less destructive



Where are Jumping Worms?



Most likely, they are in other areas of the state and have simply not been reported or found yet

Patchy distribution within counties

Faster spread in urban areas due to compost, leaves, mulch and plant material being moved around

Why are Jumping Worms a Problem?

Note: All earthworms do this, but to a lesser degree than JW

What Happens to the Woods?



Jumping Worm Effects on Forest Soils



When a forest becomes heavily infested with earthworms the leaf litter is depleted and the soil is vulnerable to invasive species which in turn causes a decrease in the diversity of native plants and animals.

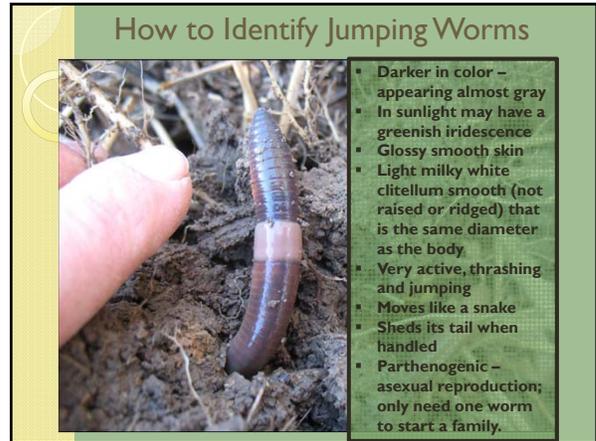
JW Effects on Forest Soils

Earthworm droppings denser than the native soils compacting the forest floor rather than aerate it.

Earthworms impact seed bank compositions through germination and seedling survival.

Research shows degraded root structures and fewer native seedlings in forests infested with earthworms. (*slight variation depending on worm species and functional group)

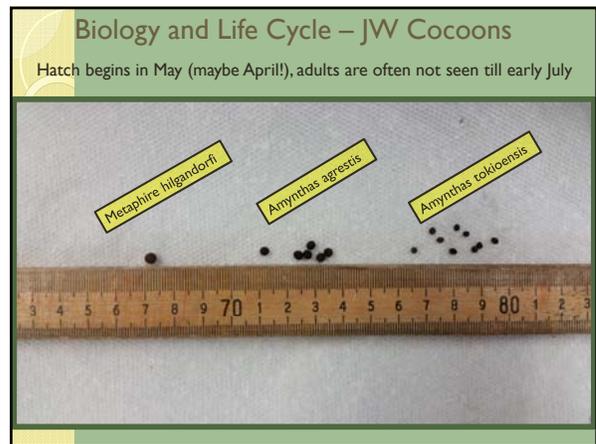
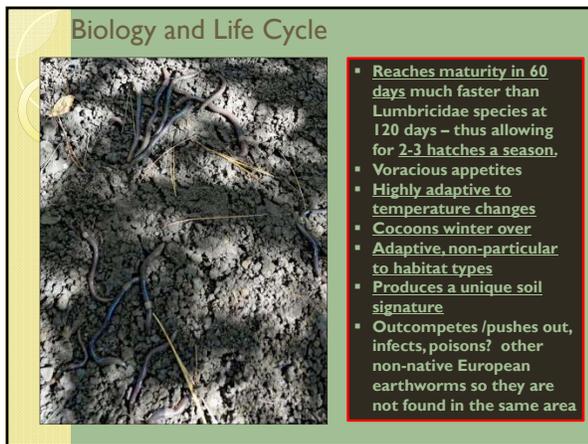


ARBORETUM
University of Wisconsin-Madison

Earthworm Comparison

<i>Amyntas</i> spp.	<i>Lumbricus rubellus</i>
	
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



Biology and Life Cycle – JW Cocoon



How are Jumping Worms Spread?



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

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

How are Jumping Worms Spread?



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Thanking Dinner For Worms

What Can Be Done to Slow the Spread?

- Plant Sale Protocols Example
 - Dane County UWEX Master Gardener Plant Sale Protocols
 - Scout properties first (fall before and spring)
 - Rinse roots at donating property and leave rinsate and soil at donating property
 - Clean tools, shoes, wheelbarrow tires, etc. before leaving site
 - Repot at sale site with clean soil and clean pots
 - Treat with Early Bird™
 - Store plants off ground
 - We still do not guarantee JW-free
- Check plants purchased at garden centers, especially if stored on-ground
 - Ask vendor what their protocols are
 - Pull out of pot if you'd like, but realize that early in season, cocoons will not be visible

What Can Be Done to Slow the Spread?

GENERAL LANDSCAPE AND NURSERY PRE-ACTIONS

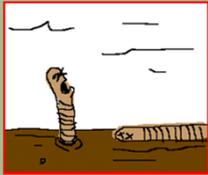
1. **GENERAL LANDSCAPE AND NURSERY PRE-ACTIONS**
 - Landscaper must wear for disposal of all proper soil.
 - Clean and hose off tools, boots and gloves before entering the propagation facility or moving from one site to another.
 - Clean large equipment and trucks as needed before entering from an off-site location or in the propagation facility.
 - Rinse all incoming plant material, place in quarantine area for observation time before introducing to production areas.
 - Landscaper should avoid using heavily composted material, or wrap bags in plastic or other material to keep soil from dispersing.
 - All plants should be inspected and kept separate on site before the soil and plant combine or an effective barrier between existing soil contact.
 - Report all plants before leaving site.
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What Can Be Done to Slow the Spread?

- Do not use 'free' compost from yard waste facilities that are not heating or storing properly
- If you purchase compost, all composting companies are required to follow NR 502.12 if they are licensed by the DNR.
- Compost piles are best stored on a cement pad
- The compost piles are required to hold a temperature of 131 degrees for 15 days and the windrows/piles must be turned 5 times to ensure even distribution of temps.
- They are required to keep books logging the process since they can be inspected by the DNR at any time.
- Realize this still does not absolutely guarantee JW-free but significantly lessens possibility of worms/cocoons

How Do I Kill Them If I Have Them?

- We don't have a good answer for this yet, but there are some things you can do
 - Dig and purge (raised beds and containers)
 - Early Bird™ Fertilizer (only for experimental use)
 - Biochar (only for experimental use)
 - Chickens like them!
 - Moles like them!



Early Bird Fertilizer

FOR EXPERIMENTAL USE ONLY!

- Not labeled as a vermicide, but DATCP has approved it for this off-label use in Wisconsin
- Organic; tea seed meal is the active ingredient
- Analysis: 3-0-1
- Granular or liquid formulations
- Causes membrane irritation and worms come to the surface, desiccate and die
- All worms are affected, but apparently other soil macro-fauna are ok according to Arboretum research
- Does kill cocoons in lab, but not in soil
- 6 lbs/1000 sq. ft on bare soil, more needed on mulched areas (no recommendations given on needed amount, dependent on mulch depth among other factors, but it is a fertilizer so should not be over-applied)
- Expensive \$75/50 lb bag retail at Paradigm Gardens in Madison, or \$50/50 lb bag at DHD Tree And Turf in Juneau (not sure if they deliver)
- Must be heavily watered in (1-2"), especially if garden bed is mulched





Biochar

- Research is proceeding on this as a control
- Biochar is charcoal used as a soil amendment.
- Biochar is a stable solid, rich in carbon, and can endure in soil for thousands of years.
- Like most charcoal, biochar is made from biomass via pyrolysis.
- Need very fine grade (not chunks) and must be worked into the soil
- Local suppliers??
- For more scholarly info about biochar than you ever wanted to know: <http://biocharfarms.org/farming/>




Mustard Powder

- Recipe: 1/3 a cup of mustard powder to a gallon and a half of warm water
- Used to monitor for worms (liquid extraction)
- Does not kill them, but expels them
- <http://www.bulkfoods.com/>
- <http://www.bulkfoods.com/herb-seeds-distributor/2532-Mustard-Powder-25-pounds.html>
- May not be useful on large scale
- Mustard and the water act as a chemical reaction. The effectiveness of the mustard as an irritant that makes them uncomfortable only lasts for about 30 minutes. Then it just becomes stinky water that if left to ferment can empty a room
- Soil effects? Macrofauna effects?




Summary

- JW is widespread in Wisconsin and is not going away
- Much research is needed; we are still learning about JW
- Sanitation practices are needed to slow the spread
- Control measures are not a panacea and more research needs to be done here as well



Thank you!

Thanks to
Bernie Williams, DNR
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JW information

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