UNIVERSITY OF MOUNT UNION HUSTON-BRUMBAUGH NATURE CENTER

BRUMBAUGH Bytes

The 2022 Spread of Invasive Jumping Worms (*Family Megascolecidae*) at the Huston-Brumbaugh Nature Center

Featured scientist: Elizabeth Regovich from University of Mount Union

Collaborating scientists: Chris Stanton, Director Huston-Brumbaugh Nature Center, University of Mount Union

Research Background:

Jumping worms (JW) are a group of invasive earthworms originally from Asia, with about 16 different species that fall into this category. They were first reported in the United States over a century ago, back in 1905, but have only recently been found in Ohio. Scientists are worried about these worms because they can dramatically change the forest floor.

Figure 1. An adult JW with clitellum.

Unlike the earthworm students might be familiar with, jumping worms rapidly consume the layer of fallen leaves (called leaf litter) that normally decompose slowly and provides important nutrients for plants, fungi, and animals. By breaking down this material too quickly, jumping worms can disrupt nutrient cycles in the soil, harm native plants, and alter entire ecological communities. At the Huston-Brumbaugh Nature Center (HBNC), jumping worms were first discovered in July of 2021, raising concerns about their potential impact on the local forest ecosystem.

In 2022, student researcher Lizzie Regovich studied where jumping worms are found on HBNC property, how they might have arrived, and how they could affect the forest floor.

Research Questions:

- How did jumping worms get to the HBNC?
- Where are they located now?
- Are they spreading?
- How might they impact forest communities?

Hypothesis:

If jumping worms are invasive and spread easily, then they will be found in multiple areas of HBNC, especially in disturbed soils like mulch beds, and will have visible impacts on soil and leaf litter.

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HBNC Environmental Education Outreach Coordinator
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To answer these questions Lizzie searched for the presence of JW from June 1 to Aug 12, 2022 at three different locations: (1) Nature Center, (2) Research Reserve, and (3) Ball Research Area. Sites 1 & 2 are located closely together (Figure 3) and site 3 is located about 45 minutes SW of HBNC.

In these areas, observation of soil conditions and communities were noted, and JW were measured for approximate length every two (2) weeks to determine growth rate and maturity.

Scientific Data:

Figure 2. Highly disturbed soil conditions from flower bed at the HBNC.

Figure 3. *iNaturalist* map of JW locations on sites 1 and 2. Site 2 (Research Reserve) is circled on the map.

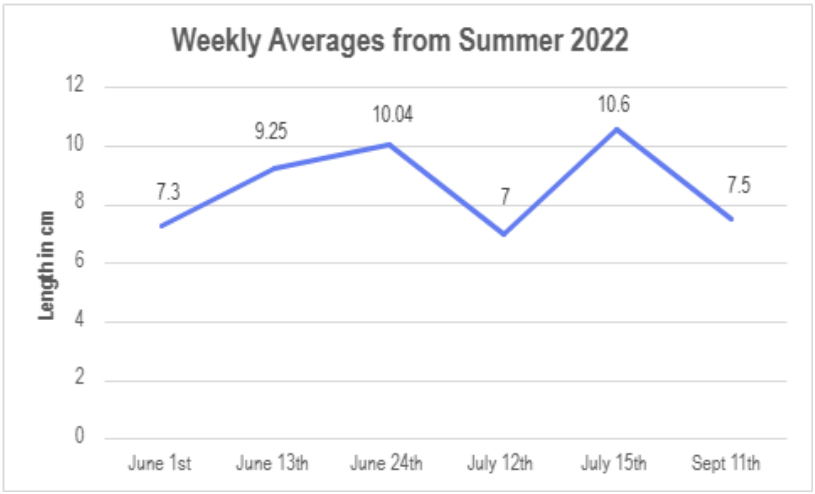

Figure 4. Average length of JW during summer 2022.

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Summary of the Data:

Arrival at HBNC	Jumping worms were likely introduced in October 2020 through a mulch delivery from a local nursery.
	They then spread further through the movement of mulch and compost around the property.
Distribution	Found throughout much of the HBNC property and the Ball Research Forest.
	Not found in the HBNC Research Reserve.
	Spread seems to follow drainage patterns, moving from higher elevations to lower areas.
Soil & Leaf Litter Impacts	Where jumping worms were present, the soil looked granulated (crumbly, like coffee grounds).
	Leaf litter (the natural layer of fallen leaves on the forest floor) was reduced.
	In these areas, researchers observed fewer invertebrates and no red-backed salamanders, species normally common in healthy leaf litter.
Growth & Maturity	Worms were measured every 2 weeks.
	By July 19th, they reached sexual maturity (around 11 cm long) and developed the clitellum (a ring-like structure indicating adulthood).
	Average worm length increased over the summer but showed dips on July 12 and September 11, likely due to the presence of newly hatched juveniles and changes in sampling conditions.
Predators	Jumping worms were observed being eaten by raccoons, turkeys, and toads.

Guiding Questions for Students

1. Where were jumping worms first observed at the HBNC, and how did they likely arrive?

2. Looking at the data, what soil changes were observed where jumping worms were present?

3. How might jumping worms affect other organisms like salamanders and invertebrates?

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4. What pattern of spread was observed across the property?

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5. Do these results support the hypothesis? Why or why not?

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Claim Evidence Reasoning Prompt

6. Make a claim about whether jumping worms are likely to negatively impact the HBNC forest floor. Support your claim with evidence from Lizzie's data and explain why invasive species like JW can be a problem in ecosystems.

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Interpreting the Graph

When Lizzie measured jumping worms over the summer, she noticed that their average length increased steadily as they grew, but there were two unexpected dips in size on July 12 and September 11. What could explain this?

Scientists think there are a few possibilities:

- **New worms hatching:** When many small juveniles appear in the population, they bring the average length down, even though some adults are still present.
- **Sampling conditions:** On hot or dry days, larger adults may burrow deeper to avoid stress, leaving smaller worms near the surface where samples are taken.
- **Adult mortality:** Larger worms may die off due to heat, dryness, or predation, leaving behind a higher proportion of juveniles.

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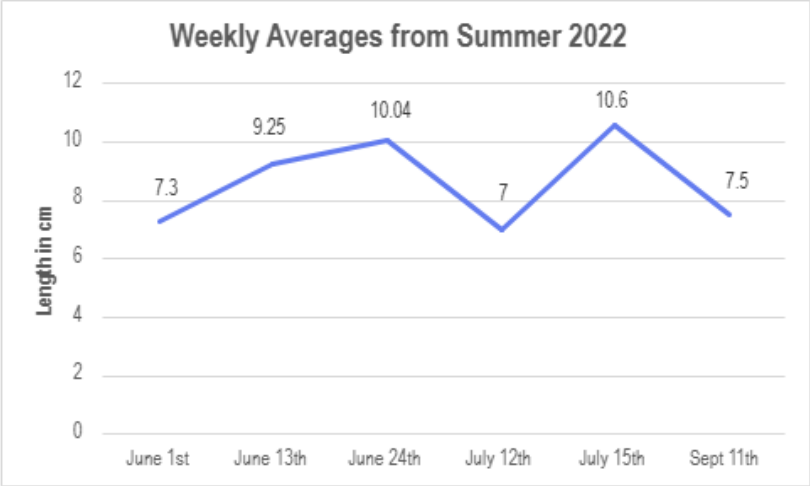

7. Looking at the dips in average worm length on July 12 and September 11, which explanation do you think is most likely? Use evidence from the study and what you know about worm life cycles or environmental conditions to support your reasoning.

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Your next steps as a scientist:

8. Science is an ongoing process. What new question(s) should be investigated to build on Lizzie's research? How do your questions build on the research that has already been done?

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Citation:

1. **Regovich, E., & Stanton, C. (2022).** *The 2022 Spread of Invasive Jumping Worms (Family Megascolecidae) at the Huston-Brumbaugh Nature Center.* Brumbaugh Scholars Program, University of Mount Union, Alliance, OH 44601

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