

# Deer, invasive earthworms gang up to damage forested areas

May 6 2019

---



Case Western Reserve University biology researchers dig into a wooded area in South Chagrin Reservation to look for evidence of earthworms. Credit: Jean Burns

Case Western Reserve biologists say combined effect of two species could be harming Ohio's forest ecosystems; research could inform deer-park management

An overpopulation of whitetailed deer is contributing to the spread of invasive earthworms—a newly discovered link to understanding environmental damage in Ohio's forests.

How the connection between those two species may be hurting the state's wooded areas is among the surprising findings by two Case Western Reserve University biologists.

"We're talking about a large ungulate (hoofed mammal) and a small, underground invasive species—how on earth would you ever make that connection?" said Colin Cope, a 2018 Case Western Reserve graduate who conducted the study with Jean Burns, an associate professor in the Department of Biology.

"But research has shown the connection, and they both play major roles in harming [forest](#) ecosystems," he said. "We wanted to find out more about how and which worm species may benefit most (from the presence of whitetailed deer)."

That question led to what may be their most compelling discovery during their four-year study: The presence of twice as many of a smaller but destructive [earthworm](#) (*Octolasion tyrtaeum*) in wooded areas that were not fenced to keep deer out. That worm species can wreak havoc on the [soil](#), Burns said.

"What you're left with after earthworms have consumed the organic layer (leaves) on top of the soil, is a soil that is more clay-like, almost pebbled," said Burns, whose Ecology Lab in the College of Arts and Sciences focuses in part on the study of invasive plants and animals.

The research did not project how widespread the environmental impact might be on Ohio forest lands, but focused on how the two [species](#) combine to damage specific areas—and how to detect their impact.

For example, Burns said, if a forest land manager were to identify the presence of the smaller earthworm, it could be a simple and fast way to signal an existing deer problem—and give that managers evidence to

support reducing the deer herd.

But does the presence of deer really influence earthworm populations?



Credit: Case Western Reserve University

To find out, Burns and Cope conducted their research at 44 locations throughout Ohio. Their findings were published in a forest ecology journal in March.

## **Understanding the connection**

Among the theories considered by Burns, Cope and others: that deer fecal droppings enhance the nutrient content of the soil and that their "scrapings"—when they dig up leaves and soil with their hooves—disturbs the soil, promoting a better habitat for the smaller worms, which feed lower in the soil column.

Previous research has also established that those particular earthworms break up the root and underground fungus networks responsible for

transferring water, carbon, nitrogen and other nutrients and minerals.

But it's not only the smaller worms that cause problems. The large "nightcrawler," a European invader, is blamed for consuming the seeds and seedlings of native plants, Burns said.

"We had an undergrad working with us who was lifting a small seedling out from the soil and literally watched one come up to her tweezers and yank it back into the ground," she said. "That's pretty bold."

This new work by Cope and Burns builds on a growing, but still fairly new field of study that focuses on both above- and below-ground interactions among plants and animals, Cope said.

Deer overpopulation is considered a global problem spurred by increased urbanization and a decrease in predators to eat the deer. The [negative effect](#) those deer have on forests as they eat vegetation on the forest floor has long been studied by biologists and land managers, Burns said.

Ohio's deer herd has grown from about 17,000 in 1979 to more than 700,000 today, according to the Ohio Division of Wildlife. Worse, white-tail deer, for example, prefer to feed on certain native plants, leaving forested areas more susceptible to an invasion from unwanted plants like the aggressive garlic mustard.

"So, would stopping earthworms stop other [invasive species](#)? No, we can't say that," Burns said. "But if we can continue to bring [deer](#) population down, we now have evidence that it may slow the earthworm invasion, too."

**More information:** Colin G. Cope et al. Effects of native deer on invasive earthworms depend on earthworm functional feeding group and correlate with earthworm body size, *Forest Ecology and Management*

(2019). DOI: 10.1016/j.foreco.2019.01.003

Provided by Case Western Reserve University

Citation: Deer, invasive earthworms gang up to damage forested areas (2019, May 6) retrieved 8 May 2024 from <https://phys.org/news/2019-05-deer-invasive-earthworms-gang-forested.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.