

ECOLOGY

Crawling to Oblivion

Invasive earthworms denude Great Lakes forests BY MICHAEL TENNESEN

Cindy Hale, an ecologist at the University of Minnesota, answers e-mails from a lot of distraught citizens of the Great Lakes region. The residents, it seems, have introduced certain earthworms into their gardens, she says, “and now they’ve got that ‘nothing grows here syndrome.’”

Long considered a gardener’s friend, earthworms can loosen and aerate the soil. But the story is different in the Great Lakes region. The last Ice Age wiped out native earthworms 10,000 years ago, and ever since the Northeast forest has evolved without the crawlers, Hale says. But now earthworms are back, a product of fishers who toss their worms into the forest, of off-road vehicles and lumber trucks that carry them in the treads of their tires, and of people who bring in mulch—and any worms that might be in it—from other areas.

As invasive creatures, the earthworms wreak the most havoc with hardwood forests, such as those consisting of maple, basswood, red oak, poplar or birch species. (Conifer-dominated forests seem to experience less dramatic impacts.) According to Peter Groffman, a microbial ecologist at the Cary Institute of Ecosystem Studies in Millbrook, N.Y., northern hardwood forests have relied on thick layers of leaf litter that serve as a rooting medium. The earthworms, Groffman reports, “come into an area with a thick organic mat, and two to five years later that layer is gone.”

As a result, some northern hardwood forests that once had a lush understory now have but a single species of native herb and virtually no tree seedlings. Evidently, earthworms change the forest soils from a fungal to a bacterial-dominated system, which speeds up the conversion of

leaf detritus to mineral compounds and thereby potentially robs plants of organic nutrients.

Not all foreign earthworms are destructive. Of the 5,000 species around the globe, only about 16 of the European and Asian varieties do the real damage. One of them is the night crawler (*Lumbricus terrestris*), a popular fish bait that can measure up to 15 to 20 centimeters (six to eight inches). Another is the Alabama jumper (*Amyntas agrestis*)—also known as the snake worm or crazy worm—an aggressive Asian worm

which leads to a net loss in salamander numbers. The amphibians themselves, Maerz notes, are an important prey species for “snakes, small mammals, turkeys and a host of forest creatures.”

Once established, earthworms are impossible to remove from the environment, Hale says. Concerned about their impact, the U.S. Department of Agriculture recently awarded Hale and her fellow biologists a three-year, \$397,500 grant to study the ecology of the earthworm invasions in cold-temperate hardwood forests. The scientists also hope to answer questions about nutrient and carbon cycling—including whether the earthworm activity helps to sequester carbon in the soil or releases it back into the atmosphere. “The jury is still out on this issue,” Hale explains.

Researchers agree that the best hope is to contain the worms, which spread only five to 10 meters a year on their own. That may mean new regulations governing off-road vehicles, bait disposal by anglers,

or equipment hygiene and use in the logging industry. Hale would like to control community mulch piles as well: “I remember

when I first heard about them, I thought, what a great idea, but think about it. You take leaves, weed seeds and earthworms from all over, bring them in, mix them up and then disperse them back out. That’s a horrible idea.”

Michael Tennesen, based near Los Angeles, described how forest sounds could reveal ecological health in the October 2008 issue.



HARDWOOD FORESTS near the Great Lakes are being damaged by introduced earthworms such as the night crawler (inset). The worms eat the leaf litter, which acts as a rooting medium.

that lives at high densities and can literally jump off the ground or out of a bait can, according to fishing lore. A voracious eater, it does the most harm to the soil.

The presence of the earthworms affects more than just the plants. John Maerz, a wildlife ecologist at the University of Georgia, says that adult salamanders that consume these earthworms are more successful at reproduction but that earthworms are too big for juvenile salamanders to eat,