

Study shows earthworms to blame for decline of ovenbirds in northern Midwest forests

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A forest without earthworms has a rich understory of herbaceous plants, tree seedlings, and shrubs, and a thick, spongy leaf litter layer. A recent decline in ovenbirds, a ground-nesting migratory songbird, in forests in the northern Midwest US is being linked by scientists to earthworms. Credit: Photo by Scott Loss

A recent decline in ovenbirds (*Seiurus aurocapilla*), a ground-nesting migratory songbird, in forests in the northern Midwest United States is being linked by scientists to a seemingly unlikely culprit: earthworms.

A new survey conducted in Minnesota's Chippewa National Forest and Wisconsin's Chequamegon-Nicolet National Forest by a research team led by Scott Loss of the University of Minnesota and the Smithsonian Migratory Bird Center has revealed a direct link between the presence of

invasive European earthworms (*Lumbricus* spp.) and reduced numbers of ovenbirds in mixed sugar maple and basswood forests.

The results are detailed in a paper published online in the scientific journal, *Landscape Ecology*.

European earthworms are invading previously earthworm-free hardwood forests in North America the scientists say, and consuming the rich layer of leaf litter on the forest floor. In turn, herbaceous plants that thrive in thick leaf litter and provide cover for ground-nesting birds are thinning out, replaced by grasses and sedges.

As a result, ovenbird nests are more visible and vulnerable to predators and ovenbirds searching for nesting sites reject these low-cover areas outright. Areas of reduced leaf litter also contain fewer bugs for the ovenbirds to eat, requiring them to establish larger territories, resulting in fewer birds over a given area.

The worms invading northern Midwestern forests (and forests in the northeastern U.S. and Canada) have been in the U.S. since soon after the first European settlers arrived. Loss explains the worms were brought over inadvertently in the ballast of ships, in the root balls of agricultural plants or on purpose for use in gardening. Only now is the leading edge of their continued invasion, caused mainly by logging activities and fishermen dumping their bait, reaching interior [wilderness areas](#) such as parts of the study site in the remote forests of Wisconsin and Minnesota.



A forest experiencing heavy earthworm invasion often has few remaining herbaceous plants and seedlings, no intact litter layer, and extensive patches of bare soil. A recent decline in ovenbirds, a ground-nesting migratory songbird, in forests in the northern Midwest US is being linked by scientists to earthworms. Credit: Photo by Scott Loss

"Night crawlers [*Lumbricus terrestris*] and the slightly smaller red worms [also called leaf worms or beaver tails, *Lumbricus rubellus*], have the most damaging impacts to the soil, litter layer, and plants in forests that were historically earthworm-free," Loss says.

"Everyone has probably heard at one time or another that earthworms have really positive effects in breaking down soil and making it more porous," Loss explains. "This is true in agricultural and garden settings but not in forests in the Midwest which have developed decomposition systems without earth worms."

Because the forested areas of the Midwest U.S. were once covered in glaciers, there are no native earthworm species present in the soil.

"These earthworm-free forests developed a slow fungus-based decomposition process characterized by a deep organic litter layer on the forest floor," Loss says.

Earthworms feed on this layer of [leaf litter](#) and make it decompose much faster, Loss explains. "As a result, we see the loss of sensitive forest-floor species such as trillium, Solomons seal, sarsaparilla and sugar maple seedlings and a shift in dominance to disturbance-adapted species like Pennsylvania sedge."

One result is reduced nest concealment for the ovenbird and increased predation by squirrel and bird predators.

The researchers found no decline in three other species of ground-nesting birds included in their survey—the hermit thrush (*Catharus guttatus*), black-and-white warbler (*Mniotilta varia*) and veery (*Catharus fuscescens*)—nor did they find a correlation between ovenbird decline and invasive worms in other [forest](#) types, such as red oak, paper birch and aspen.

"Our results suggest that ovenbird density may decline by as much as 25 percent in maple-basswood forests heavily invaded by invasive earthworms," the researchers conclude. "Maple-basswood forests are among the preferred ovenbird habitats in the region, comprise a considerable portion of the region's woodlands...and are experiencing *Lumbricus* invasions across most of the northern Midwest."

Previous studies have demonstrated that invasive [earthworms](#) also are harmful to other native North American species, such as salamanders.

There is reason for concern that the overall population of ovenbirds could decline, Loss points out. "Ovenbirds migrate to Central America and the Caribbean and back every year --a trip during which they can fly into buildings and towers or get nabbed by a cat as they rest on the ground--and they also face loss of habitat on their breeding and wintering grounds. Now, here is yet another potential threat to their survival."

Provided by Smithsonian

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