What's the big deal about earthworms?

We assume that earthworms are good for our gardens and soil. But consider the natural ecosystems in the National Park System, for example national parks in the upper Midwest. Recently researchers have reported in various articles that invasive, exotic earthworms from Europe and Asia (e.g., *Lumbricus rubellus*) can have a deleterious impact on the forest floors of northern temperate forests.

The most dramatic effect of earthworm invasion is the loss of the forest floor at previously undisturbed sites.

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Under natural conditions—without earthworms—fallen leaves decompose slowly, creating a spongy layer of organic duff, which is the natural growing environment for native woodland ferns and wildflowers. The duff layer also provides habitat for ground-dwelling animals and helps prevent erosion (Holdsworth et al. 2004). Invading earthworms eat the leaves that create duff, thereby eliminating the layer and decimating forest floors. Mature trees survive, but saplings, ferns, and flowers perish.

Although beneficial in many urban and agricultural settings, earthworms create a soil of a certain consistency, which can have adverse effects in northern forest ecosystems by actually compacting soil. Compaction decreases water infiltration, and less infiltration combined with less duff results in increased surface runoff and erosion (Holdsworth et al. 2004).

In addition to changing the structure of soil, exotic earthworms alter the chemistry of soil. Invasion alters the location and nature of nutrient cycling in soil profiles and changes total carbon and phosphorus pools, carbon-nitrogen ratios, and the loss and distribution of different phosphorus fractions. The organism factor in soil formation also is affected by earthworm invasion: the distribution and function of roots and microbes is significantly disturbed (Bohlen et al. 2004).

The take-home lesson: Exotic earthworm invasion is a significant factor that will influence the structure and function of temperate forest ecosystems over the next few decades. Researchers have little doubt that earthworms are invading new habitats in northern forest ecosystems and that such invasion constitutes a potentially important change in these systems over wide geographic areas (see pages 61–62). If earthworm invasion is an important factor influencing patterns of nutrient cycling and loss in northern forests in the coming decades, then regional evaluations of forests will need to consider the presence or absence of earthworms along with other important drivers of those processes, such as pollution, climate, or underlying soil characteristics (Bohlen et al. 2004). —K. KellerLynn

References

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Holdsworth, A., C. Hale, and L. Frelich. 2004. Earthworms: contain those creepy crawlers. University of Minnesota Center of Hardwood Ecology and Minnesota Department of Natural Resources, Saint Paul, Minnesota. Available at http://www.dnr.state.mn.us/invasives/terrestrialanimals/earthworms/index.html (accessed 26 July 2004).