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Snake or Jumping Worms in Connecticut

For generations, gardeners have sung the praises of earthworms. They break down organic matter releasing nutrients for plants and microbes. As they tunnel through the soil, pathways are created for air, water and plant roots to move. Their droppings or castings are nutrient rich, serving as a slow release fertilizer source. Earthworms aid in incorporating soil organic matter into the soil improving its structure and associated properties.

Are Earthworms Native to Connecticut?

Native earthworm populations in New England were decimated by the glacier that flowed from Canada to Long Island approximately 15,000 years ago. Forests that regrew following its retreat formed symbiotic (mutually beneficial) relationships with mycorrhizal fungi. Earthworms were not reintroduced until the English colonists, most likely inadvertently, brought European species with plants from the homeland or in ship's ballasts starting in the 1600s.

Species of European earthworms are often unearthed when turning over garden beds. Photo by D. Pettinelli

These introduced species (often *Lumbricus* species) provided the positive benefits previously mentioned when encountered in man-made home garden or agricultural locations. It is when they migrate into forested ecosystems that irreplaceable damage occurs. Their presence causes physical, chemical, and biological changes in the soil environment of forest ecosystems. These negative effects were amplified with the entrance of Asian earthworms of the *Amynthas* or *Metaphire* species that were introduced to the U.S. more than 70 years ago, most likely with the import of exciting new plant species from Asia. Their name comes from the rapid, snakelike, or thrashing movement they make when disturbed.

Negative Effects of Eawrthworms in Forest Ecosystems

Typically, our woodlands have a heavy cover of leaf litter on the ground and light to dense understories depending on tree species, age and any disturbance. Jumping worms inhabit the soil surface layer just below the leaf litter. They are voracious feeders with their metabolism, and consequently rate of leaf litter and woody deitritus consumption, increasing with increased temperatures during the growing season. Infested woodlands often contain bare soil with sparse understories. Invasive species, like garlic mustard, may move in.

The leaf litter layer is extremely important to a healthy, functioning forest ecosystem. It serves as a habitat for the mycorrhizal fungi

and other microbes as well as some insect, amphibian and reptile species. Certain birds create nests in the forest floor and it is a home, hiding place and source of food for many animal species. Native plants often find the organic, moist litter layer essential for germination. As the litter layer is consumed, these creatures will all be negatively impacted, eliminated, or displaced.

Left in its place are the highly aggregated castings or droppings of the jumping worms that some have liken in size to bits of ground beef or Grapenuts cereal. They contain nutrients, microbes and high amounts of organic matter and are easily transported in heavy rain events removing these essential, life-giving items from the site. Without a dense herbaceous understory, herbivores such as white-tailed deer tend to feed on tree seedlings that if left uneaten would replace mature trees as they die or are harvested.

Aggregated castings of jumping worms. Photo by D. Pettinelli

Identification and Life Cycle

In their mature state, jumping worms are readily identifiable. There are three known species in this area: *Amynthas agrestis, A. tokioensis* and *Metaphire hilgandorfi*. They range in size from 1.5 to 8 inches long and mature adults have a distinctive whitish colored band called a clitellum that encircles their body not far down from their head. This area contains the worm's sex organs and is where the egg capsules are produced. These species of earthworms are very quick moving and often will cast off their tail if grabbed from that end.

Mature jumping worms have a light colored collar or clitellum that encircles the whole body. Photo by D. Pettinelli

Jumping worms are an annual species meaning that the adults perish as temperatures drop and winter approaches. The egg capsules or cocoons they laid, however, overwinter in the soil and hatch the following spring. They can withstand temperatures to minus 40 F and are difficult to distinguish from soil aggregates being the size of a poppy seed. Cocoons contain 1 to 2 eggs, and each adult may produce up to 60 cocoons. It takes approximately 60 to 90 days from egg to mature adult. Typically, there are 2 generations each year. Young jumping worms are often difficult to distinguish from European earthworms but they do tend to be erratic in their movements. Mature jumping worms can mate with a partner but they can also produce eggs without mating, a type of reproduction known as parthenogenesis.

Because of their voracious appetite and rapid regeneration, jumping worms can outcompete other species of earthworms.

What Can You Do?

Determine whether or not they are present on your property or where you garden. They might not be obvious until midsummer. At that time, just a little digging, especially in mulched areas, will provoke them to lunge out of the soil. Infested wooded areas are often devoid of leaf litter and the understory may consist of ferns, grasses and jack-in-the-pulpits with some invasive plant species gaining ground. Affected areas will have soils with that granular, well-aggregated appearance.

Mustard Test
For those unsure of whether jumping worms are present, mix up 1/3 cup of ground mustard with 1 gallon of water and pour half of it slowly over 1 square foot of area you suspect the earthworms are in. The mustard mixture irritates them and as they come to the surface, you can collect and destroy them. Keep in mind this liquid causes all species of earthworms to surface and not just the jumping ones.

Control Options
Unfortunately, there is not an easy method nor a registered chemical to control jumping worms. They can be hand-picked as you are working your gardens and dumped into a bucket of soapy water or bagged and left out in the sun and then discarded in the trash. If no bucket or bag is near, as a last resort toss them into the middle of a hot, paved surface where they will be desiccated by the sun.

Natural Control Options
Earthworms do have natural predators such as moles, snakes, birds, toads, nematodes, microbes and other creatures but researchers do not know which, if any, have an affinity for jumping worms. Some experiments using biochar and diatomaceous earth have been carried out with not very encouraging results. Tea seed meal, an organic fertilizer, shows some promise but is difficult to find. Researchers are currently looking at biological controls such as the fungus, *Beauvaria bassiana.*

Solarization
If jumping worms, and consequently, their eggs are present in compost or mulch piles, solarization may decimate populations so that finished compost or mulch can be added to garden beds. If temperatures of 104 F can be reached for a minimum of 3 days, both eggs and earthworms will be eliminated. Finished compost or mulch can be spread out, preferably on a solid surface like a driveway but any flat surface can do. The material should be moist so sprinkle if necessary. Lay down clear plastic over it sealing edges as much as possible. Do this in the heat of the summer for maximum temperatures. Use a soil thermometer to monitor temperatures.

Last Words
If you have them, do not spread them to other sites by sharing plants or compost. Do what you can to reduce populations in your yard. Note that in infested vegetable garden beds, rototilling around Memorial Day may drastically decrease the survival of young jumping worms. Spread information about this invasive species to your local

communities and garden clubs. If local organizations hold plant sales, inform them of best management practices for snakeworms that would be to wash plant roots after digging and pot up in a purchased commercial soilless media.

If you do not have them, do your best to keep them out. Inspect the potting medium of any plants you are adding to your gardens. While likely there is no need to worry about the soilless media that vegetable and annual transplants are growing in, if you purchase plants from local plant sales, it might be advisable to unpot the plants and wash the plant roots before setting in your garden. The soil or media the plant was growing in, should be bagged and placed in the trash. Be sure to inspect any loads of mulch or topsoil delivered for signs of jumping worms, although they may be difficult to notice in early spring deliveries.

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