

## Jumping Worms

Information for ID and protocol if positively identified

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### Context:

All earthworms are considered non-native to North America. There is no historical record of them being present since the latest glacial age. They are soft-bodied so fossilized record is nearly impossible and nonexistent.

There are two main categories of earthworms, European and Asian. European worms have been in North America for as long as European immigrants have been here. They were likely brought over in the cargo holds of ships that traveled across the Atlantic ocean. European worms are the most common earthworms in the US. Nightcrawlers and red composting worms both fall into this category and are the only two species that are legally able to be traded.



Asian worms are newer to North

America, they were first found in the Southeast parts of America about 50 years ago, likely brought to the US via plant material. They are common across the East Coast and have been slowly moving their way west. All earthworms are herbivores. Eating plant material at the soil surface or buried organic material.

European worms are very slow to colonize an area without human help. They have been shown to travel at a rate of about ½ mile in 100 years. Asian worms on the other hand are much quicker, they were shown to colonize 30 acres in one season at the U of W Madison campus. Humans are the main mode of transportation for all worms. This can be done in many ways depending on the type of worm.

European worms like Nightcrawlers are able to borrow much deeper into the soil which allows them to survive colder temperatures and live from year to year. Asian worms do not borrow as deep and typically live in the top 2-4 inches of the soil. This means that the adults do not survive cold winters. The Asian worms produce small cocoons that house 1-3 offspring that will overwinter in the top layers of soil and hatch around Mother's day in the spring. Asian worms take about 90 days to reach sexual maturity. All worms are hermaphroditic but Asian worms do not require sexual fertilization to reproduce. The cocoons from Asian worms are very small and are impossible to distinguish from the soil.





Asian worms have a much higher metabolism and will eat much more organic matter than European worms. Asian worms are also able to digest lignin meaning that they are able to eat wood chips and mulch. This high rate of metabolism is detrimental to the soil health and ecosystem for a couple of main reasons. They are cycling nutrients too fast for plants to be able to absorb key nutrients like nitrogen. They are disrupting soil structure which is greatly reducing the soil's ability to hold water and changing the pH of the soil.

**How to ID:**



There is a couple of main behavior and physical characteristics that you can use to positively identify European vs Asian worms.

European worms are characterized by slower movement, while Asian worms are very active when disturbed. Asian worms have gained many nicknames including - snake worms, crazy worms, and jumping worms. This is one of the easiest ways to identify Asian worms.

Physically there are a couple of key differences. All worms have a ring on their bodies called the clitellum used for reproduction. On European worms, this is an incomplete band that is raised slightly above the rest of their bodies. Asian worms have a band that is complete around their whole body and is smooth with their bodies. European worms have a longer "head" or area in front of the band and larger European worms like nightcrawlers have a slightly flattened tail. Asian worms can also detach part of their tails when extremely threatened.

A good way to identify if a garden bed has Asian worms is from the large concentrations of their castings. This will be at the surface of the soil and is commonly said to look like coffee grounds. This is a sign that the garden bed has a high concentration of Asian worms that are feeding on the organic matter in the garden beds.

**Comparison of jumping worms (Asian origin) and common red wigglers (European origin)**

	<b>Asian jumping worms</b>	<b>Common red wigglers</b>
<b>Scientific names</b>	<i>Amyntas</i> spp. ( <i>A. agrestis</i> and <i>A. tokioensis</i> )	<i>Lumbricus rubellus</i>
<b>Life cycle</b>	Annual species. Several generations per season. Over-winters as cocoon. Parthenogenic (asexual reproduction)	Lives more than one season. One generation per season. Adults burrow into soil during winter re-emerges in the spring. Sexual reproduction.
<b>Adult length</b>	7- 20cm depending on species	3 - 10cm
<b>Skin</b>	Darker dorsally than ventrally, slightly rigid and firm	Reddish brown
<b>Clitellum</b>	Milky white to gray in appearance, annular, smooth. Not split. Located on segments #14 - #16	Raised, pink/red, saddle shape, split down the back. Located on segments #26 - #32
<b>Behavior</b>	Very active, snake like, sheds tail when handled roughly	Less active, wiggles, slightly limp, does not shed tail
<b>Soil signature, casts (excrement)</b>	Coffee ground texture	Dispersed casts/piles
		



### **What to do if you have Asian worms?:**

The first thing to do if you think your property or one that you are working on has Asian worms is to submit photos and the location via the [Worm Ranger program](#). (Google "Worm Ranger") After reporting a positive presence of Asian worms then you need to do your best to contain them on your property. This includes washing your boots and tools of soil and organic matter. Do not divide and share plant material with neighbors and friends unless it has been bare-rooted. This is especially important in the spring because signs of Asian worms are not present in the spring.

There are no chemicals that are labeled for the treatment of earthworms of any kind.



### **What can I do to prevent Asian worms on my property?:**

If you have no evidence of Asian worms on your property then you must be careful of the modes of transportation that they can take. Any soil, mulch, rock, organic material, or plants can be a method of transportation for these worms. It has been shown that heating soil or mulch to above 104 degrees for 3 days is enough to kill all adult or cocoons of Asian worms. There are many manufactures that will verify their products to be clean, this process is sufficient to kill the Asian worms.

Bare-rooting a plant is the best practice if you are concerned about a plant that may have Asian worms. Keep any unused bags of landscaping material off the ground, this includes soil, mulch, plants, etc. Pallets have been deemed adequate for this purpose.

They seem to prefer soils that are consistently moist, high in organic matter, and have a low to moderate pH.





**What does this mean for greater MN?:**

Asian worms have been positively identified in many parts of the twin cities and the Rochester area. The urban ecosystem is so greatly modified that this pest will not likely make a large difference in how our properties look. What is of greater threat is the greater prairie and woodland ecosystems of Minnesota. If these pests make their way out of the metro we are not sure how they will affect these areas.



**Is this confined to the horticultural industry?:**

Absolutely not, any industry that is interacting with soils is a possible vector for the transportation of Asian worms. This includes (but is not limited to) construction, agriculture, big-box retail, outdoor recreation. As horticulturalists, we have our eyes closer to the soils and are able to see this type of pest earlier than others.

**What is next?:**

At this point, the USDA has been tasked as the regulating agency for Asian worms. They are mainly gathering info on the distribution of their presence.

There is work being done to get this shifted to the DNR. If USDA or DNR classify Asian worms as invasive this will put massive restrictions on the horticulture industry and all industries involved in the movement of soil and organic matter.

The most important thing is to be observant of the sites and soils you are working with and understand your impact in this.

