



Asian jumping worms (AJ worms): What I've learned so far

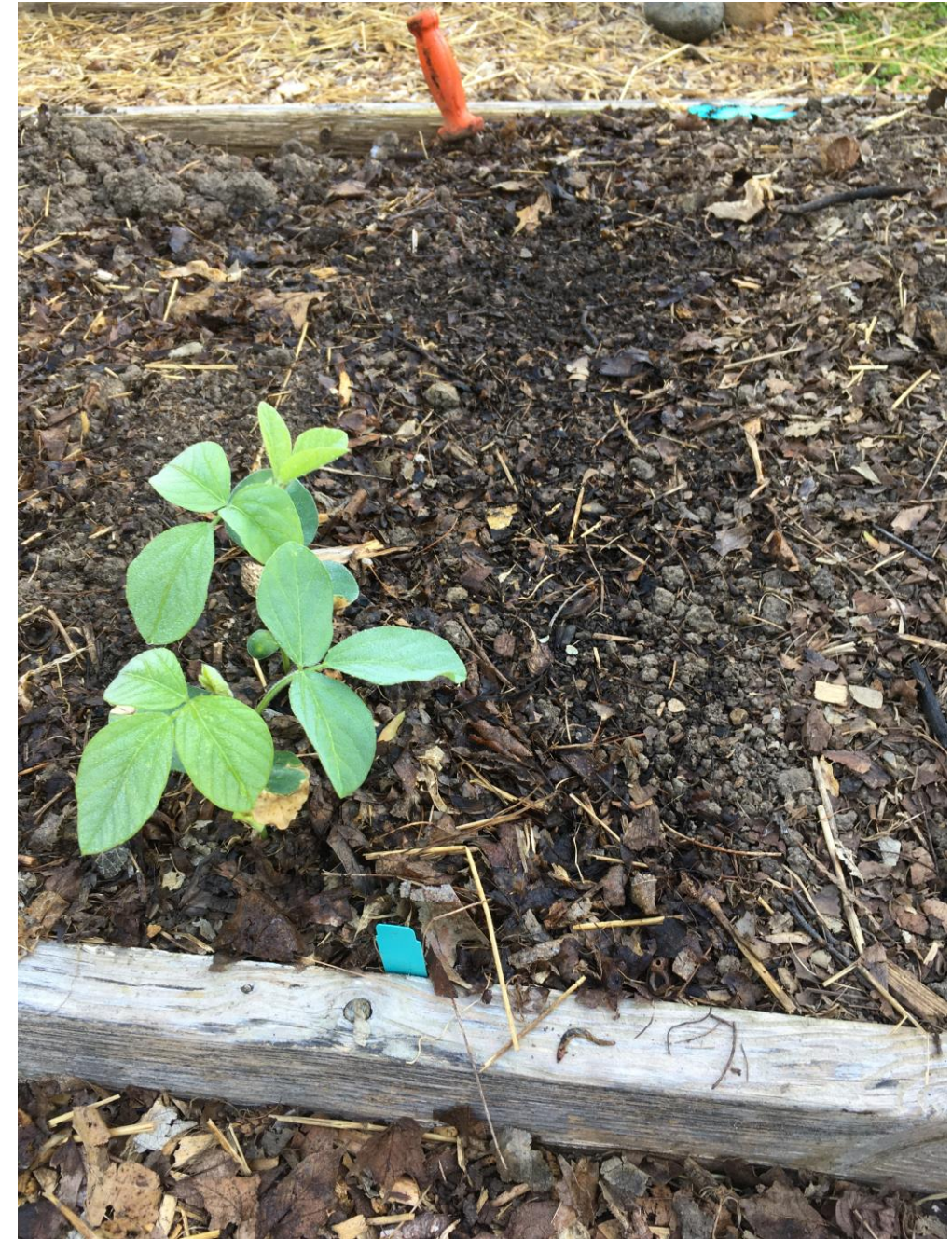
Joanne Dole
July 2020



I first learned about jumping worms after investigating these piles of soil pellets on my wood chip paths and along my raised beds.



Next clue – edamame and kale planted June 24 and replanted on July 3. Only 2 edamame germinated and just a few sickly kale. I found worms, slime and germinated edamame seed when I dug. The churned soil had crusted over in our hot weather and the seedlings couldn't get through the soil or never germinated.





As if all these worms isn't gross enough, I've found this slime occasionally when I've dug.

This healthy tithonia, transplanted in late June, was killed by the deteriorated stem and roots below the soil line.



AJ worms don't actually produce a slime trail like slugs and snails, but their feeding through the gut is coated with enzymes and other compounds that could be slimey. They also decompose and turn into bacterial slime. Samuel S. Chan Oregon State University

My conclusions so far:

I first found worms in my leaf pile I had collected from neighbors last fall. I unknowingly spread the worms in the mulch around my garden this spring. Now I solarize my leaf mulch before using it. I also found worms in my compost this summer, so now I solarize that also. One benefit of these hot summer days we've been having is it's easy to get to the pasteurizing temperature of 140° inside a closed clear plastic box.

Seeds and transplants planted April – early June do fine if they are planted and get established before the worms get too big in mid-June.

By mid/late-June, seeds and transplants can't outcompete the worms.

On July 24 I dug through the soil three times and physically removed the worms in one bed and then planted transplants. I'll see if they fare better with a much smaller worm population.

I found worms wrapped around the root ball of some plants I pulled. Inspecting plants and their root balls to remove noticeable adult worms can help minimize impact and spread. It's best not to share plants that come from an active infestation. You will never find the eggs since they are so small and the color of soil.

Sam and Linda have given me lots of good information.

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Though the worms might be impossible to eradicate, I believe that you can manage the situation so you can continue your enjoyment of gardening. You have made an important stride already by recognizing the problem, seeing the impacts and taking steps to minimize further spread.

The most obvious signature of the Asian jumping worm is when provoked, its fast flailing, almost snake-like movement and jumping ability.

Closer examination of the larger worms will reveal a smooth, milkish-creamy color ring (the clitellum) towards the anterior of its body. The clitellum is where the eggs (cocoons are stored and secreted).

The cocoons produced by the worms are hardy and almost like a "seed". They are easily transported on our shoes, tools and moving infested plant roots and compost.

Practicing sanitation and dedicating tools and shoes for work only in known infested areas and not moving the soil, plants and compost will limit its spread.

Samuel S. Chan Oregon State University

I routinely find worms right under the soil pellets – especially when they are still moist. You can see the churned soil right outside the bed containing healthy onions.

The worm pellets and the soil granules they form look and function differently than healthy soils.

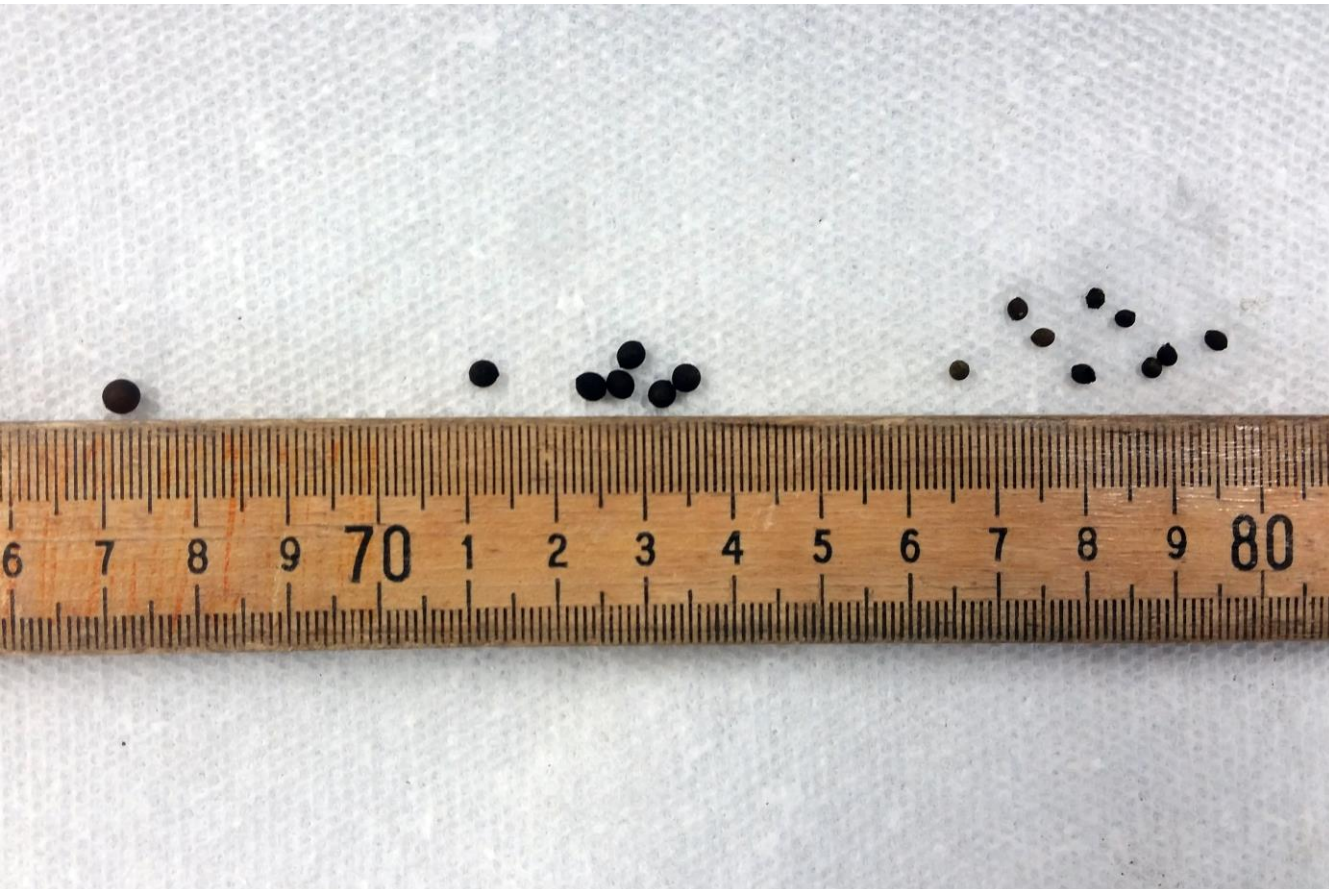
The pellets and granules formed are coarse and become hard, crusted even quite hydrophobic when dried. Course granular soil structure forms rather large air pockets. This can impact rooting, water and nutrient retention.

Samuel S. Chan Oregon State University



The real problem: cocoons

Unlike most other kinds of earthworms, jumping worms are parthenogenic - they self-fertilize and do not need mates to reproduce. Each new generation begins with the production of hardened egg capsules, known as cocoons, that overwinter in the soil to hatch the following spring. Jumping worm cocoons are resistant to cold and drought and are as tiny as mustard seeds. Since they greatly resemble small bits of dirt, they are hard to see and so are often unknowingly moved in soil, mulch, potted plants, etc.



<https://dnr.wi.gov/topic/invasives/fact/jumpingworm/index.html>

When to look for jumping worms

Jumping worms are most noticeable in late summer/early autumn when most of them are fully mature.

Time of year	Activity
April -May	Tiny jumping worms hatch from cocoon-encased eggs.
Summer months	Worms feed and grow.
August – September	Mature worms reproduce, depositing egg-filled cocoons into surroundings. Jumping worms are parthenogenic; each worm can reproduce on its own without a mate.
First freeze	Adult worms die.
Winter months	Eggs spend cold months protected in cocoons (about the size of mustard seeds!)

It takes only 60 days between hatching and reproduction. Jumping worms, unlike European earthworms, can easily complete two generations per year in Wisconsin.

<https://dnr.wi.gov/topic/invasives/fact/jumpingworm/index.html>

Eggs lie dormant during the winter.

The worms will hatch when soil temperature near the surface reaches about 50 degrees F.

Jumping worms reach sexual maturity within 60-90 days of hatching and will be able to produce cocoons shortly thereafter.

In Ohio, worms will likely hatch starting in late April and wouldn't be sexually mature until the end of July or August.

New cocoons would primarily be produced in the late summer and fall and lay dormant until the following spring.

However, it is possible, depending on the exact temperatures and timing, that there could be two rounds of cocoons, with the first batch in mid-summer and the second batch in fall.

Linda Tucker Serniak Oregon State University

Solarization and the heat it generates can be one solution gardeners can employ with soils, planting beds, containers, growing frames, compost and walking paths. Samuel S. Chan Oregon State University

Soil Solarization for Gardens & Landscape <http://ipm.ucanr.edu/PMG/PESTNOTES/pn74145.html>

Read in this article: **SOLARIZING SOIL IN CONTAINERS**

Soil solarization has been shown to be effective for disinfesting small amounts of moist, containerized soil and soil in cold frames.

My very handy husband built an elevated raised bed for me to try.
It is filled with solarized garden soil, solarized compost, solarized leaf mulch and bagged purchased potting soil (hopefully sterile!).





**Solarize my compost and leaf mulch
in plastic bin elevated to allow heating
from all sides**



Placing the litter in sealed plastic boxes and allowing them to solarize can be very effective. The length of treatment is temperature dependent. Studies indicate the cocoons die at 100+ F. Typically pasteurization occurs after 30 minutes at 140 F. On sunny warm days, those temperatures may not take long to achieve. Samuel S. Chan Oregon State University

I covered and tightly sealed my garden soil in the wheelbarrow with clear plastic to solarize it on a sunny hot day. An oven thermometer under the plastic registered 150° for most of the day.



Solarize soil in cold frame with glass lids closed

If the soil in the frame is moist (not waterlogged), you should be able to decontaminate the upper 6" or so with confidence.. Do use your oven thermometer to check.

Keeping the contents moist helps to transfer and retain heat.

*Turning the soil every day will help.
The worms prefer residing in the upper,
4 to 6"*

Samuel S. Chan Oregon State University



Solarize soil in place

Tarping can help to solarize and generate temperatures that can kill the worms and cocoons. However, very high temperatures (up to 140 F) are achieved only in the upper 2" or so and possibly as high as 90 F 12 to 18" deep in the soil. With an abundance of summer sunlight and warm temperatures, you may be able to eliminate the worms and kill the cocoons with solarization. High soil temperatures under the plastic tarps are best achieved if the soil you want to treat is loose and moist. This helps to transfer and retain heat. Turn the soil daily.

Samuel S. Chan
Oregon State University



I haven't tried this yet:

A barrier all around my raised garden bed to prevent worms from entering.

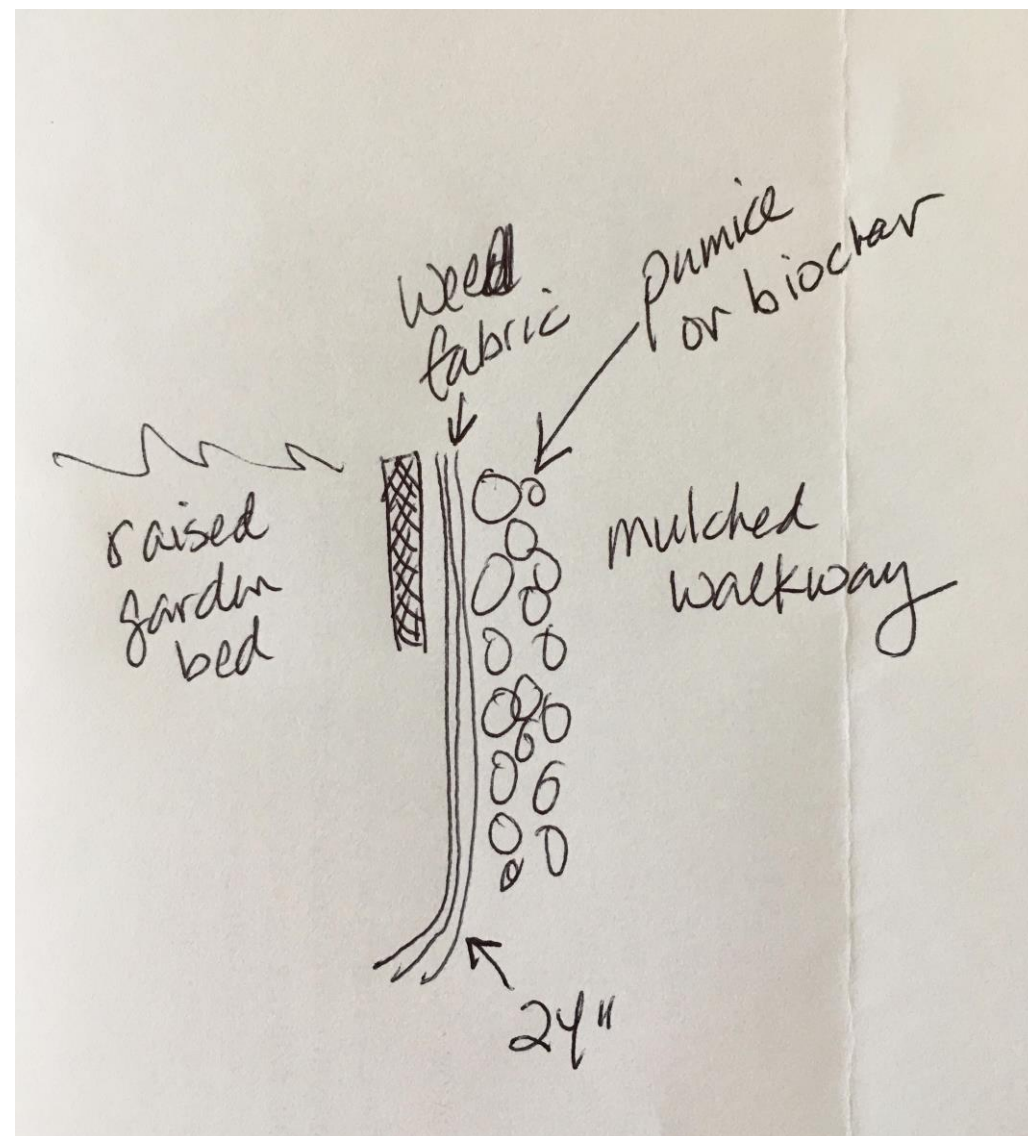
Several layers of heavy weed fabric 24" deep covered by pumice and/or a biochar could provide a dry barrier and irritant to prevent escape.

Remember, these worms jump, flail and thrash in a snake like movement, so can travel far.

Samuel S. Chan Oregon State University

First I'd have to remove all the worms and solarize the garden soil in hot weather by keeping it moist and turning it every day to kill the eggs.

I can't dig 24" without a trencher which won't fit in my garden. So I'll hand dig to 10" or so.



Some good news!!

Worms hatch around late April, so my April/May vegetables outgrew the worms and continue to do well.

Early crops garlic, spinach, arugula, peas were fine.

Tomatoes, peppers, carrots, beets, kale, beans, onions, basil, zinnias are all doing well even though there are worms in the beds.

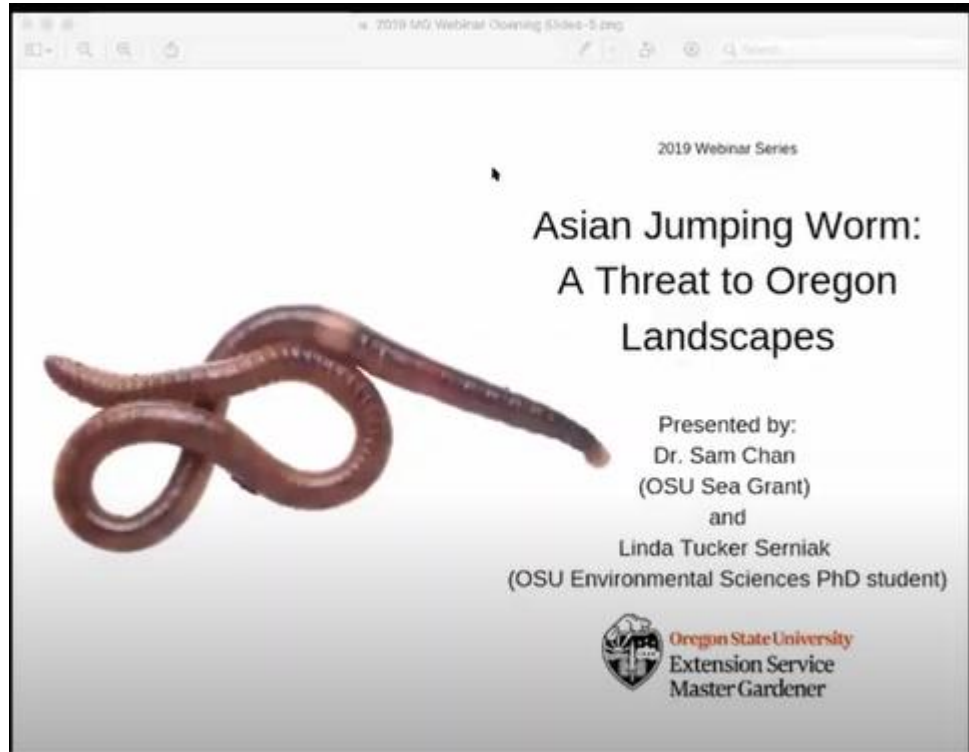


These worms were dug from the center section of this bed on July 22.

There are worms among the carrots and basil, but those crops – planted in April and May are fine.

I removed lots of worms (even though I know there are more). I'll experiment with edamame transplants planted on July 23. I hope they'll thrive with a smaller worm population.





This is a very good webinar (from August 26, 2019) that explains many details about jumping worms

<https://www.youtube.com/watch?v=tflbNuegJH0>

More good information https://seagrant.oregonstate.edu/sites/seagrant.oregonstate.edu/files/g17001_1.pdf
<https://www.sciencedaily.com/releases/2019/06/190620121357.htm>
<http://ipm.ucanr.edu/PMG/PESTNOTES/pn74145.html>
<https://dnr.wi.gov/topic/invasives/fact/jumpingworm/index.html>