Gardening Matters

Yates County Master Gardener Newsletter

Fall 2021, Issue 3

Inside this Issue

Executive Director's Note

This has been a wet, hot, and unpredictable summer.

Some vegetables, plants and flowers thrive in seasons of heavy rain and moisture. My boxwood hedge is full and robust, after a severely overdue trimming and pruning in 2020. My barberry bushes are holding their own against an aggressive tree of heaven/sumac tree invasion from the newly minted, non-gardening home owner next door neighbor. [insert favorite form of exasperation here!] My grass is very green; my hostas are hearty, and my fruit abundant gooseberry tree has created peace and harmony in the rivalry between the squirrels and song birds.

Pictured: Produce from the Penn Yan Community Garden
Photo Credit: Arlene Wilson

The heavy rains have brought fungi [tar spot on maple tree leaves] and powdery mildew [cucumber leaves]. But my cucumbers are safe to eat, and my husband is making quick work of them! Frequent rain also brings more frequent outside maintenance. Yet I find that yard work and gardening provide opportunities to chat up your neighbors, see who is new to the area, and gauge your home repair status. Take the time to walk through your community and enjoy the creativity and self-expression that is part and parcel of landscaping and gardening. Hanging baskets with brilliant colors swaying from porches, shepherd's crooks, or lamp posts; planters with ornamental grasses offsetting black-eyed Susan's; fragrant late summer roses in bloom!

As summer winds down, make sure to enjoy the quiet moments, when you can watch the wind blow through the leaves, or see fireflies signaling in the dark. Get your campfire spot ready, and your firepit cleaned up. [Utilize some of the storm clean up branches for gardening stakes, kindling and firewood!] Enjoy these final days on the porch, the patio or boat deck—feel the wind in your hair, the sun on your face and the beauty of all that grows around you.

With Friendliest Finger Lakes Region Regards!

Arlene A. Wilson

Executive Director & Master Gardener
Cornell Cooperative Extension of Yates County

At a special meeting of the Legislature on the morning of Tuesday, ***September 7, 2021****, the Legislature passed a motion that anyone entering the county office buildings must now wear a mask in the common areas of the building regardless of vaccination status.* ***Please bring a mask with you to wear through the building when you come to the CCE-Yates County Office.***

CCE Yates County has daily office coverage, with 50% working in-person, and 50% working remotely. This includes work within the community (agriculture, gardening, natural resources, youth, and families) using social distancing protocols.

Should you need to reach any of our staff members, visit http://yates.cce.cornell.edu/staff. You can also send us a message via our Facebook page, or call the office at 315-536-5123.

Garden Chat:

Catching up w/ the Yates County Master Gardeners!

What is one thing you've learned about your garden this season?

Caroline

I've learned that plants can be really unpredictable! I have some Agastache that is labeled as and has grown 3-5 tall and wide in the past. This year with the rain my plants grew a solid 8' tall! It definitely made my garden look a little funny but the bees have surely enjoyed it and now I know that the potential is there I will move them to the back of my border.

Cheryl

This year I planted native plants on one of my hill gardens were I used to plant my annuals. They are beautiful and colorful and they will be cost effective and low maintenance in the future.

Jan

I learned that when planting sunflower seeds one must be vigilant and protect them from scavenging squirrels and chipmunks. I swear they sit somewhere, watch me plant nice even rows and then wait until I am well stationed back inside and come to dig them up one by one. I planted 3 rows 3 times and in the end they left me with 3 Mexican Sunflowers and 2 Sunny Smile dwarf sunflowers. Next year I must find a way to outfox them!

Marian

I learned that a perfect onion has 13 rings! Plant them early, water them well and feed them with a balanced fertilizer. Early on the onion puts all its energy into making leaves - each will become one ring. Onions are smart and after the summer solstice, they shift their energy from making leaves to growing their bulb. Continue watering and change over to a high nitrogen fertilizer. When the leaves fall over, they are ready to harvest and you'll be rewarded with some big, healthy onions - maybe even some with 13 rings!

This season, I learned that Bacillus Thuringiensis (Bt) can effectively control gypsy moths and protect your trees if applied properly and early enough. It was the first time I had used it and it worked very well for me on my affected trees.

Also, I learned that no matter how cute and innocent they look, don't let a baby bunny live in your vegetable garden. She grows up to be big hungry bunny.

Garden Chat:

Catching up w/ the Yates County Master Gardeners!

Susan

The one thing I learned from this gardening season is that nature hates a void. With the large amounts of water, any space in my gardens that did not have a plant grew a weed. Thankfully, the soil was moist and pulling of weeds was rather easy. I also learned that comfrey loves this type of season. Usually my comfrey looks like it is ready for the compost bin right about now. Just look at these babies now!

Michelle

I learned that Black Walnut trees will kill your tomato plants, some vegetable plants and weaken many others. I have raised beds and they are 20 feet from the Black Walnut tree but the roots must go under my raised bed so I had only a few tomatoes. I planted 17 plants of all varieties and got only a small basket of tomatoes. Not sure how far those roots go under ground but I will try moving my beds 30 feet from the tree.

Have a gardening question?
Contact us at 315-536-5123, or stop by the CCE-Yates County office and fill out one of our Master Gardener questionnaires!

What to do in...

October:

* Wait until a couple weeks after the first hard frost to dig and store tender bulbs such as dahlias and cannas. This gives the bulbs enough time to “cure” prior to storage.
* Continue to water regularly any newly planted shrubs and trees. Once the soil freezes you can stop but until then it’s important for them to get consistent water while they’re putting out new roots.
* Wrap trunks of young trees with hardware cloth to prevent bark damage by vole and rabbit feeding.
* Although most plant foliage can and should be left to be cleaned up in the spring, plants that are prone to annual fungal diseases such as dahlias should have their tops cut back and the foliage disposed of in the trash. This will reduce fungal spores overwintering in the garden that could infect the new growth in the spring.
* If you used metal cages or stakes for your tomatoes this summer, scrub off any debris stuck to them, then spray with a 10% bleach solution to reduce the risk of disease next year.

November:

* Mow your lawn for the final time then spend some time winterizing your lawnmower. Take off the blades and bring them in to be sharpened. Change the fuel or add gas stabilizing additive to the tank. You’ll thank yourself in the spring!
* Mulch and put up burlap or other windbreaks to protect broad-leafed evergreen shrubs such as boxwood to protect foliage from drying winter winds.
* Gradually increase the time between watering your houseplants and stop fertilization until growth begin speeds up again in the spring.

December:

* Now is a great time to start pruning your trees and shrubs. Pruning evergreens in December will also supply you with lots of nice seasonal foliage for decorating.
* Check your large-leafed house plants and dust leaves as necessary. Removing dust from their leaves helps them more effectively photosynthesize.
* If very cold conditions are predicted, move your most sensitive plants away from the window panes to prevent freezing.

Uncommon Fall Flowers to Love

Jan Bartlett (Yates County Master Gardener)

Toad Lily: this exotic flower with speckled petals in shades of pink, white and purple develop along arching stems in the fall. Toad lilies are perennial and do best in part to full shade but will actually bloom best in more shade. It is hard to believe that these tropical looking plants are hardy to **zone 4**. Oblong leaves grow up to **6 inches** and the blossoms are reminiscent of orchids. Keep the plants well-watered if they are in partial sun and plant them in an area where the exquisite blooms can be admired.

Pictured: Tricyrtis ("Toad Lily)
Photo Credit: Flower Freedom Wisconsin Master Gardener

Beauty Berry: this shrub can grow to be between **3 and 6 feet tall** and bears small pink, white or purple flowers in the summer. In the fall bright, tight clusters of tiny purple berries appear down each stem. The fall color is impressive and its casual habit makes it a good choice for a natural garden. A bonus is that it is native and provides food for migrating birds.

Pictured: American Beauty Berry
Photo Credit: Piedmont Master Gardeners

White Wood Aster: the great benefit of this little beauty is that it will grow in dry shade. It is a mounding perennial that forms dense colonies from underground rhizomes. Wood Aster grows to be about **2-3 feet tall** and spreads about the same. Flower clusters appear in late summer and last until mid-fall. The flowers are produced in profusion and are loved by bees and butterflies. This is a good choice for a wildlife or shade garden and is deer resistant.

Pictured: White Wood Aster
Photo Credit: Kerry Woods

Want to be featured in *Gardening Matters*? If you have any seasonal tips or photos you would like to share, please submit them to:

Master Gardeners/CCE
Yates County
417 Liberty Street, Suite 1024
Penn Yan NY 14527

Worlds within Glass– Terrarium Gardening

Caroline Boutard-Hunt (CCE-Yates County Ag Educator/Master Gardener)

Fall can be a bittersweet time for gardeners. After the final push to organize the potting shed and plant the bulbs for next year, many of us can feel bereft without our time spent on garden work and observing the growth of the plants we nurture. We watch the garden slowly sink into sleep, appreciating the fall color and the softening shapes, then begin the countdown until next spring. Some of us turn our focus to houseplants, which are attractive but don't provide the same satisfaction as garden creation and maintenance. Luckily there are ways to replicate the enjoyment of summer gardening but on a countertop scale.

There are three major types of tabletop gardening:

* Terrariums
* Planted aquariums (also known as an aquascape)
* Paludariums

Each of these deserves its own article so I'll be breaking this subject into a series, starting with terrariums.

Terrariums are the most traditional of the indoor gardens. Fill a clear vessel with the right media and plants, provide it with lighting and you have a beautiful small garden that will grow and evolve throughout the year. Terrariums were first invented in 1840 by Nathaniel Bagshaw Ward who originally placed an insect chrysalis inside a glass bottle intending to observe it emerge. Instead of an insect he found that a fern spore germinated and subsequently grew in the jar. This inspired him to further explore growing plants in small glass cases, which became know as **Wardian cases** (pictured below) after their progenitor. Wardian cases exploded in popularity as a way to easily grow exotic plants in the Victorian Era. Botanists were able to transport delicate plants from the tropics utilizing Wardian cases which had previously been impossible to import to Great Britain. Although now known as terrariums, creating a balanced ecosystem in a glass case still provides us with one of the very best ways to bring nature inside throughout the year.

Many of us with kids or a history of hobbies have a spare aquarium sitting in the garage from some project or another. This tripping hazard can become a beautiful indoor garden space where you can replicate some of your favorite natural scenes. Other clear glass containers are also great candidates for a terrarium. You can design these to reflect any natural space that you want- be it a small formal garden, a replica of rainforest understory or a desert biotope.

Terrariums are a useful tool for growing miniature tropical plants that thrive in high humidity environments. Generally, houses are too arid for many of the more delicate specimens to grow well in. A terrarium provides these plants with enough moisture to look their very best. For this article, I'll focus on how to make a closed, tropical style terrarium but keep your eye out for future articles on growing succulents in terrariums.

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Building a Terrarium

What you'll need:

Container: our choice of container depends greatly on what your goals are. Pretty much anything can be used to create a terrarium as long as it is made of clear, uncolored glass or plastic. There are many really attractive container options for terrariums including some designed after the traditional Wardian cases or vases. You can even make a small terrarium in a quart sized canning jar. The larger the container, the more elbow room you'll have to work with and the larger plants you can accommodate.

Lid: A lid can be optional, particularly in a container with a small opening. However, if you want to have the full water cycle effect, you'll need a lid. If your container doesn't have a lid, you can make your own with a piece of clear polycarbonate plastic or even just a sheet of plastic wrap and a rubber band. If you go the 10-gallon aquarium route, you can purchase a clear glass lid at your local pet store or online for under $20.

Drainage element: n a terrarium, balancing drainage and moisture is key. You'll want to create a drainage layer of coarse gravel or volcanic rock at the bottom. Since this layer will probably be visible in your terrarium, make sure you pick something you like the look of. This will help your substrate from becoming waterlogged while also allowing for sufficient water in the system.

Barrier layer: This barrier will go between your drainage element and your substrate. Ideally it should be made out of synthetic material so it doesn't decompose and allow for layer mixing. Carbon fiberglass window screening works well as a barrier layer. Don't use metal mesh as it will oxidize and rust. You can also use a piece of landscape fabric with some extra holes poked in it to allow for quick drainage. If you don't want to use a synthetic element, you can put a 2-inch layer of sphagnum moss between the substrate and drainage layer. This will look very attractive as well as act as a good barrier layer though it will eventually break down and you'll need to rebuild the terrarium.

Substrate: Normal potting mix is not recommended for a terrarium as it is too dense and can lead to rotting roots. Many people build their own substrate mixture based on either sphagnum moss or coconut coir and supplemented with earthworm castings, orchid bark, perlite, charcoal and sand to provide plant nutrients and increase drainage and airflow. I've adapted this substrate recipe from SerpaDesign, a YouTube channel with fantastic terrarium build demonstrations and advice. All these ingredients can be found online or at your local garden or pet store. Call the office at (315) 536-5123 if you have trouble finding any of these and I can point you in the right direction.

Mix together:

* **1 part Coconut coir**
* **1 part fine bark- reptile bark or orchid bark may be used**
* **2 parts Sphagnum moss or other undyed dried moss**
* **1 part sand (horticulture grade sand is best as it's a little coarser than play sand)**
* **A small amount of worm castings (1 tbs for a quart sized container up to a small handful for a 10-gallon tank)**
* **A small handful of horticultural or aquarium charcoal (optional but many people believe it keeps the terrarium smelling sweeter)**

Store in a sealed container until use. If this seems like too much work, you can try using a coconut coir-based organic potting mix and mix it in thirds with orchid bark and sphagnum moss to lighten and increase drainage.

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Worlds within Glass– Terrarium Gardening

Hardscape: Hardscaping elements add structure to your design. You have a lot of options. I love finding rocks with fossils from rambles in our gully. You can use interesting found pieces of wood as well. I recommend only using hardwood in your design. Try to stick with one rock or wood type throughout your design. You can collect your own materials or look online for specialty rocks such as Seiryu and dragon stone.

Lighting: LED lighting has revolutionized the ability to successfully grow plants indoors. Depending on what plants are in your terrarium, you may not need supplemental lighting but providing a little light means you can place your terrarium where you like it, not just near a natural light source. Your light doesn't have to be fancy, just a desk lamp with a warm white or daylight white LED bulb will work. You can buy light bars designed for terrariums if you want a cleaner look.

Plants: Many local nurseries have selections of small terrarium plants for sale. There are multiple online sources as well if you're looking for something more unusual. It's important to select plants that have the same light and moisture requirements. Below are some good options for tropical terrariums:

* **Ferns-** small ferns were almost custom built for terrariums. There are a lot of options out there. Southern maidenhair fern (*Adiantum capillus-veneris*) is a delicate little fern with bright green leaflets and contrasting thin black stems. Borneo fern (*Trichomanes javanicum*) is another small, attractive fern that grows slowly.
* **Selaginella-** commonly called club moss, this is a fantastic creeping ground cover in a terrarium. It stays low and fills the available space quickly without being a bully to other plants.
* **Fittonia-** These lovely little plants have dark green leaves that are covered in a tracery of delicate pink or white lines. They are truly lovely in a terrarium and stay fairly short.
* **Hypoestes phyllostachya-** Also known as polka dot plant, this lovely little plant's leaves are covered with brightly colored spots. These can be slightly aggressive growers, but nothing that regular pruning can't manage. Leaf color is best in partial shade and may fade somewhat in a truly shady terrarium.
* **Miniature orchids-** Although these may not stay small enough for a truly tiny terrarium, they are a lovely way to add some color and height. You can tuck these into your hardscape and allow the aerial roots to ramble.
* **Begonia spp.-** Choose miniature varieties with interesting leaves.
* **Mosses-** these can create a beautiful, low maintenance terrarium. Please make sure to purchase from reputable sources or collect from your own property.
* **Carnivorous plants-** You can design a gorgeous terrarium focused on carnivorous plants such as sundews and tropical pitcher plants.

Building Your Terrarium (Step-by-Step)

1. Clean your container and allow to dry.
2. Add your drainage layer to collect water that drains down through the substrate. In a very small terrarium, you can get by with half an inch, while in a larger terrarium aim for an inch or a little more.
3. Install your barrier layer.
4. Moisten your substrate- it should be damp to the touch, but you shouldn't be able to squeeze water out of it.
5. Add your substrate layer- this should be at least 3 inches deep to allow for good root development. To give your terrarium scene more depth, make the substrate deeper towards the back of the container. Make sure not to press it down too hard.

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Building Your Terrarium (Step-by-Step Guide Continued)

6. Place your hardscape. Top tip: put your larger elements towards the front and smaller towards the back. This will give a sense of perspective and make your container seem deeper than it is. I recommend placing your hardscape then stepping away a bit and seeing how it looks from different angles.
7. Add your plants. Just as in an outdoor garden, think of masses and odd numbers of plants which will create a more natural scene than pairs. Think about the textures of the leaves and how they complement and contrast against the hardscape. Remove plants from their pots and plant. In small terrariums, a chopstick can be a fantastic tool to help press small plants into the substrate.
8. Add any other small decorative elements such as pebbles. Top tip: make sure they are similar to your main rock hardscape elements for the most natural look. Small twigs and acorns can be a nice touch as well.
9. Mist the terrarium thoroughly. The soil should be damp but not soaking wet.
10. Finally, take a small piece of microfiber cloth and wipe down the glass. Cover the terrarium and set up your light if using one.

Maintenance: Terrariums require very little regular maintenance. If your terrarium is a closed system, it will develop its own water cycle. As the temperature warms in the terrarium, the water will evaporate from where it has built up in the drainage layer, and then condense on the glass. The water droplets will drip back down onto the plants and soil. If you don't see this condensation regularly, your terrarium may need some water added. Use a spray bottle to thoroughly and evenly wet the inside of the terrarium. Open terrariums may need to be watered every few weeks while closed terrariums can usually go a month or more. Distilled water or rainwater is recommended to prevent the build up of minerals in your terrarium.

To keep your lidded aquarium fresh, take the lid off about once a week for 20 minutes or so. This helps refresh the air in the terrarium. I usually use this time to do any trimming, renewing decorative elements or other maintenance.

Growing plants may also outgrow their spaces in the terrarium. Observe your terrarium regularly and trim back any plants that are getting a little too large. It's better to do smaller, more frequent trimming versus an occasional large pruning.

Terrarium plants are generally slow growing and shouldn't require regular fertilization for at least the first year after planting. If you notice growth slowing and leaves yellowing, you can fertilize lightly with a liquid indoor fertilizer.

Keep Reading for Troubleshooting Tips

Building Your Terrarium (Step-by-Step Guide Continued)

Troubleshooting:

* **Mold on the hardscape and plants:** Mold is a part of life and there is no keeping it out completely. A little mold in the first few months of a new terrarium is normal. If mold is growing on your plant leaves, you can either remove the most affected leaves or take a q-tip dipped in hydrogen peroxide and use that to gently wipe the mold off the leaves. Mold on hardscape is a temporary issue that should disappear on its own. If you continue to have issues, you can also get yourself a clean-up crew. One addition that many serious terrarium builders add to their set ups are springtails. These tiny arthropods happily feast on any mold that appears, keeping the terrarium cleaner. They also consume dead plant matter. Fair warning- some people prefer the look of a little mold to springtails, though I find them to be pretty adorable. As your mold disappears, the springtail population will naturally reduce. Another option is to add a few isopods aka pillbugs. These little tanks will also eat mold and may be more attractive rumbling around in your landscape. You can even get flashier exotic isopods such as rubber ducky isopods. Isopods can in rare instances consume living plant matter so many people prefer just sticking with springtails.

Pictured: "Rubber Ducky" Isopod

* **Dying plants:** Check your substrate- is it slightly fluffy, dry or totally saturated? Roots need a little air space as well as moisture to be able to expand. Is your terrarium getting too much sunlight? Wet leaves are prone to burning in direct sunlight. If the leaves look a little sun damaged, try moving your terrarium out of direct sun or into a north facing window.
* **Plants stretching with pale leaves:** this is a sign that your plants are not receiving enough light. You can either move your terrarium to a sunnier position or get a small LED desk lamp to supplement.
* **Smelly terrarium:** this is a sign that your substrate is saturated with water and has gone anaerobic. Generally this will happen when a terrarium is overwatered and the drainage layer is wicking water up into the substrate layer. Either find a way to drain the excess water out or leave the lid off and allow to dry out slightly over the next few weeks. Mixing in a handful of charcoal may also help reduce the odor until the anaerobic conditions are resolved.

I hope this article inspires you to give tabletop gardening a try this winter. It's a simple way to bring a bit of garden design and nature into your home. Feel free to email me at cb239@cornell.edu to share pictures of your terrariums or if you have any questions. In the next article in the series, we'll cover how to create a beautiful planted aquarium.

The following sources were utilized for this article and are excellent places to go for more information:

- https://smartgardenguide.com/best-closed-terrarium-plants/
- https://terrariumtribe.com/
- https://www.worcesterterrariums.com/ (also search for Worcester terrariums on YouTube for fantastic how-to and troubleshooting videos)
- https://www.serpadesign.com/ (another creator with a wonderful YouTube channel that I highly recommend)

Natural Lighting for Indoor Plants

University of Maryland Extension

Key points

Photo Credit: Jean M. Burchfield

* Light is probably the most essential factor for healthy indoor plant growth. The energy derived from photosynthesis depends on the amount of intercepted light by leaves.

* Indoor plants can be classified according to their light needs and tolerances — high, medium, or low. Select indoor plants according to the availability of natural light in your home. Otherwise, you will need to supplement light with artificial lighting.

* The three important aspects of indoor light are intensity, duration, and quality. Each one has a different impact on the plant.

Light intensity

* Footcandles (FC) is the unit of measurement for determining the intensity of natural light. One footcandle is approximately the brightness of one candle, one foot away. Outdoor, direct sunlight has a peak intensity of about 10,000 FC.

* Light intensity depends upon the distance of the light source from the plant and decreases rapidly with increasing distance.

* It influences photosynthesis or the manufacture of plant food, stem length, leaf color, leaf size, and flowering.

* Factors like the presence of curtains, insect screening, weather, seasons of the year, shade from trees and other buildings, and the cleanliness and type of window all impact light intensity. Ambient light levels can be increased by reflective, light-colored surfaces inside the room.

* Excessive light is just as harmful as too little. When a plant gets too much direct light, the leaves become pale, turn brown, and die.

* Protect houseplants from excessive direct sunlight during the summer months by increasing their distance from the window or using a light shade, such as a sheer curtain.

Light Intensity	Number of footcandles	Light Exposure	Indoor Plant Examples
Low Light	25-100 FC	North-facing windows or rooms that are artificially lit (fc levels of artificial light can vary with lamp types)	ZZ plant, snake plant, cast iron plant, peace lily, resurrection plant *(Selaginello)*
Medium-bright light	100-500 FC	East or west-facing windows	Chinese evergreen, rubber plant, dracaena, African violet, Norfolk Island pine
High light	500-1000 FC	South-facing windows or some west-facing windows	Croton, hibiscus, jade plant, hoya
Direct indoor sunlight	Over 1000 FC	4-6 hours of direct sunlight. A sunroom or an unshaded south-facing bay window	Citrus, succulents and cacti, gardenia, tillandsia

Natural Lighting for Indoor Plants

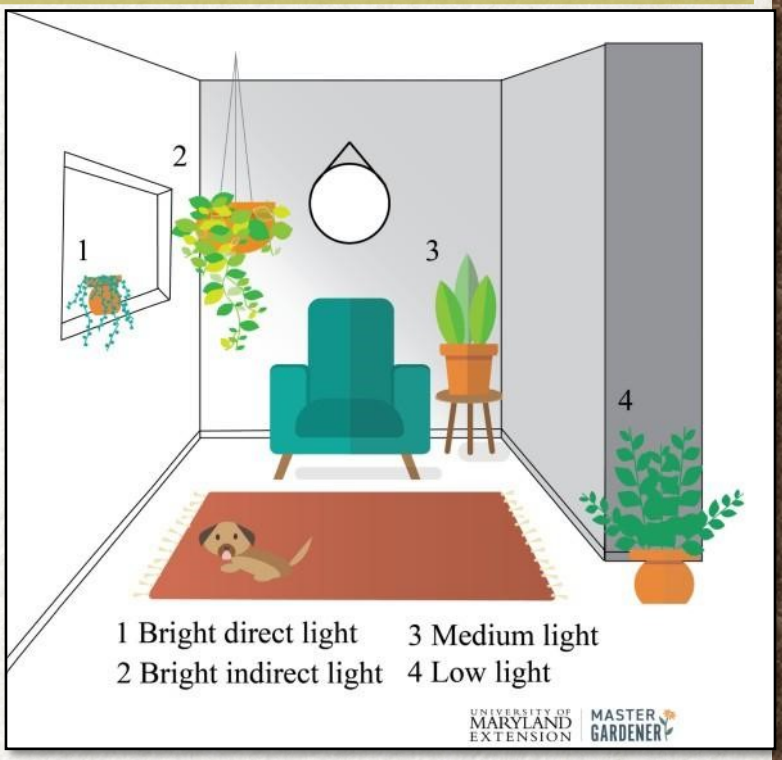
University of Maryland Extension

Duration of light

* Refers to the length of time the plant receives light each day.
* Poinsettia, Kalanchoe, and Christmas cactus are examples of flowering plants that are sensitive to photoperiod (day length). Buds and flowers only develop when the day length is short (11 hours of daylight or less).
* Most plants require a period of darkness to develop properly, so illuminate them for no more than 16 hours each day in total, especially if using artificial light combined with natural light.

Quality of light

* Light quality is more of a concern with growing plants using artificial light than natural light.
* Generally, sunlight is best for plant growth but artificial lighting can improve the quality of light plants receive, improving plant growth.



Light intensity and plant placement near a west or south-facing window

* When artificial light is needed to supplement natural light, the spectrum (colors the lamp produces) is important. For example, red, far-red, and blue wavelengths are most important for plant development. For healthy plants, supply all three wavelengths.

Impacts of too little light

* Indoor plants can become spindly or “leggy”, as they stretch to reach for more light. When grown where light reaches them from one direction, they can develop a lean.
* Additional symptoms can include a fading of leaf color, diminished flowering, and poor growth. The same plant grown in brighter light would be more compact, better branched, and have normal size leaves.
* Houseplants can fail after a healthy start because of inadequate light. Plants can already be stressed by the switch from growing in a greenhouse to awaiting sale in a store that may not be well-lit.
* Moving indoor plants back inside after spending the summer outside can cause leaf drop and yellowing. An example is weeping fig (Ficus benjamina) that can experience significant leaf drop. It takes time for plants to adjust to lower light conditions inside homes.

Additional resources

Gardening Under Lights - The Complete Guide for Indoor Growers by Leslie F. Halleck, published in 2018 by Timber Press, Inc.

Extend the Harvest by Properly Storing Fruits & Vegetables

Barbara Ingrham (Food Scientist Specialist UW Extension)

Garden produce that is properly stored can help ensure the taste of summer in family meals for several months after the first frost, according to Karen Delahaut, former University of Wisconsin Extension Fresh Market Vegetable Horticulturist.

Whether harvested from your garden or purchased from the grocery or farm market, fruits and vegetables need to be stored properly for best quality. According to Delahaut, each harvested commodity has an optimum storage temperature. “Many fruits and vegetables should be stored only at room temperature because refrigerator temperatures (ideally 32°F to 40°F) damage them or prevent them from developing good texture and flavor. For example, when stored in the refrigerator, bananas develop black skin and loose sweetness, watermelons loose their flavor and deep red color if stored for longer than 3 days, and tomatoes loose flavor and become soft,” says Delahaut.

Teryl Roper, UW-Extension Fruit Crops Specialist, agrees. Roper notes that apples, a crop commonly found in Wisconsin home gardens, can be stored for up to six months if properly stored. But proper storage depending on careful handling, says Roper. Most fruits and vegetables are easily bruised if not handled carefully. When harvesting, treat produce gently. Most produce should be washed after harvest and before storage, but there are some exceptions. Delicate berries should be rinsed in cold water just before consuming. Washing berries before storage will hasten the decay process. While potatoes store better with a fine layer of soil left on the skin, avoid leaving clumps of soil on potatoes as this will only encourage spoilage.

Several vegetables benefit from post-harvest curing, notes Delahaut. Curing heals or suberizes injures from harvesting operations. It thickens the skin, reducing moisture loss an affording better protection against insect and microbial invasion. Curing is usually accomplished at an elevated storage temperature and high humidity. An enclosed home storage area with a space heater can provide the conditions effective for curing some crops.

Root crops such as beets, carrots, rutabagas, parsnips and turnips can be left in the ground into late fall and early winter. A heavy mulch of straw will prevent the ground from freezing so the roots can be dug when needed. Many people prefer the taste of these crops after they have been frosted because their flavors become sweeter and milder, notes Delahaut. But make sure to finish harvesting these crops before the ground freezes solid, or you’ll have to wait until spring to dig them out, says Delahaut.

The Following are some recommendations for handling some specific fruits and vegetables:

Potatoes: Late crop potatoes are best for long-term storage. After harvest, cure late potatoes by holding them in moist air for 1 to 2 weeks at 60 to 75°F. Lightly cover during curing to help retain moisture. After curing, lower the storage temperature to about 40 to 45°F, ideally in a cool, dark basement or cellar. Do not wash potatoes before they are put into storage and avoid chilling below 40°F. Store potatoes in the dark to prevent greening.

Onions: Harvest onions when the tops have fallen over and begun to dry. Cure onions after harvesting by spreading them in a single layer on screens in the shade or in a well-ventilated garage or shed for 1 to 2 weeks or until the tops are completely dry and shriveled. Trim tops back to 1 inch and store onions in shallow boxes, mesh bags or hang in old nylons in a cold, dry well-ventilated room.

Garlic: Harvest garlic in mid-summer when the plant still retains 5 green leaves. Cure garlic in a warm, dry place with good air circulation for 1 month before cutting the tops and roots back. Hardneck garlic will store between 3-9 months while softneck garlic will store for 6-12 months or more.

Sweet and hot peppers: Mature, green bell peppers can be kept for 2 to 3 weeks if handled properly. Firm, dark green peppers free of blemishes and injury are best for storage. Harvest before frost to avoid damage to the fruit. Hot peppers are easiest to store after they are dry. Peppers can be dried by either pulling the plants together and hanging them upside down or by picking the peppers from the plants and stringing them together.

Tomatoes: With care, mature green tomatoes will keep and ripen for about 4 to 6 weeks in the fall. Harvest tomatoes from vigorous vines, tomatoes from nearly spent vines are more subject to decay. Harvest fruit just before the first killing frost. To store, pick tomatoes and remove the stems. Reduce rot by disinfecting fruit by washing in water with 1-1/2 teaspoon bleach per gallon of water. Dry thoroughly with a soft cloth and pack fruit 1 or 2 layers deep in shallow boxes. Remove fruits as they ripen.

Continued on Page 15

Extend the Harvest by Properly Storing Fruits & Vegetables

Pumpkins and winter squash: Harvest mature fruit with hard rinds (ones that resist fingernail pressure) just before frost. Leave the stem on when cutting from the plants to prevent decay. Cure for 10 days at 80 to 85°F. The one exception is acorn squash: store at 45°F after harvest. (Curing acorn squash will lead to stringiness.)

Apples: Late maturing apples are best suited for storage. Store in baskets or boxes lined with plastic or foil to help retain moisture. Always sort apples carefully and avoid bruising them. Store apples as close to 32°F as possible, a temperature of 30 to 32°F is ideal. Because apples give off a gas, ethylene, that will hasten the ripening of other fruit, store apples separately from other crops if possible.

Pears: For good flavor and texture, ripen pears after harvest. Pick pears when they are fully mature, firm in texture and light green in color. Ripen pears by placing them in a room at 60 to 65°F for 1 to 3 weeks. Once pears ripe, the fruit is soft and a yellow-green color, transfer to the refrigerator and store at 29 to 32°F and 90% humidity.

Many fall-harvested crops lend themselves to long term storage. Delahaut and Roper recommend the following storage conditions for extended shelf life and maximum eating quality of fall produce:

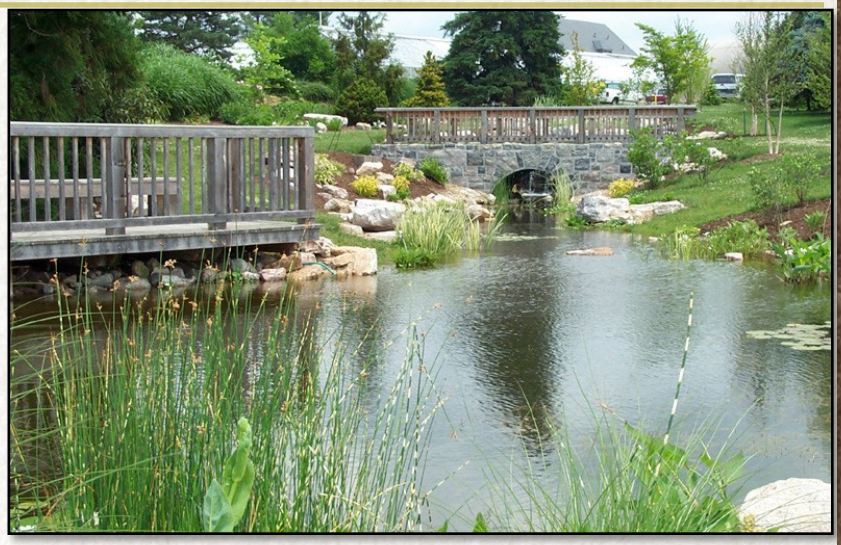
Storage Temperature, Humidity & Storage Life of Selected Fruits and Vegetables :

Commodity	Temp. (Fahrenheit)	Relative Humidity (%)	Storage Life
Apples (Late Season)	30-38	95	2-6 months
Beet, bunched	32	98-100	10-14 days
Beet, topped	32	98-100	4-6 months
Broccoli	32	95-100	10-14 days
Brussels Sprouts	32	95-100	3-5 weeks
Cabbage	32	98-100	3-6 weeks
Carrots, bunched	32	95-100	2 weeks
Carrots, matured	32	98-100	3-6 weeks
Cauliflower	32	95-100	3-4 weeks
Celeriac	32	97-99	6-8 months
Celery	32	98-100	2-3 months
Garlic	32	65-70	6-7 months
Horseradish	30-32	98-100	10-12 months
Kale	32	95-100	2-3 weeks
Kohlrabi	32	98-100	2-3 months
Onion, dry	32	65-70	1-8 months
Parsnip	32	98-100	4-6 months
Pears	34-36	95	2-4 months
Pepper, sweet	45-55	90-95	2-3 weeks
Potato, late	50-60	90-95	5-10 months
Radish, winter	32	95-100	2-4 months
Rutabega	32	98-100	4-6 months
Squash, winter	50	50-70	Variable
Tomato, ripe	46-50	90-95	4-7 days
Turnip	32	95	4-5 months

For more information on making the most of home and market produce, see **Storing Fruits and Vegetables from the Home Garden, 2006** (A3823) available from your county extension office or online from the UWEX Learning Store at http://learningstore.uwex.edu/pdf/A3823.pdf.

Winterizing the Water Garden

Virginia Cooperative Extension



Water gardens require maintenance throughout the year. Preparation for the winter months is especially important for the survival of both the aquatic plants and the wildlife in and around the pond. Some plants will not tolerate winter weather and must be removed from the pond while cold-hardy plants need only to be completely immersed in the pond. Debris such as leaves and dying plants must be removed, especially if there are fish in the pond. Fall is the time to take action. Prepare the pond for the winter months by managing the plants, cleaning the pond, and monitoring the water conditions. If treated properly, many aquatic plants and wildlife can survive in the water garden for years.

Manage the Plants

Many plants begin to go dormant as the weather becomes cooler in the fall. Stop fertilizing pond plants at this time to stop top growth and encourage root development. Remove all foliage that is yellow, brown, or decaying to keep it from falling into the pond. Take inventory and decide which plants can be overwintered in the pond, which ones must be removed from the pond for winter survival, and which ones should be discarded and purchased new the following Spring.

Discard

Removal and thinning of aquatic plants is required when there are too many plants to overwinter in limited pond space. Discarding unwanted aquatic plants requires knowledge of the growth habits and characteristics of each plant. Aquatic plants such as water hyacinth (*Eichhornia*) and water lettuce (*Pistia*) are excellent additions to the compost pile, adding nutrients and water, and degrading quickly. Other aquatic plants such as water celery (*Oenanthe*) and water pennywort (*Hydrocotyle*), which overwinter well, root easily, and spread by underground stems, can become weed problems in the landscape if added to the compost pile and not completely composted. These plants should be discarded with the trash. **Never discard water garden plants by putting them into lakes, ponds, ditches, streams, or other natural waterways.**

Tropical or Hardy?

This question is best answered by referring to the United States Department of Agriculture (USDA) plant hardiness map. Determine the zone in which the pond is located, and then refer to the hardiness rating for the plant. For example, many water lilies (*Nuphar*) are cold hardy in the entire state of Virginia while other water lilies (*Nymphaea*) are considered tropical and will not survive the winter even in the warmest location in Virginia. The following chart provides some guidance but is not inclusive. Many water-gardening resources are available to give the pond owner guidance on the winter hardiness of specific varieties of water plants.

Common Plants and Hardiness

Plant	USDA Zone	Plant	USDA Zone
Arrowhead (*Sagittaria*)	5-11	Sedges (*Carex*)	3-9
Arum (*Calla*)	4-8	Sweet Flag (*Acorus*)	4-11
Calla Lily (*Zantedeschia*)	7-10	Taro (*Colocasia*)	9-11
Canadian Elodea (*Elodea*)	8-11	Water Celery, Water Parsley (*Oenanthe*)	5-11
Cardinal Flower (*Lobelia*)	3-9	Water Clover (*Marsilea*)	6-11
Cattail (*Typha*)	3-11	Water Hibiscus (*Hibiscus*)	5-11
Fairy Moss (*Azolla*)	5-11	Water Hyacinth (*Eichhornia*)	8-11
Floating Heart (*Nymphoides*)	6-11	Water Lettuce (*Pistia*)	9-11
Frogbit (*Hydrocharis*)	6-11	Water Lily - Hardy (*Nuphar*)	Varies by variety
Iris (*Iris*)	3-9	Water Lily - Tropical (*Nymphaea*)	10-11
Parrotfeather (*Myriophyllum*)	5-11	Water lotus – Hardy (*Nelumbo*)	4-11
Rush (*Juncus*) Rush (*Scirpus*)	4-9 3-9	Water Pennywort (*Hydrocotyle*)	7-11

Winterizing the Water Garden

Virginia Cooperative Extension

Overwintering Plants

Plants such as hardy water lilies (*Nuphar*), cattails (*Typha*), sedges (*Carex*), and rushes (*Juncus* or *Scirpus*) can be put in the bottom of the pond with a water depth of 20 inches or more. The deep water insulates the plants from the cold temperatures, and the following spring these plants can be returned to the shallow water. Cold-sensitive plants such as taro (*Colocasia*) and tropical water lilies (*Nymphaea*) must be placed in a pond or tub of water in a location where the temperature stays above 50°F. Submerged oxygenators such as anacharis (*Elodea*) or parrot feather (*Myriophyllum*), and floating plants such as fairy moss (*Azolla*) can be maintained in an aquarium for the winter. When overwintering cold-sensitive plants, change the water frequently to avoid plant rot and to discourage insect pests.

Clean the Pond

Ponds need a balanced ecosystem prior to winter. The best maintenance scenario involves prompt removal of dead plant material and adequate netting placed over the pond each autumn to catch falling leaves. If debris has entered the pond, drain the pond and remove all dead and decaying plant material, soil, and other debris that has collected in the pond. First, take the water pH and temperature in the pond. Next, plants and any wildlife such as fish should be removed, if possible, and placed in adequate holding containers to avoid harming them. Then, drain the pond, clean, and inspect it for damage. Damaged areas must be repaired before fresh water can be added. To avoid plant or animal shock and possible death, make sure the pH and temperature of the replacement water is similar to what it was in the pond prior to cleaning. When replacing the pond water with chlorinated water or water from a new source, add a water treatment compound with a dechlorinator according to the label directions. Place the plants in the deeper locations of the pond for winter and engage the pump system to circulate the water. The last step is to slowly re-introduce the fish. This process is best handled within the timeframe of a day. Once this process is complete, take steps to prevent debris from entering the pond as much as possible.

Winter Water Management

In areas with particularly cold winter temperatures, snow or ice in the pond should be kept from freezing solid. Most water plants go dormant during the winter and the fish in the pond slow down, but both still need the oxygen provided by unfrozen sections in the pond to survive. Several methods to prevent ponds from freezing solid include: continually running the water pump, using pond heaters, floating de-icers, bubble balls, air-bubblers, passive solar heating options, or hand removal. Some ice in the pond is okay, but thick ice should not be allowed to develop and seal off the pond. Water levels should not be allowed to drop significantly over the winter months in order to maintain a healthy habitat for the plants and wildlife living in the pond. Monitoring the pond regularly throughout the winter will help ensure a healthy pond for the following spring.

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North Carolina State University Aquatic Plants Information Online:

Aquatic Plant Information: *http://www.weedscience.ncsu.edu/aquaticweeds/*

Water Gardening Information: *http://www.ces.ncsu. edu/depts/hort/consumer/hortinternet/water_gardens. html*

USDA Plant Hardiness map: *http://www.usna.usda. gov/Hardzone/ushzmap.html*

Virginia Cooperative Extension Publications: *http://www.ext.vt.edu*

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INVASIVE SPECIES FOR HOMEOWNERS

ASIAN JUMPING WORM

Amynthas agrestis, A. tokioensis, and *Metaphire hilgendorfi.* Family Megascolecidae

BACKGROUND

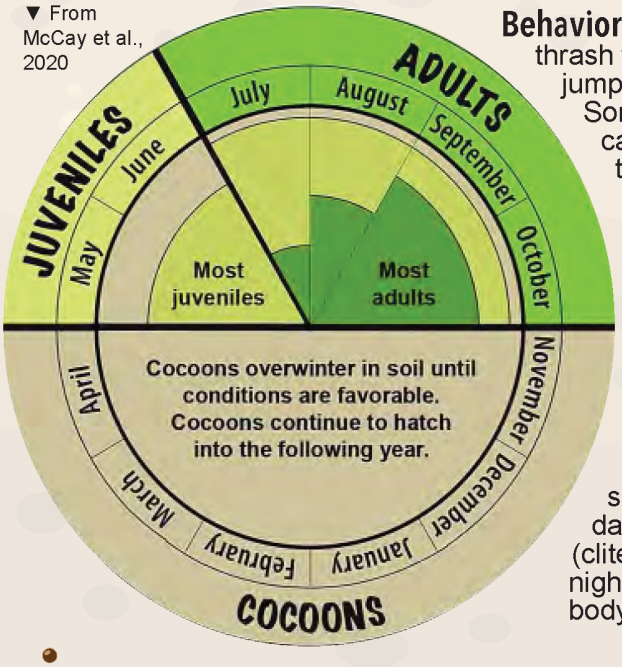
Earthworms might be a friendly sight in gardens or your favorite tool for catching fish, but most earthworms in the northeast U.S. are non-native. Jumping worms, a group of species originally from Asia, are invasive species that alter soil qualities and make it inhospitable for some plants and animals. They do this by consuming the upper organic layer of soil, which leaches nutrients and erodes the ground. This makes it hard for many plants (including garden plants) to grow and threatens even the most well-tended lawns. What's worse–humans spread worms without realizing it, carrying jumping worm egg cases (cocoons) in soil, mulch, potted plants, landscaping equipment, and even the treads of shoes and tires.

▲ Recorded sightings of jumping worm (red) in the Northeast and Midwest U.S. Data from iMapInvasives (2020).

KNOW THE WORM

Life Cycle: Most jumping worms have an annual life cycle. In the spring they hatch from poppy-seed-sized cocoons and after 70-90 days become mature and can produce new cocoons. In the late fall, adults die but the cocoons over-winter to start the next generation.

▼ From McCay et al., 2020



Behavior: These worms thrash wildly and often jump or flip over. Sometimes they cast off the end of their tail.

IN A NUTSHELL

When jumping worms invade, they consume and degrade soil which threatens the future of gardens, forests, and lawns.

Jumping worms are often spread by people through mulch, compost, gardening tools, and treads.

Stop the spread! Use our checklist (pg. 2) to be worm-smart.

Castings: Their castings (feces) appear like coarse coffee grounds that create a loose layer between leaf litter and mineral soil beneath. ►

Look-alikes: Jumping worms might be confused with another invasive worm, the nightcrawler (*Lumbricus* spp.); both can be large with dark coloring. Jumping worm adults have a smooth milky-white collar (clitellum) close to the head end (14-16 segments away), whereas nightcrawlers have a raised pink-red collar more central along the worm's body.

▲ Jumping worms hold their eggs in cocoons the size of a poppy seed, like this. *Can you find the 7 other cocoons?*

JUMPING WORM

NIGHTCRAWLER

▲ Note the collar's color and its distance from the head. Credit: UW Madison Arboretum

NEW YORK INVASIVE SPECIES RESEARCH INSTITUTE NYISRI

Jumping Worm Outreach, Research & Management
JWORM WORKING GROUP

CHECKLIST


Jumping worms present on your property: Focus on preventing spread


No jumping worms present on your property: Focus on monitoring and preventing introductions


Before Planting: Act before planting to prevent jumping worm introductions

MINIMIZE THE SPREAD

Be a worm-wise buyer

Do not buy or use jumping worms for bait, vermi-composting, or gardening. Purchased earthworms may also be mislabeled, so learn to identify jumping worms by their look and behavior.

Scout the Soil: Check new mulch, compost, and soil for jumping worms and inquire with providers if measures have been taken to reduce the spread of jumping worms.

Use mulch, compost and soil that are free of jumping worms and cocoons.

If you can't confirm the source is jumping worm-free, only purchase or trade mulch, compost, and soil that has been heated to appropriate temperatures and duration following protocols for reducing pathogens (104 - 130°F for three days is sufficient).

Scan the Plants: Check the soil and roots of potted plants and trees for jumping worms or castings before planting them in your yard.

When the option exists, choose bare-root plants over potted plants, ensuring no soil remains affixed.

If you find jumping worms in materials you bring in, dispose of all contaminated soil and castings in the trash and kill worms by freezing or leaving in a bag out in the sun, then discard. Alternatively, worms may be killed using vinegar or rubbing alcohol.

KNOW THE SIGNS

- Educate yourself and others to recognize jumping worms.
- Educate yourself and others about the life cycle of jumping worms.
- Learn to recognize the soil signature of jumping worms.

Clean boots, gear, and even roots

Clean compost, soil and debris from vehicles, personal gear (clothing and boot treads), equipment, and gardening tools before moving to and from sites. Anything larger than a poppy seed could contain jumping worm cocoons.

When working with logging and landscaping companies, request equipment arrive and leave clear of soil– and encourage your neighbors and local government to do the same.

If jumping worms are present on your property, minimize the sharing and moving of plants where possible. If you do move or share plants, wash roots and share them either bare-root or re-pot in sterile potting soil.

When sharing or moving seedlings and small plants, rinse roots to minimize jumping worm spread when possible: gently massage roots in a basin of water to remove soil clumps, until no soil remains affixed. Afterwards, strain the water and place any solids larger than a poppy seed in a trash bag in the sun before disposing.

TAKE INITIATIVE

Check your property periodically for jumping worms by raking leaf layer, checking underneath.

Use mustard to count the earthworms on your property: Mix 1 gallon of water with 1/3 cup of ground yellow mustard seed and pour slowly into the soil. When worms come to the surface, look for jumping worms. Note: 1) this method is safe for most plants 2) mustard is not lethal to earthworms and is not an effective control.

Report jumping worm observations to your state department of natural resources or your local cooperative extension.

Help advance jumping worm research by taking part in citizen science, a bioblitz, or use recording apps like iMapInvasives.

Jumping Worm Outreach, Research, & Management Working Group, 2021

Abby Bezrutczyk, Audrey Bowe, Carrie Brown-Lima, Andrea Dávalos, Annise Dobson, Brad Herrick, Timothy McCay, Kyle Wickings

Questions?
Visit: **http://www.nyisri.org/research/jworm-2/**
Email: nyisri@cornell.edu

Report your sightings

Go to **https://www.imapinvasives.org/** to record any sightings of jumping worms.

We actively use this data for early detection and understanding the invasion.

About Us

The Master Gardener Program is a national program of trained volunteers who work in partnership with their county Cooperative Extension Office to share information throughout the community.

Master Gardeners are neighbors teaching neighbors about landscapes, vegetables, fruits, herbs, houseplants, beneficial and harmful insects, plant diseases, integrated pest management, wildlife management, soils, birds, composting, water conservation, and much much more.

Master Gardeners are considered researchers rather than experts. They participate in 40 hours of training provided by experienced staff from Cornell Cooperative Extension to gain a basic understanding of horticulture and available horticultural information and online resources. Course topics include plant nutrition, soils, vegetable, fruit culture, trees, shrubs, lawns, diseases and insects that affect plants, pruning and more.

You don't need to be an expert to join, if you enjoy gardening as a hobby, this may be perfect for you.

To become a Master Gardener, all you need to do is attend a 10-week training offered by Cornell Cooperative Extension.

For more information, please call us at 315-536-5123!

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