



Trumpet Vine

Knowledge for the Community From Loudoun County Extension Master Gardeners

Summer 2018

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LOUDOUN COUNTY EXTENSION MASTER GARDENER LECTURE SERIES

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July 12, *Blooming Hill Lavender Farm*, a field trip to tour these attractively designed lavender gardens in Purcellville.
19929 Telegraph Springs Rd.
Purcellville, VA

August 2, *In Search of Wild Orchids* with Hayden Mathews. He will share his experiences finding and identifying wild orchids in our area.

September 6, *What's Up With Washington Weather?* with Kevin Ambrose, author and member of the Washington Post's Capital Weather Gang. Is it our imaginations, or is our local weather really becoming crazier every year?

For more information, visit our website at
loudouncountymastergardeners.org.

Visit us on Facebook:
Extension Master Gardeners of Loudoun County, Virginia.

Summer – Anticipating Wonderful Results

Abundant harvests, beautiful flowers, beneficial insects--that's what summer is all about for gardeners.

We had a difficult winter that was dry, windy, and cold, which some plants could not survive. Then, we had a relatively cool and very wet spring. But the plants that haven't drowned or rotted seem to be thriving. For the first time my paw paw trees were full of flowers and now small fruit (the raccoons are already circling!) My spring ephemerals put on a fine display, a small jack-in-the-pulpit that I planted last year came back, and the ferns are incredibly lush. I hope these are signs of a great growing season to come.



Assassin bug on hyssop in Demo Garden



Monarch on Joe Pye in Demo Garden

Let's hope all our plans and toil produce wonderful results this summer.

You are welcome to visit our Demo Garden in Leesburg, 94 Ida Lee Dr. NW. Follow the signs to the gardens and walk just past the community garden plots. Master Gardeners are in the garden every Tuesday and Thursday morning and would be happy to give you a tour and answer questions. The Demo Garden is open dawn to dusk. It's a great place for photography.

Children in the Garden

The Children's Education Team (CET) of the Loudoun County Extension Master Gardeners has a primary focus of providing age-appropriate horticultural educational activities for the youth and children in our community.

CET volunteers consult with schools on new or revitalized school gardens and offer workshops and lessons on a variety of garden-related topics to school classes and after-school or summer youth programs. This year a pilot program was held at Sugarland Elementary School in Sterling where every class had a gardening lesson offered during their library time once a month. Through stories, lessons, and hands-on activities, children learned basic garden and plant needs; the interconnectedness of plants, insects, and other garden creatures in food webs; the importance of good soil; the parts of a plant and the food we eat from each plant part; and the makeup



Students at Sugarland Elementary School examine soil. Photo by Diane Bayless

and role of seeds. Once weather warmed in the spring, children planted seeds and began tending their garden plots, and an after-school garden club was formed for 4th and 5th graders. As the year wraps up, an evaluation is underway to refine the program for the coming year with the goal of making similar programs available to other schools in the future.

School and youth group programs are limited to their specific audiences, but our annual summer series at the Sterling Library is open to all children in grades K-5. This year the programs will be held Mondays from 2:30 to 3:30 p.m. beginning June 18 and running through August 6. The various lessons will include hands on activities relating to garden basics, the parts of a plant, seeds, foods we eat, and monarch butterflies. More information can be found at <http://loudouncountypubliclibrary.evanced.info/signup/calendar>, using the key word gardening.

Another opportunity for children to get involved in gardening exists at the Demonstration Garden at Ida Lee Park in Leesburg. A children's garden section contains child-sized features aimed to stimulate senses and encourage imagination. A winding maze is filled with colorful plants, a *touch* garden includes plants with different textures, and a *scents* garden encourages children to become more aware of different smells of plants. Colorful painted birdhouses line one side of a fence that provides a backdrop for Virginia wildflowers. The garden also contains is a charming child-sized vine house covering the picnic table that provides a secluded spot for play or lunch.

A new feature in the vegetable portion of Demo Garden is a special section just for children. This section, at one end of the garden, is clearly outlined with a small white fence and marked with colorful signs. It is a special place designed



Students at Park View High School plant in their new garden. Photo by Cynthia Falconer



Children's section in the vegetable garden. Photo by D. Bayless

specifically with children in mind. Produce in the main beds of the vegetable garden is delivered to Loudoun Hunger Relief to serve the needs of our community so visitors are encouraged to observe growing techniques but not to pick the produce. In the special children's area, however, children are invited to pick and sample the garden produce to connect the food they eat with gardening. This area is a joint project involving Demo Garden and CET volunteers and was planted with the help of Girl Scouts from Troop 4007.

Why is children's gardening so important? Many recent studies have shown that children who plant their own vegetables or are actively involved with gardening are more likely to develop healthful eating habits. Working in the garden also provides great physical exercise, a further factor in reducing childhood obesity. Caring for a garden with age-appropriate tasks such as weeding, watering, and gathering produce can help children learn responsibility. When children are given meaningful experiences in a real-life setting they develop a greater sense of pride and self-esteem.

Careful observation in the garden can help children learn about the interaction among plant and animal life in the garden. This can help children better understand the natural world and the impact their actions have on it. The garden can become a science lab for learning when children make observations and predictions and take measurements: Which pumpkin do they think will be the biggest? Which plant will grow the tallest? Which tomato plant will produce the most fruit? What method works best for protecting plants from harmful insects while still protecting the environment? Can they predict when the first bean will be ready for picking? Children are sure to think of dozens of other questions they can explore in the garden.

The garden can also spark imagination and creativity. Children with an artistic interest can draw what they see. Those who love literature can write poems or make up stories--perhaps a story about a toad that startled you when you were watering? Older children can use the garden experience as a springboard for more learning: research what the toad eats, where it sleeps, or who its enemies are. How can we encourage toads and other beneficial creatures to frequent our garden?

The possibilities for garden learning are endless. The volunteers from the Children's Education Team plant the seeds for this learning through their programs. Teachers and youth group leaders can request presentations at <http://loudouncountymastergardeners.org/programs/childrens-program/>. But anyone who cares about gardening and its impact on the environment (which probably means anyone reading the Trumpet Vine) and is also a parent, a grandparent, an aunt, an uncle, a mentor, or someone who otherwise cares for children can encourage them to get out in the garden and explore all it has to offer.

Diane Bayless, Loudoun County Extension Master Gardener

Maintaining the Summer Vegetable Garden

As we move from the wet days of spring into the heart of summer, vegetable gardeners shift from spending their time planning and planting to anxiously awaiting that first pepper, bean, or tomato.

On your daily trip to the garden seeking out that first fruit, consider some key actions that will aid you in reaping the maximum benefit from your time and efforts.



Watering lettuce Photo C. Ivory

Provide adequate water – Mother Nature will be a bit stingier with the rain during the summer months. Determining watering frequency and the amount of water needed is dependent on many factors including the soil content, specific plant requirements, and the gardening method. Containers and raised boxes will require more frequent watering than more traditional methods. A good rule of thumb is to water when the top 2 to 3 inches of soil has dried and to water deeply when watering (approximately 6 inches).

Finalize support systems – If you have not done so already, now is the time to get those stakes, tepees, and trellises installed. Benefits to using these supports include increased air circulation, access to more light, and easier pruning and thinning. Be cautious not to injure roots if you are installing structures after planting.

Choose a mulch – Surrounding your plants with mulch serves a variety of different purposes; it retains moisture, regulates soil temperature, and reduces weeds and disease. Fortunately, there are numerous options available for even the pickiest among us. Choose from hay, pine needles, compost, rocks, landscape fabric, etc. Each method has its strengths and challenges. Choose what works for you and your plants.



Tomato cage Photo from [Gardeners Supply](#)



Photo by C. Ivory

Eliminate weeds – The common saying "it grew like a weed" exists for a reason. We may not be able to completely eliminate weeds but we can certainly give it a try. Weeds harbor diseases and insects and compete with our plants for resources like space and nutrients. Dispensing of weeds early and then using a mulch to prevent their return will result in less weeding throughout the season.

Feed – Plants will have differing needs throughout the growing season. Check the labels of your plants when you purchase or research to determine how much and how often to feed. Vine plants are heavy feeders and you will want to feed them as they begin to spread and when in bloom. Plants like peppers and tomatoes will need to be assessed three to four weeks after planting. Just as humans can be harmed by overeating, overfeeding can damage your plants. Be sure to follow the instructions on any fertilizers or amendments.

Be on the lookout for bugs and disease – Visit your garden every day and be aware of any changes to your plant that are outside the norm (leaves dropping, leaves curling, leaves spotting, color changing, plant wilting, etc.). If you need help diagnosing or treating problems, call the Loudoun County Extension Master Gardener Help Desk at 703-771-5150 or consult <https://www.insectid.ento.vt.edu/insect-id/vegetable-pests/index.html>.



Striped adult cucumber beetle
[Photo: U. MD Extension](#)



Vegetables from the garden
Photo N. Martin

Harvest regularly – This is the part most of us relish. Regularly harvesting fruits and vegetables encourages new growth for leafy vegetables and fruit production on tomato, pepper, and vine crops. Harvest a few carrots, onions, and radishes while small to make room for the remaining vegetables to grow larger.

Remember to clean your tools regularly to prevent the spread of disease from plant to plant.

Theresa Hutton-Sherman, Loudoun County Extension Master Gardener

It's Tick Season! Facts You Need to Know

Ticks have been very prevalent recently. Make sure you know what the different ticks in our area look like and which ones cause the most concern. Lyme disease is carried by the black-legged tick or deer tick.

http://www.vdh.virginia.gov/content/uploads/sites/12/2016/10/Tick_borne_Disease_Flyer.pdf

Be aware of the symptoms of Lyme disease.

<https://www.mayoclinic.org/diseases-conditions/lyme-disease/symptoms-causes/syc-20374651>

Bacterial Leaf Spot in the Home Garden

Due to our recent spring weather pattern, gardeners should be on the lookout for bacterial leaf spot. Bacterial diseases (much like fungal diseases) favor wet and/or humid conditions such as those we have been experiencing. Bacterial leaf spot can infect many common home garden plants. Tomatoes and peppers are both susceptible to bacterial leaf spot. In addition, the following common plants and trees are susceptible to bacterial leaf spot:

Herbaceous Plants

- Chrysanthemum
- Geranium
- Phlox
- Salvia
- Hibiscus
- Zinnia
- Purple Coneflower
- Black Eyed Susan
- Impatiens

Woody Ornamentals

- English Ivy
- Hydrangea
- Magnolia
- Prunus Family, including apricot, cherry, peach, and plum
- Many maples, especially Japanese maples

Bacterial leaf spot is more likely to affect a susceptible host when the environmental conditions are favorable. When temperatures rise above about 65 degrees and moist conditions are present, the bacterial disease is prone to spread. Moist conditions may come from frequent rain, humidity, or frequent overhead watering.

Identification: Bacterial leaf spot may not display any symptoms in the earliest stages of the disease, but eventually the characteristic leaf spots will appear. Bacterial leaf spot may be confused with various other fungal leaf spot diseases. One way to tell them apart is to take a close look at the spots themselves. The spots of bacterial leaf spot tend to be more angular, while fungal leaf spots are often more round. In addition, bacterial leaf spots do not tend to cross leaf veins. The spots are often described as greasy looking, especially when the leaf is wet. Over time, the inner parts of the lesions dry and fall out, leaving small holes. Eventually, a heavily infected leaf may turn yellow and fall off.



Bacterial leafspot lesions on peach.
Courtesy George Philley, TAES - 1995.

<https://plantdiseasehandbook.tamu.edu/food-crops/fruit-crops/peach-apricot-and-nectarine/>

Bacterial leaf spot may also affect the fruits of the host plant, such as stone fruits and tomatoes. The fruit lesions will have a scabby or corky appearance. Note that another common leaf spot disease affecting tomatoes, Septoria Leaf Spot, will not cause spots on the fruits. Although unsightly, the lesions will not cause the fruit to rot, and the fruits are still edible.



<https://extension.psu.edu/bacterial-spot-of-tomato-biology-and-management>

Remediation: If you suspect you have plants infected with bacterial leaf spot (or any leaf spot disease!), the following are recommended clean-up activities:

- Remove infected plant parts.
- Clean up plant debris (don't compost).
- Get rid of nearby weeds.
- Turn over the soil near the plant.
- Thin the plants to improve air circulation.

Prevention: While we cannot control the weather, the good news is that there are many things the home gardener can do to reduce the likelihood of bacterial leaf spot. These actions include:

- Buy certified disease-free seeds.
- Buy resistant cultivars of plants.*
- Mulch the area around the plants.
- Weed the area around the plants.

- Disinfect garden tools between uses.
- Don't prune in wet weather.
- Avoid frequent overhead watering.
- Do not overcrowd plants.
- Don't let lower branches be in contact with the soil.
- Reduce plant stress through proper care.

*For an excellent list of vegetable cultivars that are resistant to bacterial leaf spot and other afflictions, reference Cornell University's Vegetable MD Online at

<http://www.vegetablemdonline.ppath.cornell.edu/Tables/TableList.htm>

Marcee Judd, Loudoun County Extension Master Gardener Intern

A New Danger to Crops in Virginia: The Spotted Lanternfly

The spotted lanternfly, an invasive species with potentially significant consequences for some popular Virginia crops, was discovered near Winchester, Virginia, in January. It is highly invasive and can spread rapidly when introduced to new areas. This is attributed to its wide host range (more than 70 host plant species) and a lack of natural native enemies. In Pennsylvania, the lanternfly has been seen on grapes, hops, and stone fruit, and it has also appeared on apples.

The spotted lanternfly, *Lycorma delicatula*, is a non-native sap-feeding plant hopper. The first sighting of the spotted lanternfly in the United States was in Berks County, Pennsylvania, in 2014. Thought to be native to China, the species spread to other Asian countries in the early 2000s. In South Korea, the population of spotted lanternflies expanded and caused significant economic damage to grapevines and fruit trees. Reporting has identified spotted lanternflies feeding on more than 70 species of plants, including tree of heaven (*Ailanthus altissima*)--the preferred host plant; apple (*Malus spp.*); plum, cherry, peach, apricot (*Prunus spp.*); grape (*Vitis spp.*); and pine (*Pinus spp.*) among others.

Life Cycle and Identification

Spotted lanternflies overwinter as egg masses containing 30 to 50 individual eggs and produce one generation each year. In Pennsylvania, nymphs hatch from late April into May and are less than ¼-inch long. Nymphs undergo four instars, all of which are wingless and incapable of flight. The first three instars are black with white spots and somewhat resemble ticks. The fourth instar develops red patches on the body and is more than ½-inch long.



Spotted lanternfly nymphs are black with white spots in their first three instars; the fourth instar develops red patches. Photos: E. Swackhamer, Penn State



The adult spotted lanternfly holds its wings over its back tentlike. Photo: Henripekka Kallio



Bright red coloration of the hind wing distinguishes spotted lanternfly. Photo: H. Raguza, PA Department of Agriculture

Adult spotted lanternflies are visually striking when they are startled and expose their bright red coloration on hind wings. The forewing is gray with black spots near the base, and the tips are black with a dense series of lighter gray crossveins. A spotted lanternfly holds its wings over the body tentlike. The adult's abdomen is yellow with black bands running down the center. Although they have wings, adults are weak fliers. Instead they jump with the aid of their wings.



Egg masses of spotted lanternflies can be found on many objects September through May. Photo: E. Swackhamer

From late September until early December, in Pennsylvania, adults disperse widely and congregate on host plants (most commonly tree of heaven). This is a good time to search for spotted lanternflies. Adults lay brown to tan seed-like eggs in rows on host plants (most commonly tree of heaven) and other smooth surfaces (bricks, lawn furniture, rusted metal, etc.). Rows of eggs are often oriented vertically and covered with a gray waxy secretion that first appears white, but quickly turns gray-brown in color.

Signs of infestation

Trees fed on by spotted lanternflies will develop weeping wounds. The gray or black trails along the trunk produce sap that will attract other insects, particularly wasps and ants. There may also be a buildup of honeydew excrement on affected plants and on the soil around the plants. Black sooty mold may also grow on the honeydew or on the surrounding soil and understory plants.

Control in Virginia

Since the Winchester spotting in January, researchers and scientists from multiple Virginia agencies and the United States Department of Agriculture are working to develop control strategies to slow its spread across the state. Virginia researchers have learned a lot about the spotted lanternfly from research conducted in South Korea and Pennsylvania, but they don't know if the control strategies used in Korea and Pennsylvania will work in Virginia.

What can you do?

1. Search tree trunks, stone surfaces, lawn furniture, fruit trees grapevines, and other smooth surfaces for egg masses.
2. Scrape egg masses from surfaces into a plastic bag. Be sure to remove all the seed-like eggs.
3. Wet egg masses with alcohol or hand sanitizer and discard the bag.

If you want more information on the spotted lanternfly, **or if you think you might have identified one on your property**, see: <https://ext.vt.edu/agriculture/commercial-horticulture/spotted-lanternfly.html>. This website will tell you how to report your sighting.

Carol Ivory, Loudoun County Extension Master Gardener

References: *Ecological Landscape Alliance. Spotted Lanternfly (Lycorma delicatula) by Maureen Sundberg, May 15, 2018, in [Disease and Pests Management](#).*

That Cactus Is a Native?

The eastern prickly pear cactus, *Opuntia humifusa*, **is** a Virginia native. While the native plant literature lists it as a coastal plant that grows on sandy coastal dunes, it can also be found thriving in rocky Piedmont clay. It grows at the Virginia arboretum on a rocky outcropping, at the base of a large juniper at Oatlands, and around mailboxes in Leesburg. The United States Department of Agriculture plant map shows that it is native from Ontario to Florida and as far west as Montana. It prefers dry, well-drained spots.



Cactus plants at the nursery. Photo by C. Ivory

It is described as a clump-forming cactus bearing few yellow flowers, often with reddish centers and flat, fleshy, green pads covered with clusters of minute, reddish-brown, barbed bristles. The oval, segmented pads of this prickly pear occur in low mounds usually less than 8 inches in height but up to 3 feet across. Large, waxy, yellow flowers with masses of showy stamens are produced singly or in small groups along the upper edges of the pads. A reddish-colored, edible fruit follows. Small hair-like spines occur on the pads and fruits.

The juicy and edible red fruits measure from 1 to 2 inches. As the fruit matures, it changes color from green to red and often remains on the cactus until the following spring. The ripe fruit can be eaten raw or in jelly. Tender young leaf pads can also be eaten during the spring. A variety of recipes can be found online.

The flowers are recognized by pollination ecologists as attracting large numbers of native bees. The plant including its seeds is also occasionally eaten by wild turkey and small mammals.

New plants are easy to propagate from cuttings:

1. Cut off an individual pad.
2. Allow the cut end to dry and heal over for about one week.
3. Plant the pad with the cut end about 2 inches into the soil.
4. Water sparingly.
5. Test for new roots by tugging gently after about one month's time. If the plant resists pulling, you have roots. If it comes loose, give it more time.



This photo illustrates the importance of keeping cactus free of weeds. Photo by C. Ivory

The prickly pear cactus is relatively maintenance-free, but it should be weeded. Don't be alarmed if your plants deflate during the winter. This is their normal response to dormancy. They'll plump back up in spring. If you have a dry sunny spot, add a native cactus as a conversation starter.

Carol Ivory, Loudoun County Extension Master Gardener

Aucuba Japonica – Right Plant, Right Place

One of the phrases taught to us in Master Gardener training was “Right Plant, Right Place.” This phrase has taught me a lifelong lesson in gardening.

Both my mother and grandmother had *Aucuba japonica* in their yards; they were unusual and beautiful plants. When I lived in Winchester, Virginia, I also had an aucuba and it was a striking plant in my yard. I knew when I moved to Leesburg, I would be planting an aucuba.

I thought the location I chose for my aucuba would be perfect. However, at the end of winter and beginning of spring, my aucuba looked horrible. On one branch, all the leaves had turned black. On another branch, the leaves were wilted and were turning brown. Many leaves had dropped off. I was certain my dying aucuba had a disease or a pest or both. I immediately started researching the care of the aucuba while the mantra of “Right Plant Right Place” kept ruminating in my mind.

Aucuba japonica, also called Japanese laurel or spotted laurel, is a dense broadleaf evergreen shrub that is typically found in the understory layer of a forest or in dark shady areas of a yard. The shape is rounded with upright or arching branches that have limited branching. The evergreen aucuba can be grown as a specimen plant, in groupings, or as a screen. These introduced shrubs from Asia, ranging from Japan and China to the Himalayas, are grown for their foliage. The 3 to 8 inch dark green, leathery leaves of an aucuba are toothed, oval, and shiny with differing amounts of gold variegation. One cultivar, Gold Dust or Variegata, has gold-speckled leaves while the Picturata has leaves with a large golden yellow center. While the aucuba is not a native plant, the Gold Dust cultivar has been in the United States since the late 1700s. Horticulturist Michael Dirr lists 21 varieties of aucuba that can be propagated easily from cuttings.

According to the Mississippi State University Extension Office, an aucuba adds winter interest and texture to your landscape. Dirr writes that the aucuba adds a “touch of brightness to dark corners.” The aucuba is cold hardy to about -5 degrees, and may need more protection in zone 6. The aucuba grows relatively slowly. Depending on the cultivar and the growing conditions, aucuba can grow 3 to 10 feet tall (with some varieties up to 15 feet tall) and 3 to 5 feet wide.

Aucuba are dioecious plants, having a male and a female plant with a male or a female flower on separate shrubs. The panicle flowers bloom from March to April with the female plant producing large red berries in the fall. The fruit is a berry-like drupe similar to a cherry that matures in October and November. You will need female varieties and a male or two to successfully produce berries. The reddish-purple flowers are not very showy but the male flower is taller than the female flower. The berries are often hidden by the foliage. Both the leaves and the fruit are poisonous if eaten by pets.

The University of Florida Extension Office describes an aucuba as a tough plant that is drought tolerant when it is older. Disease and insects are not significant problems with the aucuba. The aucuba prefers partial to full shade and young leaves will blacken when exposed to sun. Clemson University Extension says that the biggest problem of the aucuba is that full sun will burn the foliage.

The aucuba needs moist soil that drains well according to the University of Florida Extension Office. Clemson Extension states “the ideal soil is moist, high in organic matter and well-drained,

although it will tolerate almost any soil condition." The aucuba competes well with other tree and shrub roots and can be pruned at any time to control growth. The Royal Horticulture Society in Great Britain states "Aucuba is recommended for its robustness and ability to grow in dry, shaded sites. Aucuba can become stressed when its roots become waterlogged during cold, wet winters, for example, and as a result the leaves and shoot tips turn black." So both too much sun and waterlogged roots can cause blackened leaves.

Since I had been observing where my plant was living, I realized it was in very strong afternoon sun for up to three or four hours every day even during the winter. I also noticed that the soil in the area where the aucuba was planted did not appear to drain well. I wondered if perhaps the location, specifically the sun and the soil, was the culprit and not a disease or pest.

I had been ready to pull out my aucuba and start over but Dirr writes that the aucuba is easily transplanted and presents no transplanting problems. Both Clemson and NC State Extensions also stated that the aucuba transplants easily. Although I was not eager to transplant the aucuba and cause even more stress to an unhealthy plant, I made the decision to move the plant. On April 22, I dug up my aucuba and moved it to a more consistently shady location with better drainage.

Although the aucuba is called a slow-growing plant, to my surprise, after only two weeks in its new location, there were many new shoots, no wilted leaves, and no new black leaves. The plant looks healthier. Maybe this location is finally the "right place" for the right plant, a beautiful aucuba japonica.



Black leaves on my aucuba at the end of the winter.



New leaf growth on my aucuba after two weeks in its new location.

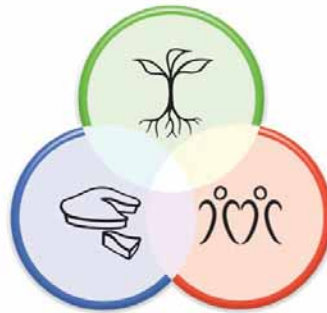


Beth Checkovich, Loudoun County Extension Master Gardener Intern

What the Heck Is Permaculture?

Permaculture is a system of cultivation intended to maintain permanent agriculture or horticulture by relying on renewable resources and a self-sustaining ecosystem.¹ The concept was pioneered by two Australians, David Holmgren and Bill Mollison, in 1978.² It involves a set of three ethics and twelve design principles that are used in creating agricultural ecosystems.³

Central to permaculture are **The Three Ethics**.



1. **Care of the Earth** - This can be taken to mean caring for the living soil. The state of the soil is often the best measure for the health and well-being of society.
2. **People Care** - This begins with ourselves and expands to include our families, neighbors, and wider communities. The challenge is to grow through self-reliance and personal responsibility. Self-reliance becomes more feasible when we focus on nonmaterial well-being, taking care of ourselves and others without producing or consuming unnecessary material resources.
3. **Fair Share** – This speaks to taking what we need and sharing what we don't while recognizing that there are limits to how much we can give and how much we can take.

The Twelve Design Principles ensure that the Three Ethics are used in appropriate ways.

1. **Observe and Interact** - Good relationships, careful observation, and continuous interaction **are** required to begin the change process. The evolution of land use is difficult. Pre-designed systems from the outside will not be as successful as a locally evolved model. Diversity of local models should inspire innovation and help others to develop their own models.
2. **Catch and Store Energy** - Overharvesting of fossil fuels is unsustainable. We need to rethink our energy development and sources. This is not just about the big name items of sun, wind, and runoff water. It is also about other potential sources of energy that could come from wasted resources in the agricultural, industrial, and commercial arenas.
3. **Obtain a Yield** - Any system needs to be designed for self-reliance at all levels. If what we create does not produce immediate and useful outputs, it will not last.

¹ Dictionary.com <http://www.dictionary.com/browse/permaculture?s=t>

² <https://en.wikipedia.org/wiki/Permaculture>

³ Permaculture Principles by David Holmgren – www.permacultureprinciples.com - Creative Commons license [CC BY-NC-ND 2.5 AU](https://creativecommons.org/licenses/by-nc-nd/2.5/)

4. **Apply Self-Regulation and Accept Feedback** - Understand how positive and negative feedbacks work in nature. Design a system that is self-regulating. That involves making every element of the system self-reliant and energy efficient.
5. **Use and Value Renewable Resources and Services** - Think about every resource that is used and how it will be replenished. Understand the difference between renewable and nonrenewable.
6. **Produce No Waste** - This addresses frugality, care for material goods, pollution, and opportunity to reuse waste. Think through the waste produced in your system and figure out how to put it to good use.
7. **Design From Patterns to Details** - Start with the big picture then dive into the details. Site analysis is very important. Apply patterns to the design of the system. Understand zones of intensity in each area--sun, wind, flood, and fire patterns all figure into the design.
8. **Integrate Rather Than Segregate** - Think about how animals, plants, and humans work together and interact in your system. Focusing on these relationships can bring them closer together, and decreasing the amount of human intervention is required to maintain the system. Eliminate the single point of failure.
9. **Use Small and Slow Solutions** - Systems should be designed to perform functions at the smallest scale that is practical and energy-efficient for that function. Human scale and capacity should be the yardstick for a humane, democratic and sustainable society.
10. **Use and Value Diversity** - Diversify to avoid vulnerability. Polyculture is the cultivation, within an integrated system, of many different animal and plant species. Polyculture not only reduces vulnerability to pests and diseases (thereby reducing the need for toxic chemicals) but it also decreases resistance to market changes and increases the number of goods introduced into the local economy.
11. **Use Edges and Value the Marginal** - Don't just look at the main components of a system. Look at how components meet and what happens along those edges. Think about the things that you cannot see that happen within the system. How can they be supported and used to contribute to the overall system?
12. **Creatively Use and Respond to Change** - Nothing is stable. Change is good. Don't fear it. Be flexible. Study the change. Use it to your advantage.

So the next time you start to plan a garden, a farm, or an entire city, keep your permaculture design ethics and principles in mind! For more information, visit www.permacultureprinciples.com.

Katie Conaway, Loudoun County Extension Master Gardener Intern

Pruning Your Azaleas

Azaleas are a classic woody plant in Virginia and also in a wide range of states, particularly in the Southeastern United States. As our family has moved (military assignments) we have had azaleas in Georgia, Alabama, Illinois, and Virginia. Our azaleas have flourished in each of these areas, even in the colder environment in Illinois. The lavish flowers of the azaleas make spring really special.

What we have found is that pruning depends not only on the hardiness zone but more importantly on which kind of azalea you have. Do you have a native azalea or an Asian variety? Native azaleas are more like vines. They do not need pruning except pruning dead wood as in all bushes. Try not to buy varieties that will get too large for the space where they are planted. Satsuki hybrids such as Gumpo grow only about 3 feet tall, while Southern Indica hybrids such as George Lindley Taber and Mrs. G.G. Gerbing can grow 10 feet tall. You naturally would not want to plant one of these larger varieties under a first story window. Also consider the natural habit or shape of azaleas to help guide you in pruning. All shoots grow outward from their tips. Whenever tips are removed, lower buds are stimulated to grow. Buds are located at nodes, where leaves are attached to twigs and branches. Each node produces from one to three buds, depending on shrub species. Evergreen azaleas have mounding habits. That is, they generally have soft, flexible stems, small leaves, and are often used in mass plantings.

As you examine your azaleas, **are they happy?** I view shrubs, trees, and plants as our friends. They sit there growing in their own way, trying to survive and thrive, occasionally asking for our help, not literally, but conceptually. They don't require much attention but they do need the right kind of soil, on the acidic side (4.5 to 6.0) and the right mix of sun and shade, on the shady side but not too shady. They should not be exposed to severe wind. They need some pruning now and then. Cut back that gangly branch that wants to reach for the sun. They are not people but they are living things. Even those that are not feeling well, in my opinion, should be given a chance to come back. Give them a chance.

Are there **signs of fungus** or other problems? One of the common difficulties is a scaly growth on the branches. It looks like lichens that you see on rocks or old trees. These tend to be on dead wood. If this dead wood is not cut back in time, the whole plant might be lost. Also look for borers in the ends of previous cuts. Be sure to cut back enough to get to live wood with no hole in the center. If you still see a hole, try to cut back further toward the center of the bush. If borers have gotten to the ground level, the whole bush may be lost. There should be at least three or four main branches coming out of the ground. If a borer gets to the ground level, cut that whole main branch off. One of the other two or three branches that are left may survive. Also cut suckers at the base of the bush. Always remember to dispose of cuttings quickly so that any disease is not spread. REMINDER: Be sure to use a disinfectant on pruning tools when going from bush to bush or even within cuts to a single bush that has evidence of fungus. This helps to prevent the spread of fungal growth. A 20 percent bleach in water solution can also be used but be aware that a bleach solution can be very corrosive to metal parts of pruning tools.

When should I tackle them? Prune them soon after they bloom. The longer we wait, the more likely it is that we are cutting off next year's buds. We want to make sure that all the energy of the plant is being used toward growth that is going to be around next year, i.e., try not to let them grow for two months after bloom and then cut off large portions. The energy that the plant

used would be wasted. In Northern Virginia, pruning should be done before August to ensure that new buds are not lost, i.e., that flowers for the next season are not lost. Do they really need pruning? Look for branches that have come out well beyond the rest of the plant. In most cases these branches will be at least 5 or 6 inches beyond the rest of the bush. Cut these off below the level of the rest of the plant. They will normally sprout additional growth nearer the center of the bush, which will add to the overall health of the bush by adding a higher level of leaves and thus a higher level of photosynthesis. That in turn makes the overall plant healthier.

What is my objective? Is it purely for creating a look or obtaining perfection or to solve a serious imbalance? Let's look at a possible serious imbalance first. This frequently occurs when there is a significant difference in the amount of sunlight that parts of the bush get or occasionally in cases in which different parts get drastically different amounts of water, such as near a drain spout. If the bush were in a large container on a patio it would be easy to just rotate the container. When the bush is in the ground, obviously it can't be rotated, so modest pruning can help the appearance. Prune back ten percent or less of the long or overgrown side. **Prune smaller amounts every year** rather than a lot in any one year. Cut some of the branches further into the bush as was mentioned earlier. Below are azaleas needing this type of pruning.



All photos in this article taken by Joe Guirrerri.

If there is no serious imbalance, we should take a closer look at doing any pruning. Are there other indications or **needs of the bush**? Is the intent to get a totally uniform look, more commonly associated with boxwood shapes? We actually get more blooms if the surface is not exactly consistent, i.e., it is better if there are moderate dips in the surface. This increases the overall surface area, which allows more photosynthesis and creates a healthier plant. In any event, do not use electric hedge trimmers or hedge hand shears (which have two long blades). Use hand pruning tools or long handles loppers or hand saws for the larger cuts. Make clean, sharp cuts with no ragged edges where insects or disease can get started. Be selective on each branch and cut just above a branch intersection or bud.

The pictures on the following page show an example of an azalea that has become leggy. Notice also a couple of yellowed branches at the bottom. The middle picture shows a cut deep in the bush. The result of this type of pruning is a more balanced effect with a rounded but not formal shape. Note also that when I got deep in the center of the bush, I found several poison ivy vines getting started.



In some cases azaleas have overgrown for many years, leaving tall leggy branches with totally bare branches underneath. In these cases, extreme pruning back to one foot above the ground level may be warranted. Leave three or four main branches coming out of the ground. Cut off all suckers. After this heavy cutback, it is important to fertilize (12-6-6; read the label for amounts and recommended application frequency; don't overfertilize) and be sure to water. Deep watering should be done once a week if it has not rained that week.

Finally, one other technique is used to increase branching and encourage added growth. That is **pinching new growth**. Timing is important. Look for areas that have bare spots. Watch the budding and new growth around the bare areas. When the new growth becomes woody, pinch it off. Do this when it will break, not when it is still green and flexible. Each of the areas that are pinched will create multiple new branches, helping to close some of the bare areas. Remember to complete this process before August so that the new flower buds have time to form. We have looked at a few ways to keep your azaleas healthy and vibrant. Start with these ideas and continue to increase your knowledge over the years. Your plant friends will greatly appreciate your efforts.

References:

Help This Popular Shrub Keep Its Naturally Beautiful, Loose, Rounded Shape by Charlie Thigpen

<https://www.southernliving.com/home-garden/gardens/azalea-pruning-tips>

Two Methods: Doing an Annual Maintenance Pruning--Doing a Drastic Pruning

<https://www.wikihow.com/Prune-Azaleas>

How to Prune Overgrown Azaleas <http://homeguides.sfgate.com/prune-overgrown-azaleas-39031.html>

How Do You Prune an Azalea by Heather Rhoades

<https://www.gardeningknowhow.com/ornamental/shrubs/azalea/pruning-azaleas.htm>

Joe Guirrerri, Loudoun County Extension Master Gardener Intern

Hydrangea Basics

Hydrangea is a very large genus comprising 70 or more different species. Of these, only six are generally grown in the United States. Cultivars of this summer-blooming shrub range from an impressive 20 feet tall (*H. paniculata*, when grown as a small tree) to a diminutive 2 feet tall, which is suitable for small gardens and pots. The woody vining species, *Hydrangea anomala* ssp. *petiolaris*, can grow up a wall, building, or tree to 60 feet or more if it is really happy with its site. Hydrangeas can be used as specimen plants in the landscape, massed as a flowering hedge, in mixed garden borders, or even in large pots.

The six commonly available species are:

- *Hydrangea macrophylla* (bigleaf hydrangea, French hydrangea, mophead hydrangea, garden hydrangea, hortensia, florists' hydrangea, snowball hydrangea). This is the traditional hydrangea, found in old homestead gardens, a small-to-medium shrub with white, blue, pink, or purple flowers.
- *Hydrangea serrata* (mountain hydrangea, serrated hydrangea, tea of Heaven). Sometimes treated as a variety or subspecies of *H. macrophylla*, a smaller plant with flower buds more cold hardy than *H. macrophylla* but very similar in other aspects.
- *Hydrangea quercifolia* (oakleaf hydrangea). A large native shrub with oak-like leaves and conical white flowers fading to purplish pink or rose in midsummer and good fall leaf color.
- *Hydrangea arborescens* (smooth hydrangea; seven-bark, wild hydrangea). A small to medium-size native shrub with white flowers. Pink cultivars are now available.
- *Hydrangea paniculata* (peegee hydrangea). Another old garden favorite. A large shrub frequently grown as a small tree now being bred in smaller sizes for smaller gardens. Conical flowers are white, fading to purplish-pink in late summer. A few pink and lime cultivars are now available.
- *Hydrangea anomala* ssp. *petiolaris* (climbing hydrangea). This climber has large sterile flowers surrounding a central cluster of fertile flowers, all of them white.



***Hydrangea macrophylla*, in typical mophead flower form.**

Photo by Shihmei Barger, Licensed under Creative Commons at [Flicker.com](https://www.flickr.com/photos/shihmei/)

Generally, hydrangeas are easy to grow if you give them a site appropriate for the specific cultivar and follow some very basic guidelines for their care.

A few prefer full sun; most are content with partial or dappled shade; and a few prefer full shade, but not deep shade, where they won't flower well. Ideally most hydrangeas should have four to six hours of sun to flower well, preferably morning sun and afternoon shade.

- They all generally like moist but well-drained, rich, loamy soil. Don't plant them in either wet, soggy soil or excessively dry soil; they won't thrive in either situation. A layer of compost or mulch helps keep the soil cool, retain moisture, and control weeds.

- Because of their large leaves, hydrangeas tend to need a lot of water, particularly during the first year after they are planted. A thorough soaking once or twice a week may be needed if rainfall is inadequate, but don't overdo it--soggy is not good! Generally, one inch of water a week during the growing season is sufficient. Even if adequately watered, the leaves of some may wilt in the heat of the day, particularly if the plant receives hot afternoon or full sun. Before watering, check the soil 4 to 5 inches down to make sure it's actually dry. It may be moist and the plant may not need watering at all; it simply may not be able to replace fast enough the water its large leaves transpired during the day. It will recover in the cool evening. If this happens, moving the plant to a shadier spot may solve the problem. People with wells cannot water safely during a drought; in these cases, hydrangeas, particularly bigleaf and smooth hydrangeas, will look ratty but they will survive.
- Fertilizer requirements are species specific, however, all hydrangeas appreciate an occasional dose of fertilizer, generally 8-8-8 or 10-10-10 applied in March, May, and July, or a timed-release fertilizer in March only, sprinkling it around the plant's dripline.
- Pruning is rather specific to each of the species and needs to be done carefully. It is important to know if the plant blooms on old or new wood (see below) because this affects the pruning schedule. Generally, pruning should be done only for one of the following reasons:
 - To remove dead wood;
 - To snip off flower heads if these aren't wanted for late summer and fall interest;
 - To remove leaves damaged by a late frost;
 - To increase air circulation;
 - To reduce the size of a badly overgrown plant if absolutely necessary; or
 - To reshape a plant.
- Diseases and pests are few and rare if plants are well grown. The most serious problem in our area is deer--hydrangeas occasionally are severely damaged by deer, and if they nip off the flower buds in winter browsing, you'll have little or no bloom the next year.



Typical lacecap flower. Photo by Ken McMillan
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Old vs. new wood: Some hydrangeas (specifically bigleaf, mountain, oakleaf, and climbing hydrangeas) bloom on old wood, i.e., growth made by the plant the previous growing season. Pruning these hydrangeas at the wrong time will result in no bloom or diminished bloom the following summer. Generally, these hydrangeas need little or no pruning except to remove dead wood. Prune these lightly, if at all, *immediately* after flowering, before flower buds begin to set.

Others (specifically smooth and panicle hydrangeas) bloom on new wood, i.e., growth occurring in the current year. These hydrangeas can be pruned at any time after they bloom, even in late winter or early spring. Even if killed to the ground by a particularly harsh spell of freezing weather, they will regrow from the roots and you'll still have flowers that summer.

The distinction between old and new wood is also important when selecting plants. All hydrangeas grown in our region have roots and leaf buds that are hardy and will survive freezing

temperatures. Some of the mountain and bigleaf hydrangeas, however, have weak flower bud dormancy, which may break during a warm spell in late winter. When freezing weather returns, the flower buds die and the plants will not bloom that summer. If this is a concern, select only varieties that say “improved bud hardiness” or similar language or select a reblooming cultivar. Planting on the northern or eastern side of a slope or building reportedly is also helpful.

Thanks to hybridizing, some *H. macrophylla* and *H. serrata* cultivars have now been bred to bloom on both old *and* new wood, obviating the bud hardiness question. Technically these are called “remontant” hydrangeas. Informally they may be referred to as “ever-blooming” hydrangeas. In catalogs and on nursery labels they are specifically referred to as “Reblooming” or “Rebloomers.” Rebloomers generally don’t need pruning except to remove dead wood.

Bloom failure: Generally hydrangeas fail to bloom for one of the following reasons:

- The plant is getting too much shade.
- The plant blooms on old wood and the flower buds were browsed by deer, were cut off by pruning too late in the season, or were killed by a late winter or early spring freeze after they had started to expand.
- The plant is receiving too much nitrogen, resulting in large leaves, but no flowers.



H. paniculata ‘Vanille Fraise’ with panicle flower.

Photo by Eleanor (Ellie) Enking

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Flower forms: Not only are hydrangea flowers lovely in the garden, they also are useful in both fresh and very long-lasting dried bouquets. Hydrangea flowers are of three different types: mophead (globular), lacecap, and panicle (cone-shaped or pyramidal).

- **Mophead:** When people think of hydrangeas, the mophead flower form is the form that immediately comes to mind. This is the type usually seen at supermarkets and florists’ shops around Mother’s Day, grown specifically in pots for the occasion. Mophead clusters consist of many small sterile florets clustered together to form what looks somewhat like round puffballs. Sometimes there are tiny fertile florets beneath the showy flowers, but they are very small and hidden by the larger florets. The large sterile flowers can last for weeks on the plant. Mophead flowers appear in several, but not all, of the species.
- **Lacecap:** In the lacecap flower form the tiny, bud-like pollen-bearing fertile florets are readily visible to the naked eye and are surrounded by showy sterile florets. The entire effect is of a lacy, flat cap. Lacecap flowers can occur in all of the species grown in our gardens and some species only bear the lacecap form of flower.
- **Panicle (cone-shaped, pyramidal):** Cone-shaped flower clusters can be small or as large as 12-15 inches long. Oakleaf hydrangeas typically are arranged in cone-shaped clusters as are flower clusters of *H. paniculata*.

Flower color: *Hydrangea quercifolia*, *H. arborescens*, and *H. anomala* ssp. *petiolaris* species are available only in white. In the past, *Hydrangea paniculata* and *H. arborescens* also were available only in white but thanks to hybridizers, color has now been introduced to these species.

Hydrangea macrophylla and *H. serrata* come in white, blue, pink, purple, combinations of these shades, and red. With these two species, and *only* these two species, the color-controlling factor for the blues and pinks (and *only* the blues and pinks), while expressed as soil pH, actually is the



***Hydrangea anomala* ssp. *petiolaris*, Climbing**

***Hydrangea*.** Photo by Leslie Turek

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availability of aluminum in the soil. Soils where aluminum is readily available (i.e., acid soils with a pH of 5.5 or below) produce plants with blue flowers. Soils above pH 7.0 (alkaline soils) produce plants with pink flowers. Between these two figures, i.e., between 5.5 and 7.0, (neutral) plants will have a mixture of blue, pink, and purple flowers. To change the color of the flowers, the soil pH must be changed, which, of course, can be done if it's important to have a specific color. Or you can simply let nature take its course and have a lovely tricolored shrub with tones of purple intermixed among blue and pink.

With so many species and cultivars available, at least one of these wonderful hydrangeas is bound be suitable for inclusion in most gardens!

Lina B. Burton, Loudoun County Extension Master Gardener

***Hydrangea arborescens* 'Annabelle'**

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A Very Special Garden.....

In late April, we met up with old friends in Columbia, South Carolina, for a long weekend, and one of our planned activities was to visit the Pearl Fryar Topiary Garden in Bishopville, only a stone's throw away. I had learned about Pearl's garden on a National Geographic special not long ago and was intrigued, to say the least. I was not disappointed either!

Meet Pearl Fryar:

With no previous topiary experience, Pearl began developing his garden the early 1980s. He shared that the property owner had been hesitant to sell him the property because (in the old South at that time) it was thought that "Black folks didn't take care of their places." Pearl, in his persuasive manner, convinced them otherwise and bought the property, which is shown below as it is today. As a tour bus unloaded at the street fronting his property, we saw firsthand that visitors come from around the world to meet Pearl and to see his garden. It is a marvel, spectacularly beautiful and serene, while bursting with creativity and imagination. Pearl's intent: "I like to let people see what they want to in my plants. The creativity comes in making a shape that speaks to me in one way but may say something else to everyone else."

When Pearl bought this property, it was a cornfield. Pearl planted all the trees and shrubs, many of which were throwaways that he rescued from the compost pile at nurseries. Pearl took the plants that were too ugly or too sick to sell and turned them into impressive topiaries. Most of the plants in the garden are junipers, hollies, Leyland cypress, pines, or oaks, which Pearl maintains by trimming them every four to six weeks.

Walk along with me on a short tour:









The metal sculptures and fountains often incorporated in the topiaries are designed and constructed by Pearl, who uses scrap metal to create his “junk art.” If you look closely at his sculptures, you will often see the words “peace” or “love.”

Photos just do not do his masterpiece proper justice! Today, local and national organizations work closely with Pearl to ensure that his garden and message: “Every individual can make a difference. I think everyone has a contribution to make.” are maintained for the future. As one leaves Pearl’s garden, his final message can’t be missed: 8-foot-tall letters of “Love, Peace and Goodwill” cut into the ground, the message Pearl hopes that all visitors take with them upon departing.

For more information about Pearl and his garden, visit www.pearlfryar.com. Better still, if you’re in the area, be sure to stop by. Pearl may just be passing by in his cart, as he did the day we visited, and he always has something to share!

Pamela McGraw, Loudoun County Extension Master Gardener

Rusty Tools? Try This, It works!

I managed to leave my good pruning shears outside during the week of rain. When I finally found them, they were a rusty mess. I did a little online research and found a video of a fellow cleaning his rusty Felco pruners. Using a Mason jar, he soaked the pruners in distilled white vinegar for 24 hours and then the rust just melted away when he scrubbed the pruners with a nonscratch scrub pad. When all the rust was gone, he covered all metal surfaces of the pruners with oil.

My shears have a 7-inch blade, so I had to use a large plastic pitcher and a lot of vinegar. After the shears soaked for just 23 hours in the vinegar, I couldn't wait any longer and set about scrubbing the rust off. Just as in the video, the rust melted away. I oiled the shears with 3-in-1 oil, and they are now as good as new.

Oil is oil. You can use any oil you have handy--baby oil, mineral oil, cooking oil, or WD-40.

I was so enthused; I used the vinegar treatment on a pair of hand pruners that really weren't very rusty, just full of gunk. The vinegar soaking made the gunk very easy to remove. The cleaned-up pruners are shown in the photo.

A variation was suggested for more unwieldy tools. Put vinegar in a spray bottle and thoroughly spray the metal parts of the tool. Then wrap the tool (metal part) in a paper towel and drench the towel with the spray. Place the tool in a plastic bag and tie it shut for 24 hours. Open the bag, remove the towel, and then scrub off the rust.

I tried this with a pair of loppers. When I removed the plastic bag after 24 hours, the paper towel was red with rust. When I scrubbed the loppers, the rust and gunk came right off.

All types of cutting tools are very sharp and should be handled and cleaned with care.



Vinegar, scrub pad, and oil used to clean these pruners.

Carol Ivory, Loudoun County Extension Master Gardener

Notes From the Help Desk

A caller asks, "How can I reduce the weeds in my garden?"

Weed Management

Weeds compete with vegetable crops for water, nutrients, and light as well as harboring insect and disease pests. It is best to start before the growing season and keep weeds down early in the season when they are small and easy to remove. Weed seeds can remain dormant for five or more years depending on the species so they are very difficult to eradicate. Addressing weeds before they flower helps to reduce the amount of weeds in the soil over time.

Cultural control of weeds in vegetable gardens is preferred because there are few chemical control options. Not many herbicides can be applied to a wide range of vegetables.

General Cultural Controls

Cover crop:

Planting a winter cover crop such as rye in the fall after the final harvest will inhibit weeds until spring planting when it can be tilled into the soil.

Cultivation, Hoeing, Hand Weeding:

Tilling the garden in spring controls winter annual weeds and perennial weeds. Some may need repeated tilling. Hoe weeds out of the alleyways between vegetable rows. Cut annual weeds at or slightly below the soil surface to minimize soil disturbance. (Deeper hoeing brings weed seeds from greater depths in the soil to the surface where they can germinate.)

Organic Mulches

Organic mulches conserve soil moisture and cool the soil. Spread the mulch 2 to 4 inches deep.

Pine bark, pine straw, sawdust, and grass clippings are good mulching materials if they are properly composted and free of weed seed. Grass clippings from a lawn or pasture that has been recently treated with an herbicide are not advisable.

Monitor soil fertility, because nitrogen tie-up can occur when using mulches like sawdust. Newspaper or landscape fabric on the soil surface will also help to suppress weeds.

Resources for lawn and garden weed management

http://pubs.ext.vt.edu/content/dam/pubs_ext_vt_edu/456/456-018/ENTO-238.pdf

Spring Weed Management:

<https://ext.vt.edu/lawn-garden/turfandgardentips/tips/spring-weed-management-2006.html>

Summer Weed Management:

<https://ext.vt.edu/lawn-garden/turfandgardentips/tips/summer-grassy-weed-control-in-lawns.html>

Fighting Weeds:

<https://ext.vt.edu/lawn-garden/turfandgardentips/pete-dye/index.html>

Common Garden Weeds:

<https://www.preen.com/weeds/va>

Weed Identification

https://digitalcommons.usu.edu/cgi/viewcontent.cgi?article=2049&context=extension_curall

Weed Identification by Region

<http://www.weedalert.com/search-by-region-results.php?region=4>

Becky Anzelone, Loudoun County Extension Master Gardener



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