July 2019-Vol.5 No.7

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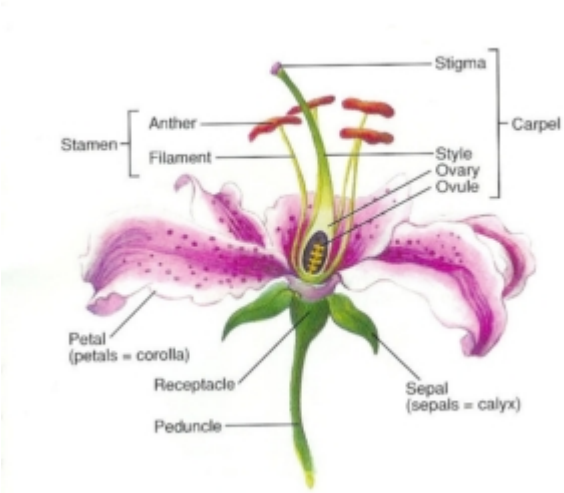
Pollination: Flowering Plants, Pollinators, and the Wonder of it All

By Ralph Morini | July 2019-Vol.5 No.7

Pollination is a familiar term to almost everyone. We understand that flowers must be *pollinated*, usually by various insects, for the plant to create fruits and seeds. We have seen headlines asserting that insect pollinator populations are declining, threatening those essential processes. We know that pollen is that yellow dust that covers our cars in early spring, and we blame it for our seasonal allergies. For many of us, that's about as far as it goes. But taking the time to look deeper can lead to some amazing discoveries.

Individual plants have developed their own, often unique and highly specialized structures and pollination techniques over millions of years. Plant-pollinator interdependence has evolved to become the central facilitator of both plant reproduction and pollinator nutrition. A thoughtful look at this adds clarity to why maintaining bio-diversity is so important to the health of the earth and its people. So let's take a brief, and hopefully insightful, look at the fundamentals.

The Basics of How it Works



Graphical representation of a "complete" flower courtesy of the greatestgarden.com, https://www.printablediagram.com/flower-diagrams-printable/

Pollination is the reproduction system used by flowering plants. Specifically, it is the **act of transferring pollen from the male "anther" to the female "stigma" of a flower to make seeds** and enable reproduction. Pollen are fine dust-like particles that develop within the anther and collect on its surface. Pollen grains are unique in their shape and the sculpturing of their tough exterior surfaces. For successful pollination, the pollen must be transported to a stigma of the same plant species at the right time.

Pollen tube illustration: backyardnature.net

When pollen lands on a receptive stigma, one of the pollen grain's two internal cells germinates and creates a pollen tube, essentially a tunnel through the stigma and style, forming a path to an ovule inside the flower's ovary. The second cell in the pollen grain divides into two sperm cells which travel down the pollen tube to the ovule. One sperm cell unites with the egg, creating the embryo, and ultimately, a seed. The other unites with a cell in the ovule to create endosperm, which provides nutrients for the embryo and in some cases for the seed's early growth. Ovaries may have one or many ovules. Only fertilized ovules develop into seeds. If all the ovules aren't fertilized by individual pollen grains, fewer seeds develop and the resulting "fruit" is likely to be oddly-shaped. The realization that the seeded fruit and vegetables we eat are actually plant ovaries may be slightly off-putting, but is an interesting fact nonetheless.

Today we recognize more than 250,000 flowering plants that require pollination for reproduction. About 80% of these require biotic pollination, via animals. Of the 20% of plants that are pollinated abiotically, 98% are wind pollinated and 2% water pollinated.

Plant and Flower Types

A little bit of botany goes a long way with most of us, but a few basic terms are instructive.

Complete and **Incomplete flowers** refer to the overall flower structure:

- **Complete flowers** have sepals, petals, pistils and stamens on each flower, as in the drawing above:
    - Both male and female reproductive parts
    - Sepals protect the flower buds during development
    - Petals lure pollinators to the flower to promote pollination
- **Incomplete flowers** are missing one or more of those features

Perfect/imperfect flowers refer only to the **sexual** flower parts:

- **Perfect flowe**rs have both male (staminate) and female (pistillate) parts on the same flower. They are referred to as hermaphroditic and represent about 90% of flower types.
- **Imperfect flowers** are missing one set of reproductive parts

Female and male pumpkin flowers. Photo: plantbreeding.coe.uga.edu

Male (left) and female (right) begonia blooms. Photo: Ralph Morini

Imperfect flowers reside on one of two plant types:

- **Monoecious plants** (above photos) have both sexes on the same plant on separate imperfect flowers. Examples include corn, melons, cucumbers, squash, pumpkins, pecans, begonia and clematis.
- **Dioecious plants** have separate male and female plants. Hollies and willows are examples.

Plants may be **Self-Pollinated** or **Cross-Pollinated**:

- **Self-pollinated means** fertilized with their own pollen
- **Cross-pollinated** means fertilization occurs between pollen and ovules of different plants of the same species.

Cross-pollination is predominant. There are benefits to variation in helping plants adapt in a changing environment. Flowers prevent accidental self-pollination in several ways, including varying the timing of pollen release and stigma receptivity, the spatial arrangements of anthers and stigmas, and by separating male and female flowers on the same plants. Amazingly, some plants that normally have self-pollination barriers in place can change structure and chemistry to accept their own pollen if cross-pollination doesn't occur in a timely way due to weather or lack of pollinator activity.

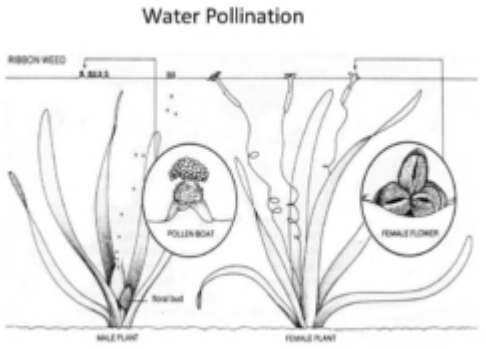


Illustration of water pollination. Courtesy of Marion Lindsey Campbell, slideplayer.com, https://slideplayer.com/slide/5283099/

Water Pollination

Water pollination can take place both underwater and on the surface. In both cases, large amounts of pollen are released and depend on currents or breezes to bring it in contact with a receptive stigma.

Ribbon weed is an example of surface water pollination. It is dioecious, having separate male and female plants. Female flowers, tethered to the mother plant reside on the water surface, creating a dimple in the water. Male flowers are released from the male plant to float on the surface, relying on breezes or drift to find their way to a dimple. The flower slides down into the dimple, colliding with the female flower, causing pollen to be catapulted to the stigma. There is a lot of chance involved in successful water pollination, which may explain the relatively small number of water pollinated plants.

Wind Pollination

Conifers and about 12% of flowering plants are wind-pollinated. Oak, birch and cottonwood trees and cereal crops, grasses and ragweeds are examples. Wind pollinators don't waste energy on colorful or scented flowers. Their anthers generate huge amounts of lightweight, smooth pollen that is easily wind transportable. Their stigmas are feathery and sticky to catch the floating pollen as it disperses relatively unpredictably. Wind-pollinated plants may be monoecious or dioecious.

Corn anthers (tassels) and stigmas (silk). Photo: gardensouth.org

Corn illustrates the wind pollination of a cereal plant. It is monoecious. The top tassels are the male anthers and the silks growing out of the husk are the female stigmas. Corn pollen is heavy and elevated. When released, it drifts toward the ground, its length of travel influenced by the weather (wind and rain). Each silk is the stigma for one kernel. Silks are covered in sticky hairs to help them catch passing pollen. Typically the silks emerge a day or two before pollen release and remain receptive for about 6 days.

When a pollen grain lands on a silk, it has to enter and pass down through the silk to the cob. The pollen has the usual two cells, the first creates a pollen tube through the silk to the ovule. The second cell follows the first to the ovule where it splits into two sperm cells, one of which fertilizes the ovule forming the seed embryo. The second forms the endosperm which surrounds the seed as it develops. Within 4 days of pollination, the silk detaches and dries up.

The silks from the tip of the cob are the last to emerge from the husk and can be buried under the existing silks, making fertilization difficult to achieve and explaining why the leading end of the corn cob is often populated with undeveloped kernels. A corn cob covered with fully developed kernels has had all of the 1,000 or so silks in the husk fertilized by 2000 or so pollen grains per silk released by surrounding tassels and delivered by the wind. Not efficient, but surprisingly successful, given the seeming randomness of the process. It also explains why corn is best planted densely by grouping in multiple short rows, rather than spread out in fewer long rows.

Biotic or animal pollination

About 80% of flowering plants — including 35% of our food crops — are animal-pollinated. Approximately 200,000 animal species act as pollinators, including about 3500 species of native bees, 1000 species of hummingbirds, as well as bats, small mammals and all manner of insects.

Humans think of flowers as a pretty landscape feature or home decoration. Their real purpose in nature however, is to lure pollinators to the plant so that they will blunder into the anthers, picking up pollen and depositing it on receptive stigmas as they are guided to the nectar, and in some cases pollen, that they need for their own survival. Some plants are pollinated by a variety of pollinators, others by a single type.

Different flower characteristics attract different pollinators; for instance:

- **Beetles**, among the earliest pollinators going back to the Mesozoic era, tend to like bowl shaped flowers of plain or dull coloring, open during the day. They seek scents varying from none to fruity to something resembling decaying flesh and moderate amounts of nectar. Examples are magnolia, pond lily, goldenrod, and spirea.

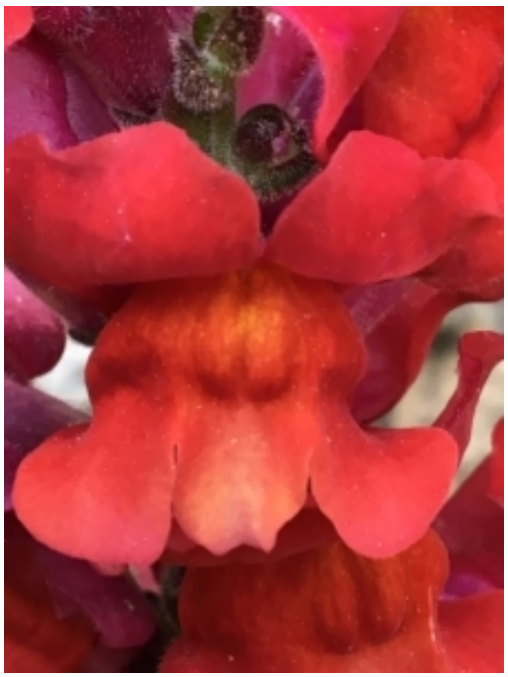
Hummingbird in a tubular, scarlet flower. Photo: Raymond Castro

- **Birds**, of which about 2,000 species globally feed on nectar, prefer tubular flowers with curving petals that create a welcoming entry, perching supports and bright red, yellow and orange coloring. Scent is unimportant. Flowers should be open during the day, have a large quantity of nectar and a pollen structure that dusts the birds' head and back as it forages for nectar. Hummingbirds are favorites to watch as their long, slender bills reach deep into flowers for nectar, withdrawing with their faces dusted in pollen.
- **Butterflies** are daytime pollinators that like brightly-colored flowers with landing platforms and scents that simulate the scents that they produce to attract the opposite sex.
- **Flies** are attracted to pale and dull colors with strong often putrid scents. They are common pollinators of tunnel-like and complex trapping flowers. Examples are jack in the pulpit, pawpaw and skunk cabbage.

Moth dipping for nectar in a morning glory. Photo: pollinators.blogspot.com

- **Moths** typically feed in late afternoon or at night on clustered white or pale flowers with strong, sweet scents that offer a landing platform and hidden nectar that they can reach with their proboscis. Morning glory, tobacco, yucca, and gardenia are examples.

- **Bee Pollinators** Bees are the best known and **most important pollinators as far as our food supply is concerned**. They tend to be attracted to bright, white, yellow and blue flowers. Their vision is UV sensitive so flower features that look pale to humans may stand out to them. Nectar guides are a case in point where lines on flower petals visually lead the bee to the well that contains nectar and often a landing platform.



Snapdragons (see photo on left above) have a bee-visible landing area. Their sexual parts and nectar are hidden, but when the right sized bee lands on the designated spot, the petals open, revealing the nectar stash and pollination organs inside.

Colonizing bees also collect pollen, inadvertently in their role as pollinator, and intentionally in their role as workers in the hive, since pollen is an important food source. Colonizing bees make 12 or more trips per day to visit several thousand flowers, usually one type of flower per trip, as they forage to bring food to the hive to raise their next generation.

Composite Flowers

Composite flower (sunflower) pollination. Photo by wackybadger

Composite flowers are a class of flower that is widespread and shares common traits among its members. Composite flowers are the flat, open flowers that include sunflowers, asters, dahlias, zinnias, chrysanthemums and black-eyed Susans. What appear to be their petals are actually "ray flowers." which are sterile and are missing one of the sexual parts. The center is made up of many "disc flowers," which are multiple petals formed into tubular shapes, each a complete flower itself, including nectar. With broad landing areas and nectar within easy reach, composite flowers are accessible to a wide variety of insects, so are great pollinator attractors.

The Take Aways

If this article communicates anything, I hope it is that there is more to pollination than most of us notice. The co-evolution and inadvertent symbiosis of plants and pollinators that has evolved over millions of years into the functioning reproduction system that supports life on our planet is both mind-boggling and awe-inspiring. That it is under threat is disturbing. The mutual dependence of many plants and specific pollinators on each other brings the need for maintaining diversity in both plants and organisms into clear focus. And hopefully, it motivates us to do our part to protect and promote natural processes in the future.

It has been eye-opening for me to look more closely at the flower structures in our gardens and even at the "weeds" on our lawn. Observing the match between the pollinators that approach each flower, and the flower design that meets pollinator capabilities and needs offers a clear visual demonstration of the adaptability and mutual dependence of both. In fact, it vividly illustrates the mutual dependence of all living things on each other.

There is a lot written about how to make our microenvironments more pollinator-friendly. *The Garden Shed* has a sprinkling of articles that touch on the topic. The August issue will feature an article on **insects,** for example. And there will be more to come. I hope you will investigate it and join us in becoming lifelong learners and promoters of pollinators, pollination and, more broadly, the natural way of things.

Sources:

The Sex Life of Flowers, (Meeuse and Morris, 1984).

Botany for Gardeners, (Capon, Timber Press, 2010).

https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/plantsanimals/pollinate/

https://powhatan.ext.vt.edu/content/dam/powhatan_ext_vt_edu/files/honeybee-pollination.pdf

https://www.fs.fed.us/wildflowers/pollinators/Plant_Strategies/index.shtml

https://www.fs.fed.us/wildflowers/pollinators/What_is_Pollination/index.shtml

https://ipm.missouri.edu/ipcm/2012/7/Corn-Pollination-the-Good-the-Bad-and-the-Ugly-Pt-3/

https://edis.ifas.ufl.edu/in868

https://www.sites.ext.vt.edu/newsletter-archive/cses/2005-08/cornsilking.html

https://orbisec.com/monoecious-vs-dioecious/

http://www.backyardnature.net/fl_comps.htm

Mystery Plant of the Prairie

By Cathy Caldwell | July 2019-Vol.5 No.7

Do you recognize this plant? Looks like a sunflower, right? But it's not.

Name that plant!

If you like guessing games, ready, Player One! Put your guess in the comment section below — BEFORE you read further! Extra credit for genus and species.

Here's a hint: if you had been an early settler crossing the prairies of the midsection of the U.S., you would no doubt have been familiar with the plants of this genus: the *silphiums*. I would probably still be ignorant of it had I not participated in a neighborhood plant exchange about 10 years ago. Incidentally, a plant exchange is a fun and free way to acquire plants, and you just might want to host one yourself. At this particular plant exchange, I took home a plant I didn't recognize, and the neighbor who contributed it was sorry but she no longer remembered where or how she had obtained it, except that it had been a passalong plant to her as well.

That single plant soon grew into a robust colony, and its clear yellow sunflower-like blooms lasted for long

periods in summer and brightened a large area that had been an empty patch of very lean clay (I hesitate to use the word *soil* in referring to this expanse of red concrete). I loved it, but I didn't know its name; neither did my neighbor. Research on this plant became a bit of an obsession, and now I'm confident that it is *Silphium integrifolium*, commonly called rosinweed. Thus began my relationship with the *silphiums*.

You may have read about the ancient plant named silphion (note the difference in spelling), which the ancients used medicinally for a variety of purposes, including birth control and as an aphrodisiac. That plant was likely a relative of fennel and may now be extinct. In any event, that's NOT the silphium we're talking about here; hope you're not disappointed.

The silphiums are natives of North America. According to the USDA Plants Database, there are 19 species in the genus *silphium*. The four species we'll focus on here — the more common ones — are rosinweed, compass plant, prairie dock, and cup plant. Keep in mind that all four are sometimes lumped together under the term rosinweeds due to the sticky resin they exude when stems are bruised. All of these silphiums have sunflower-like blossoms atop tall stems. They seem to be immune to most pests and diseases and are adaptable to most situations so long as they get plenty of sun. Given these characteristics, it's not surprising that they are capable of taking over a garden. My silphiums have generally been avoided by deer, but now and then I see evidence of browsing.

***Silphiums* are pollinator magnets**, attracting a wide variety of insects and native bees. For this reason alone, these plants would be worthy of consideration, even if they lacked those large yellow flowers atop their giant stems.

Silphium Integrifolium (rosinweed, whole leaf rosinweed)

Rosinweed makes a strong statement even before it blooms. Photo: Cathy Caldwell

All silphiums are tall, but *S. integrifolium* is the shortest of the lot at 2-6′. Still it seems like an architectural giant in my garden. The Blandy Experimental Farm operated by UVA has this plant in its meadow, and its website states that it "probably came in with meadow seed" and that it's a "midwestern species." It may not be native to Virginia, but since our weather in recent years has see-sawed from one extreme to another, perhaps a plant that's adapted to the extremes of the Midwestern prairies is just what's needed.

Silphium integrifolium has been identified as a "problem solver" plant for erosion control by the Missouri Botanical Garden, and also one of three silphiums recommended for "prairie gardens" and dry meadow gardens. I second that, but I would also note that my rosinweed — like many, apparently — has a tendency to flop after reaching its full height. I find this to be another mystery; perhaps you have a clue; if so, please let me know.

***Silphium perfoliatum* (*cup plant*)**

The cup plant — a Virginia native — does indeed have a cup-like feature, and it can actually hold rainwater, a feature appreciated by hummingbirds. Another feature is its square stem, around which the leaves meet to form the cup. Those stems reach heights of 4-8′. It grows best in full sun with wet to moderate moisture. Because it has a tap root, it does not transplant well except when quite young.

Cup plant close-up. Photo: Ron Thomas, http://bioimages.vanderbilt.edu/thomas/0124-02-02.htm

This species prefers a moist soil. In its native habitat, *Silphium perfoliatum* is found in damp areas, such as along prairie streams and ponds, though it can apparently tolerate clay. I'd love to grow this one, but my gardens are dry, not moist. Here's what the Missouri Botanical Garden has to say about garden uses for this plant:

> "A large plant that needs lots of space. Some gardeners find cup plant to be too large and weedy for border rears, but others find it to be an effective backdrop for other perennials. Adapts well to prairies, wildflower/native plant gardens, naturalized areas or moist, open woodland areas including stream/pond edges."

http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?kempercode=g650.

***Silphium laciniatum* (compass plant)**

The compass plant's leaves have a north-south orientation, so it does indeed function like a compass! In fact, early settlers crossing the plains used it as a compass. There's a biological reason for this: the plant's leaves arrange themselves north and south to avoid the heat of the sun at midday. The leaves are very deeply divided; thus, the species name, which is Latin for "torn into divisions" or "slashed." The flowers bloom only on the upper parts of the plant and it ranges in height from 6-8′.

Compass plant. Photo: Frank Mayfield

***Silphium terebinthinaceum* (prairie dock)**

Prairie dock blooming at the James Woodworth Prairie Preserve. Photo: Frank Mayfield.

Prairie dock has multiple flower heads on bare stems, with leaves almost entirely at the base, an unusual silhouette for a *silphium*. The leaves are large, triangular-shaped, with a heart-shaped base, and large coarse teeth. Those tall, leafless stems can reach as high as 10 feet. Because of its unusual large leaves, this *silphium* has been called the hosta of the prairie.

In the photo below, the large basal leaves are prominent on a large swath of prairie dock that is not yet blooming. The species name, *terebinthinaceum*, means "like turpentine," probably a reference to its resinous juice. Prairie dock is usually found in limestone prairies of the central plains. It can be slow to establish due to its taproot and may not flower until the second or third year.

Prairie dock in a garden setting. Note the very large basal leaves. Note also that the prairie dock is not in bloom. Photo courtesy of Missouri Botanical Garden PlantFinder.

Are *Silphiums* a good idea for your yard?

These prairie natives have so many appealing traits — they're adaptable, easy to grow natives not bothered by disease and pests and they are a boon to many native bees and other pollinators. But some gardeners consider them to be bullies.

As mentioned previously**, *Silphiums* can be aggressive spreaders**. Sometimes that can be a good thing, like when you've got a large area you'd like to fill. But it might be too much of a good thing, which is what's happening in New England, where *silphium perfoliatum* has spread into natural areas and pushed out native New England plants.

Silphium perfoliatum is native to large areas of North America — from southern Ontario through the mid-western and southeastern United States. It was apparently intentionally planted in New England as a "native" of North America, but it now has a listing in the Invasive Plant Atlas of New England. www.eddmaps.org/Center for Invasive Species and Ecosystem Health/ U. of Georgia. There seems to be a cautionary tale here.

As much as I love my rosinweed, I would have to say that *Silphiums* are probably not the ideal candidate for every garden. Try it in a remote area of your yard or use it in a meadow garden or for erosion control, where its colonizing tendencies are welcome. And if you have an area that can only be described as red concrete, bring it on!

Rosinweed looks great with purple coneflower and other purple flowers. Photo: Cathy Caldwell

SOURCES:

Silphium Plant Profile, USDA, Natural Resources Conservation Service, https://plants.usda.gov/core/profile?symbol=SILPH

"The Four Silphiums," Friends of the Eloise Butler Wildflower Garden, https://www.friendsofthewildflowergarden.org/pages/gentian/newarticles/foursilphiums.html

"Silphiums: Four Pillars in the Tallgrass Prairie," Dyck Arboretum, http://dyckarboretum.org/silphiums-four-pillars-tallgrass-prairie/

University of Illinois Extension,
http://extension.illinois.edu/hortanswers/PlantDetail.cfm?PlantID=878&PlantTypeID=14

Silphium perfoliatum, PlantFinder,
http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?kempercode=g650

Silphium terebinthinaceum, PlantFinder, http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?kempercode=f590

Silphium integrifolium, PlantFinder, http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?taxonid=277469&isprofile=0&

Silphium laciniatum, PlantFinder, http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?kempercode=f580

Fresh Tomato, Basil & Walnut Pasta

By Cathy Caldwell | July 2019-Vol.5 No.7

This is a great recipe for enjoying summer’s bounty of tomatoes, basil, and garlic. Essentially it is a deconstructed pesto, using ingredients whole, instead of blending them. Please feel free to adjust amounts of ingredients; I typically just eyeball amounts.

On the diner's plate (after tossing) Photo: Sarah Bingham

Serves 4

Fresh tomatoes, 2 cups chopped
Basil, 2/3 cup, silvered or chopped
Walnuts 1/3–1/2 cup, chopped
Parmesan or pecorino Romano cheese, ¼ c. grated
Garlic, 2 large cloves, minced or pressed
Extra Virgin Olive oil, 1/4 –1/3 cup
Salt and fresh ground pepper to taste
12 ounces of spaghetti or pasta of your choice

Chop tomatoes, basil, and walnuts and leave them separated.
Add garlic, salt and pepper along with half the cheese to the olive oil.
Cook the spaghetti/pasta al dente. Drain and add olive oil mixture. Toss together.

To serve:

Place cooked spaghetti on a platter or in large shallow bowl. Make a donut ring of the tomatoes in the middle of the spaghetti/pasta. Add walnuts to the donut hole in middle of the tomatoes. Put the chopped basil in a ring around tomatoes.
You may choose to add more salt and pepper to the tomatoes at this step or before putting on the spaghetti.
Serve the remaining grated cheese along side.
Toss the ingredients just before serving, after presentation.

Mangia, bevi e divertiti!

Presentation: BEFORE tossing — and eating! Photo: Sarah Bingham

Upcoming Events

By Susan Martin | July 2019-Vol.5 No.7

Heartflame Garden
Sunday, July 7, 1:00-6:00 p.m.
650 Sandy Bottom Road near Elkton Virginia, adjacent to Shenandoah National Park
Phone: (540) 298–8684
email: inanna@heartflamegarden.com

Heartflame Garden is a private garden and the home of Inanna and Gabriel Garretson. It is a very special 3-season display garden with about 1.5 acres of cultivated gardens and another 5 acres of rolling hills and streams to explore. This is a wonderful time to see the garden on an open-to-the-public day. For more info, see Heartflame Garden.

Through The Garden Gate: Anja's Native Garden
Saturday, July 13, 9:00 a.m. – 12:00 p.m.
105 Christa Court, Charlottesville

Anja's goal has been to use native plants as much as possible and to manage the property using sustainable gardening practices. Several years ago, this .2-acre city property became a Certified Wildlife Habitat through the National Wildlife Federation.

Hosted by the Piedmont Master Gardeners. For more information, download a pdf of the 2019_TTGG_brochure. **Admission is $5.**

Charlottesville Area Tree Stewards Tree Walk: Darden Towe Park
Saturday, July 13, 9:30 – 10-30 a.m.
1445 Darden Towe Park Road, Charlottesville

Tree Stewards Kathy Nepote and Allen Ingling will lead this new walk. In a corner of Darden Towe Park and around the Lewis and Clark Exploratory Center is a treasure trove of trees. Highlights include a wide range of native riparian trees, conifers, numerous ash trees exhibiting the progressive devastation of the emerald ash borer, a tulip tree grown from a seed of one of Thomas Jefferson's, and osage orange trees said to be 200 years old. Come join us! The class is free but registration is required (**click the date link**). **Limit 25.**

Terrain: The walk is an easy circuit on dirt trails down to and immediately around the Center.

Directions: At the entrance of Darden Towe Park, follow signs directing you to the Exploratory Center. Parking is immediate to the Center and adjacent to the dog park. The parking lot will be the starting point of the walk.

McIntire Botanical Garden Butterfly Walk
Sunday, July 14, 10:00 – 11:30 a.m.

Join Master Naturalist and Tree Steward Nancy Weiss to learn about the great variety of butterflies in Central Virginia. Walkers will assemble at the McIntire Road entrance to the garden near the intersection

with the John Warner Parkway and across the street from the Charlottesville High School stadium.
REGISTER at mcintirebotanical garden.org/

Charlottesville Area Tree Stewards Tree Basics Class: Trees and Wildlife
Wednesday, July 17, 6:30 – 8:30 p.m.
Crozet Library, 2020 Library Ave.
Crozet

Are trees important for wildlife? Yes, very. Besides providing a wide variety of habitat, trees are central to a complex food web that includes hard (nuts) and soft (berries) mast, leaves, and insects. All are essential for the survival of our diverse wildlife (fish, amphibians, reptiles, birds, mammals). Learn also about how vital native plants are to the survival of our native species. This talk by **Tree Steward Kathy Nepote** will increase your awareness of the importance of trees (both living and dead), the complex nature of plant and wildlife interactions, and also point out visible signs of wildlife in our environment. **No advance registration is required for this free event.**

Blue Ridge PRISM: Landowner Success Stories
Wednesday, July 17, 1:00 – 4:00 p.m.
Samuels Public Library in Front Royal
330 E. Criser Road
Front Royal, VA

Join Rod Walker, PRISM's Co-Founder, and Jim Hurley from PRISM Leadership, to hear how they have successfully managed Oriental bittersweet and Japanese stiltgrass on their properties. Featured speaker, Jake Hughes, Exotic Plant Management Biological Science Technician for Shenandoah National Park, will discuss restoration efforts in the Park. See blueridgeprism.org for more information

Piedmont Master Gardeners *Garden Basics Class*
Weeds and Invasives in the Home Garden
Saturday, July 20, 2:00-4:00 p.m.
Trinity Episcopal Church
1118 Preston Ave., Charlottesville

This class will help you win the "weed war" with advice on weed identification, removal, and prevention. The class is **FREE** but please **REGISTER** by sending your name to: info@pmgarchives.com. For more information, contact piedmontmastergardners.org., or call 434-872-4583.

Virginia Native Plant Society, Jefferson Chapter
Native Plant Walk
Saturday, July 20, 9:00 – 11:00 a.m.
Ivy Creek Natural Area, 1780 Earlysville Rd, Charlottesville

Meet by the kiosk near the parking lot. Free! All are welcome. No registration required.

The Nature Foundation at Wintergreen
3421 Wintergreen Dr.
Roseland, VA
Phone: 434-325-8169

Email: info@twnf.org

Hikes
Saturday, July, 6
Saturday, July 13
Saturday, July 20
Saturday, July 27
10:00 a.m. – 12:00 p.m.

Join a Foundation Naturalist for an interpretive hike. Explore Wintergreen's natural environment. These hikes are rated moderate. Nonmember fee is $8, members free. Meet at The Nature Foundation.

To register for the hikes and to see a full listing of events, go to: https://www.twnf.org/nature-events/

The Albemarle County Fair
On the Grounds of James Monroe's Highland
2050 James Monroe Parkway
Charlottesville, VA
Thursday, July 25, 4:00 – 9:00 p.m.
Friday, July 26, 10:00 a.m. – 9:00 p.m.
Saturday, July 27, 10:00 a.m. – 9:00 p.m. Admission is $5, children under 6 FREE.

Stop by the Piedmont Master Gardener Help Desk and educational display!

Tasks & Tips for July

By Cathy Caldwell | July 2019-Vol.5 No.7

Here's the ornamental garderner's To Do List for July:

- **Deadheading and pruning** can yield more flowers on certain perennials. Shear or pinch back the spent blossoms of lavender, scabiosa, snapdragons, garden phlox, purple coneflower, and thread-leaf coreopsis so that the plant will develop more blooms later on. If you want to know more about deadheading and pruning, I highly recommend the book *The Well-Tended Perennial Garden* by Tracy DiSabato-Aust, whose studies in her own garden have made her an expert.
- **Pinch back chrysanthemums and asters** one last time no later than mid-July. Do not pinch them back after that. Otherwise, the plant will not have time to set buds for this growing season. Pinching these plants back helps keep them from splaying open in the middle and also delays bloom time until later in the growing season.
- **Water** new plantings to be sure they stay moist.
    - Water plants in the cooler, early morning hours so that the water will soak into the ground rather than evaporate into the air.
    - Water plants deeply, giving them about an inch of water per week.
    - Avoid sprinkling plants from overhead. That just moistens the top of the soil but it

doesn't put water down at the root level where it's needed.
    - Use drip irrigation or soaker hoses under the mulch to water slowly and deeply at the base of each plant. If you don't have drip irrigation, use a hose with an adjustable nozzle or a watering can to deliver water only at the base of each plant. Don't water the foliage.
- **Mulch.** If a drought develops, add more mulch. Use a 2- to 3-inch layer of mulch to help hold moisture in the soil and to help protect plant roots from the summer heat.
- **Weed** before those weeds set seed and before they steal nutrients from your desirable plants
- **Postpone new plantings** until the cooler days of September

What's wrong with my dogwood's leaves? If the leaves on your dogwood are turning reddish, it might have powdery mildew. That's right, on a dogwood, powdery mildew doesn't look gray; instead, its leaves look like they're prematurely turning to their autumn colors. I learned this from a video recently produced by the Va. Cooperative Extension Service, https://www.youtube.com/watch?v=JFH92cxuYKk.

What's wrong with my boxwood? That question haunted me for a few weeks last month when spots appeared on some of my boxwoods. Then I sent samples to the lab at Virginia Tech. Was it boxwood blight? No, it was a boxwood leaf miner. What a relief! We are lucky to have the assistance of the specialists at Va. Tech. Samples should be brought to the Extension Office on 5th Street Extended. Master Gardeners will help you prepare your samples and send them off to the Va. Tech lab. Also, if you're wondering if you have boxwood leaf miners or mites, take a look at this publication, "Insect and Mite Pests of Boxwood," https://www.pubs.ext.vt.edu/content/dam/pubs_ext_vt_edu/ENTO/ENTO-42/ENTO-312.pdf. Stay on the alert for boxwood blight. When in doubt, get it checked out. The Virginia Extension Office has a new series of videos on boxwood blight. https://www.youtube.com/watch?v=6wENgjHYumc

If you're using rain barrells or stock tanks to store rainwater — an earth-friendly practice — be sure to **treat that standing water to prevent mosquitos.** The larvicide in mosquito dunks or rings is a naturally-occurring bacteria from the soil and does no harm to wildlife, except to mosquito larvae. Read more about backyard mosquito control in "Battling Mosquitos," N.C.Ext.,https://chatham.ces.ncsu.edu/2014/08/battling-mosquitoes-2/.

Speaking of rainwater, if your yard was subject to runoff problems during last summer's heavy rains, you might wish to check out a new series of publications called "**Stormwater Management for Homeowners,**" https://www.pubs.ext.vt.edu/SPES/SPES-9/SPES-9.html. You'll learn about various practices, like rooftop redirection, rain barrels, permeable pavement, grass swales, rain gardens, and buffers that allow you to manage runoff at the source, thus preventing large volumes of polluted runoff from going into storm drains that flow directly into nearby streams, rivers and lakes.

July is often the peak month of bloom in many gardens, so be sure to stop and enjoy those flowers.

In the Vegetable Garden: July

By Ralph Morini | July 2019-Vol.5 No.7

With an early spring, plenty of sun and reasonably regular rain, our vegetable gardening season is off and running. Recent heat may have pushed cool weather greens to bolt a little early, but let's view that as making way for succession planting with warm weather crops. The other side of the coin is that if you were an optimist and planted summer vegetables early based on the weather, you may well be picking all the cucumbers, tomatoes, squash and beans you can handle already.

In my own garden, **slugs** have been a bigger problem than in the past, probably due to the wetness of 2018. Slugs love moist environments and will eat any vegetation, but prefer the tender leaves of garden greens. Reducing moisture by thinning heavy mulches and thinning plants can help manage them. Sprinkling diatomaceous earth or crushed egg shells around plant bases can create a barrier to slugs reaching plant stems. Toads are a natural predator, so creating a toad house nearby may also help. Other deterrents include placing a pan of beer in the garden, inviting them to slither in and drown, or placing a partial melon rind upside down on the ground overnight, then collecting the rind and overstuffed slugs in the morning for disposal.

Tomatoes are the featured crop for many vegetable gardeners. There are a number of blights and diseases that affect plant and fruit health. A good rundown of different tomato disease and pest problems is contained in this article from the Cornell extension service. Guidelines for minimizing soil-borne disease issues include choosing resistant hybrids (next year), keeping plants up off the ground, mulching to prevent soil splash

during rain and watering, watering only the base of the plant not leaves, removing the bottom 12” of leaves to reduce the risk of pathogen transfer from the soil, and watering early in the day so that plant surfaces are dry by nightfall. A number of diseases survive in diseased plant tissue, so good garden hygiene is important, as is crop rotation. Remove diseased leaves and branches and clean your cutting tool regularly. For more details refer to the June 2015 Garden Shed article Tomato Diseases.

Additional advice for vegetable gardeners in July includes:

- July is a good month to clean up space used for spring crops and do some sequential planting with warm weather plants, including beans, squash, cucumbers, sweet potatoes, eggplant, peppers, okra, and winter squash. Late July is a good time to direct seed cool season crops like broccoli, cabbage and Brussels sprouts. It’s smart to restore soil health and fertility by adding some compost to the top 4-6 inches prior to planting.
- Not sure of what varieties or cultivars of vegetables to plant? A comprehensive list of recommended vegetables for Virginia can be found in the Virginia Cooperative Extension Publication, “Vegetables Recommended for Virginia”.
- **Watering** becomes extra important in the hotter months, not only for overall plant health, but also for taste and texture of many vegetables. The garden typically needs about an inch of water per week. Early morning is the best time to water. Leaving leaves wet overnight increases susceptibility to fungal diseases. Mulching the garden is a good idea to stabilize ground moisture and help hold the weeds down.
- It’s important to **control weeds** around vegetables because weeds will out-compete vegetable plants for nutrients, water, and sunlight. The best method to control weeds is by mechanical extraction, meaning good old-fashioned weed-pulling or the use of a hoe. For small weeds, the “**hoop” or “stirrup” hoe** is highly recommended because it allows for shallow cultivation.

Hoop or Stirrup Hoe

Another plus for the hoop hoe: it doesn’t bring weed seeds to the surface of the soil! Many weed seeds require sunlight to germinate. Deep cultivation or utilizing a tiller often brings seeds to the surface of the soil, facilitating germination of a new crop of unwanted weeds.

- To **save space** in your garden, construct temporary or permanent woven wire fences which will provide vertical support for runner varieties of beans, as well as for cucumbers. Plants can be trained to climb the fence, saving space and making harvesting easier since the vegetables will be hanging at a convenient height.

Fusarium wilt of basil (Fusarium oxysporum, f. sp. basilicum). Photo: Debbie Roos, NCSU Agricultural Extension Agent

- **A Threat to Basil** is a fungal disease specific to sweet basil called **fusarium wilt** of basil. The fungus attacks the water-conducting tissue (xylem) within the stem. Infected plants will grow normally until they are six to twelve inches tall. Then the plants become stunted and will suddenly wilt. The stem may become curved, often referred to as a shepherd's crook, and there will be brown streaks along the stems. Once established, the fungus can over-winter and survive many years in the form of spores, ready to cause new infections in basil or other members of the mint family that are planted in the same area. Currently, there is no fungicide approved for the treatment of this fungal disease, but it can be controlled somewhat by removing all diseased plants, by avoiding planting basil in the same location, and by planting disease-resistant varieties. Additional information on fusarium wilt of basil is available at ncsu.edu/-fusariumbasil
- **Pepper plants** are more productive if given appropriate moisture. Placing mulch (such as wood chips or leaf mulch) around plants will help retain soil moisture and reduce the need for frequent watering. In addition to conserving water, mulch provides the extra benefit of being a weed barrier.
- **Okra blossoms are** one of the showiest blooms in the vegetable garden, but they only last one day. Keep your eyes peeled if you don't want to miss them. If the flower has been pollinated, a miniature okra pod can be seen beneath the wilted flower.
- Wondering if your **blueberries are ripe enough to pick?** Just try pulling a few berries from the stems. If they come off easily, they are ready to harvest. If not, they need to ripen more. **Cover with netting** or the birds will beat you to the fruit.
- Dry weather causes **Swiss chard to bolt** or **prematurely** go to seed. Water your plants to extend the season.
- **Cucumbers** develop a **bitter taste** if the soil is not kept **consistently moist.** Leaf mulch will help maintain soil moisture.
- **Harvest cucumbers** for pickling when they reach 2-4 inches in length; for table use, harvest when no longer than 5-6 inches. Remove any over-ripe cucumbers to encourage continuous production.
- **Withhold water on potatoes when the plants begin to die down.** Water and fertilizer may disturb the dormancy stage and cause regrowth, and may also cause potatoes to crack.
- If **potatoes** are visible along the soil surface, they probably look **green.** This coloration is caused by exposure to light. Green-skinned potatoes will taste bitter. Avoid this problem **by**

covering potatoes with soil or mulch to protect them from the light.

- **Pumpkin and squash** blossoms are both beautiful and **edible**. To prepare squash or pumpkin blossoms for an appetizer, pick them after they open. Wash and drain the blossoms to remove insects and dirt, dip them in a flour or beer batter, and fry until golden.
- Although **tomatoes** are self-pollinating, they **need movement to transfer pollen**. If it is hot and calm for several days, **gently shake plants to transfer pollen** and assure fruit set. Hot temperatures can also interfere with blossom set.
- Shredded **Chinese cabbage** is a good hot weather substitute for lettuce in salads and sandwiches. A second crop may be started now for fall harvesting.
- In the summer**, dry soil** may become hard, making it difficult to work and inhibiting seed germination. Plant your succession and fall vegetables when the soil is moist, either after a rain or after watering the area thoroughly the day before you plant. Seeds may be planted in a shallow trench to conserve moisture.
- If **caterpillars** such as imported cabbage worm or cross-striped cabbage worms are overwhelming your cabbage, kale, collard or related cole crops, **Bacillus Thuringiensis** is an organic pesticide that can safely help control them. Follow package directions during application. For a deeper look at cabbage pests check Garden Shed article: OMG! What's Eating the Broccoli?
- If you use any **insecticides on vegetables**, always check the label to understand how much time you need to wait before safely harvesting.

Thanks for stopping by *The Garden Shed*. We hope to see you again next month!

Sources:

" Vegetable Planting Guide and Recommended Planting Dates," Virginia Cooperative Extension Publication No. 426-331, pubs.ext.vt.edu/426/426-331

"Weeds in the Home Vegetable Garden," Virginia Cooperative Extension Publication No. 426-364, pubs.ext.vt.edu/426/426-364

"Basil Problem," NC Cooperative Extension, https://growingsmallfarms.ces.ncsu.edu/growingsmallfarms-fusariumbasil/