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Good Bugs — Bad Bugs

By Cleve Campbell | August 2017 - Vol. 3, No. 8

There's an old garden saying: Plant it and *they* will come. *They* come crawling, flying, jumping, burrowing, and walking to the buffet we have created in our landscape gardens. Their numbers are staggering; it's estimated that at any given time there are 10 quintillion (that's a lot of zeros – 10,000,000,000,000,000,000) insects living on earth. Sometimes I believe that most of them have journeyed down the pathway to my garden.

Fortunately, the good news is that out of the 800,000 – 1,000,000 species of insects that have been identified/described so far, not more than 1,000 (about 1/10 of 1%) can be regarded as serious pests, and less than 10,000 (about 1%) are even occasional or sporadic pests. This 1% gives the majority of the insects in the garden a bad name. The remaining 99% are either harmless or beneficial. The harmless insects add a little color and diversity to the garden without threatening our plants. The beneficial insects pollinate our flowers or eat pests. However, at some point, bad bugs will show up in the garden, usually accompanied by lots and lots of hungry friends. Some insects bore into roots, seeds, or stems. Many suck large quantities of plant sap. Others destroy plants and crops by chewing on the succulent foliage, stems, or fruits. Adding to the challenge, some insects, such as the cucumber beetle, transmit diseases that can be fatal to plants.

As frustrating as an insect infestation can be to a gardener, insects perform many activities beneficial to our gardens and to the environment. Insects are an important source of food for many animals, including birds, fish, and frogs. Insects are vital as pollinators, and pollination is essential for most food crops and flowering

plants. Many insects are important predators of pests in our backyard gardens. Part of the reason many other insects don't become pests is because there are good insects in the environment preventing an infestation. Also, insects play a critical role in recycling and eliminating waste materials, which helps keep soils healthy.

Good bug or Bad Bug?

In the world of nature, an insect is **neither good nor bad**. Each insect has an essential role in maintaining a healthy and balanced ecosystem. As gardeners, however, we don't always see the complete picture. We typically define an insect as good or bad according to whether or not the insect assists us in meeting our human goals.

Is it a good bug or a bad bug? Well, it all depends. I am delighted when I see an assassin bug stalking a tomato hornworm caterpillar on one of my prized heirloom tomato plants. On the other hand, a butterfly enthusiast observing an assassin bug attacking a caterpillar in a butterfly garden may have a different perspective. It's also a question of the right bug in the right place. If I mow over a nest of yellow jacket wasps buried in the lawn in mid August and get attacked by a zillion unhappy stinging warriors, I tend to forget that wasps are an ally. Their appetite for reducing the number of flies doesn't seem all that important.

One of the big challenges of the garden is to identify the good guys from the bad guys so that you can gauge how the "war" against the bad guys is going in your landscape. Who are the good guys that wage war on the bad guys in the landscape?

The good guys or beneficial insects consist of **three (3) categories**: **predators**, **parasitoids**, and **pollinators**, a.k.a the **3 Ps**.

Predators eat other insects. Examples of predators include the lady beetle (*Hippodamia convergens*), assassin bug (*Redruviidaye*), damsel bug (*Nabida*e), big-eyed bug (*Lygaeidae*) and green lacewing larvae. Two very important groups of predators that that are not insects include spiders and mites. Spiders are very effective predators that are general feeders. They are often destroyed because people fear being bitten. Although many spiders bite humans and other animals, they do so for protection, not for food. **Parasitoids** are insects that lay eggs in or on other insects, resulting in the death of the host insect. Examples of parasitoids include many wasps such as the Thichogramma wasp (Trichogrammatidae). Without **pollinators**, fruits and vegetables and the production of seeds would be greatly reduced. The best-known pollinator is the honeybee, but our gardens also benefit from other native pollinators such as bumblebees and mason bees. It is estimated that some 400 different species of bees reside in Virginia. In addition, adult parasitic insects such as small wasps feed on pollen and nectar and are also considered to be pollinators. And let's not forget butterflies and moths.

The following are just a few of the more common good and bad bugs I encounter each year in my gardens.

Good Guys:

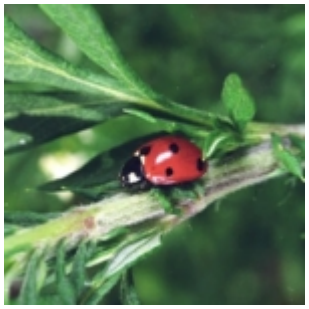
The Praying Mantis is one of the easiest insects to recognize and is an indiscriminate predator. You would not guess by looking at it, but the swizzle stick-thin mantis is a voracious eater and is not fussy about what it catches and eats. It uses those "praying" hands to pin down its victim and then shreds it alive with its powerful mouth.

Praying Mantis. ***Photo***

***Credit**: Chris Home, Bugwood.org*

The **Assassin Bug** is a great example of a creepy-looking bug that is harmless to you (if you leave it alone) and good for your garden. It subdues its prey in a particularly inventive — albeit ghastly — manner. Like a movie hit man, the assassin bug is equipped with a specialty-killing tool. Projecting from its head is a long skewer (the entomological term is “rostrum”) that is part suction tube and part syringe. The assassin bug uses this rostrum to inject a venom which first immobilizes its victim and then liquefies its victim’s insides—which the assassin bug then sucks out!

*Assassin Bug. **Photo Credit**: Gerald J. Lenhard, Louisiana State University, Bugwood.org*



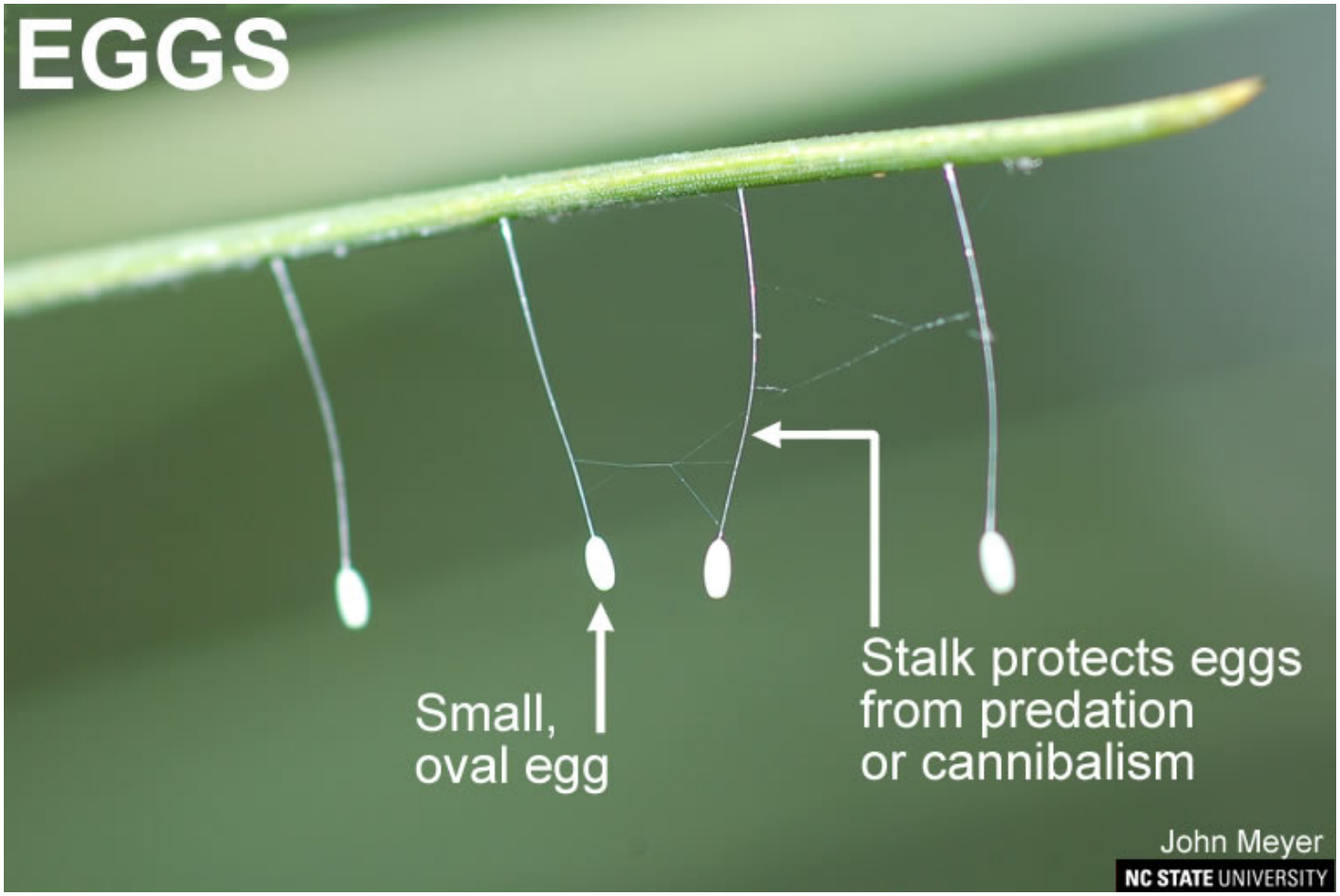
*Ladybug. **Photo Credit:** Jim Occi, BugPics, Bugwood.org*

Ladybug. Everybody loves ladybugs. Both the adult and the larvae eat other insects that we don’t care to have around our gardens. Ladybugs are especially fond of the aphids that like to wreck our Crape Myrtle trees.

The **Lacewing Fly** is **e**asy to identify because of its long, translucent wings. Adults feed only on nectar, pollen, and aphid honeydew, but the larvae are active predators that eat the eggs and immature stages of many insect pests including aphids, spider mites, and mealybugs

Lacewing Fly. ***Photo Credit:*** *Edward L. Manigault, Clemson University Donated Collection, Bugwood.org*

Distinctive strands of eggs are a sure sign that lacewings are on duty in your garden. The lacewing lays its eggs on long threads that seem to sprout from a leaf so that predators can’t eat them.

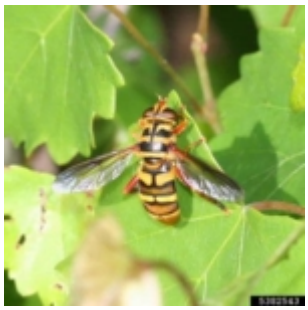


Lacewing Eggs. ***Photo Credit:*** *John Meyer, NC State University, Bugwood.org*

Damsel Bug. ***Photo Credit****: Joseph Berger, Bugwood.org*

Damsel Bugs are dull brown, tan, or gray with narrow bodies that measure about ¼" long. Damsel bugs help control aphids, asparagus beetles, cabbage worms, spider mites, and whiteflies, and have been observed feasting on Colorado potato beetle eggs and larvae.

Hover or Syrphid Flies resemble tiny wasps, with a black-and-yellow- or white-striped abdomen. They will hover like a hummingbird as they drink nectar from flowers. Adults range in size from ¼" to ½". Hover flies are important pollinators and predators. They help control aphids, cabbage worms, and mealybugs. Don't panic – hover flies are true flies and don't sting like bees or wasps. They belong in the fly family Syrphidae and some folks refer to them as syrphid flies. Hover flies are the gentle gents of the garden. According to Cornell University, a hover fly larva can consume up to 400 aphids before it becomes an adult fly. They truly are a gardener's friend.



Yellow Jacket Hover Fly. ***Photo Credit:*** *Johnny N. Dell, Bugwood.org.*

Parasitoid Wasps range in size from a flake of pepper to nearly 3 inches. They have slender, elongated antennae and are found throughout Virginia. These tiny, non-stinging wasps are know to parasitize over 200 species of pests and may be the gardener's most important biological control method. Although there are tons of different species of parasitic wasps, they all work by preying upon one or more pest insects. Depending on the species of parasitic wasp, they help rid your garden of: aphids, beetle larvae, bagworms, cabbage worms, Colorado potato beetles, corn earworms, cucumber beetles, cutworms, gypsy moth caterpillars, Japanese beetles, leaf miners, mealybugs, Mexican bean beetles, moth caterpillars, sawfly larvae, scale, squash vine borers, tent caterpillars, tobacco budworms, tomato hornworms, and whiteflies.

Parasitoid wasps are very **sensitive to insecticides**, so avoid or limit the use of chemical sprays. Most adults feed on plant fluids and sugars, so provide flowering plants that provide nectar sources. The best nectar sources are flowers with wide or shallow corollas that allow the wasps to easily reach nectar; members of the carrot (umbelliferae) and cabbage (cruciferae) families are examples of good nectar sources. Plants with floral nectaries (nectar-producing glands) are also important sources of food, as are aphids and other honeydew-producing sucking insects. Plants that provide shade on hot summer days are a big help to parasitoids. Trichogramma wasps and those that attack scale insects, filth flies, aphids, and other insects can be purchased commercially for release, but it's important to procure the right species to control the pest you have.

Parasitoid (Braconid) Wasp. ***Photo Credit:*** *Gerald J. Lenhard, Louisiana State University, Bugwood.org*

Hornworm parasitized by a Braconid Wasp. ***Photo Credit:*** *Clemson University-USDA Cooperative Extension Slide Series, Bugwood.org*

Tachinid Flies (family Tachinidae) are by far the largest and most important group of parasitic flies, with over 1,300 species in North America. All species are parasitic in the larval stage and many are important natural enemies of major pests. Many species of tachinids have been introduced into North America from their native lands to suppress populations of alien pests. Tachinid flies differ in color, size, and shape, but many somewhat resemble houseflies. They usually are gray, black, or striped, and often have many distinct abdominal bristles. Their bodies measure

Adult Tachinid Fly. ***Photo Credit:*** *David Cappaeft, Bugwood.org*

anywhere from 1/3” to ¾”. Tachinid fly larvae attack many different caterpillars, Colorado potato beetles, corn earworms, cucumber beetles, cutworms, Japanese beetles, and squash bugs. Many resemble house flies in size and color. They have robust bodies; are usually gray, black, or striped in color; and have stout, hairy bristles protruding from the tip of the abdomen. The feather-legged fly is bright orange with a velvety black head and thorax; dark legs (hind legs have a fringe of short, black hairs); yellow feet; large, brown eyes; and brown and black wings. Tachinid flies are found throughout the garden and landscape and are frequently mistaken for houseflies. Feather-legged fly is commonly found in the garden laying pale, oval eggs on the side of squash bugs. Istocheta aldrichi, may be seen in lawns and shrubbery attaching eggs to the thorax of newly-emerged adult Japanese beetles. The most obvious sign of tachinid fly activity may the presence of oblong, white eggs glued to the top of the head or body of a host insect. Most adult tachinid flies feed on nectar and pollen, especially from flowering umbelliferous plants such as carrot, dill, and other herbs; composite flowers such as asters and rudbeckias; and other flowering plants. They also feed on aphid honeydew, so having non-crop plants infested with aphids will support tachinid flies.

Ground Beetles. There are hundreds of kinds of ground beetles, and most eat other insects. Both adults and immature ground beetles are predators and they feed on caterpillars, cutworms, root maggots, spiders, snails, slugs, mites, and other beetles. They can be found under logs and debris. Ground beetles are indeed another friend found in our garden.

Starter List of Bad Guys:

Tomato Hornworms are common caterpillars in the garden and landscape. They can be found feeding on tomatoes, potatoes, and eggplants. They are called hornworms because they have a “horn-like” tail. Tomato hornworms are huge caterpillars and will become sphinx moths.

There are many natural enemies of the tomato hornworm. Various general predatory insects such as lady beetles and green lacewings often prey upon the egg stage and on young caterpillars. Another important predator is the paper wasp, *Polistes* spp. This common wasp feeds on many types of caterpillars, including those found in gardens.

Tomato hornworms are also parasitized by a number of insects. One of the most common is a small braconid wasp, *Cotesia congregatus*. Larvae that hatch from wasp eggs laid on the hornworm feed on the inside of the hornworm until the wasp is ready to pupate. The cocoons appear as white projections protruding from the hornworm's body. If such projections are observed, the hornworms should be left in the garden to allow the adult wasps to emerge. When these wasps emerge from their cocoons, they will kill the hornworms and then seek out other hornworms to parasitize.

Tomato Hornworm. ***Photo Credit:*** *Whitney Cranshaw, Colorado State University, Bugwood.org*

Cabbage Loopers are another common caterpillar. Cabbage loopers attack cabbages and other members of the cabbage family such as Brussels sprouts, broccoli, and cauliflower. Cabbage looper adults are nocturnal moths with a 1½" wing span. They have mottled, grayish-brown wings with a small silvery white figure 8 in the middle of each of the front wings. Eggs are creamy white, aspirin-shaped and about the size of a pin head. Eggs are easily seen and most often laid on the underside of the lower leaves. The caterpillars are pale green with narrow white lines running down each side. Since cabbage looper caterpillars have no legs in their middle sections, they have a characteristic looping motion as they move across vegetation, giving them the name cabbage loopers. Full grown caterpillars are about 1½" in length.

The cabbage looper has many enemies that are both native to our area and naturally occur in our gardens. These enemies include predators such as paper wasps, and parasitic flies and wasps, e.g., the parasitic wasp, *Cotesia glomerata*.

Some wasps and flies parasitize the caterpillars while others attack the pupae. As the wasps or flies develop within the caterpillar or pupae, they eventually kill their hosts. Some wasps also parasitize the eggs of these caterpillar pests. These wasp and fly parasites are small and do not sting or bite people.

Cabbage Looper. ***Photo Credit:*** *Alton N. Sparks Jr., University of Georgia, Bugwood.org*

Aphids. Most mature aphids are about 1/8″ long and are yellow or light green. A few are black, brown, white, grey, or shades of red. Aphids may be winged or wingless. Each aphid has six thin legs, two antennae on the head, a pair of tubes on the back, and a slender "beak" which is pushed into plants to suck sap. Most aphids prefer to feed on buds and the underside of terminal leaves; however, some species are adapted to feed on roots. Aphids are a huge pest on roses, other flowers, vegetables, shrubs, and trees. Enemies include assassin bugs, damsel bugs, ladybugs, spiders, and hover flies.

Yellow Aphids feeding on milkweed. ***Photo Credit:*** *Jim Occi, BugPics, Bugwood.org*

The **Colorado Potato Beetle**, *Leptinotarsa decemlineata* , is a major potato pest throughout North America. It was first recognized as a potato pest in 1859 in Colorado when the beetle switched from its normal host, buffalo bur, a relative of the potato, to cultivated potatoes brought into the region by early settlers. Once beetles began feeding and reproducing on cultivated potatoes, they were able to migrate eastward, feeding on potatoes grown on farms and in gardens throughout the Great Plains and the Ohio River Valley. On average, the Colorado potato beetle expanded its range eastward approximately 85 miles per year, reaching the East Coast by 1874.

Adult Colorado potato beetles are 1/3″ long with hard, rounded wing covers that are black-and-tan striped. The fat, reddish-pink larvae are 1/2″ long, have rows of black dots on their sides, and a small black head. Colorado potato beetles are very common across the U.S., except in the Pacific Northwest and the Deep South. They feed on all members of the tomato family, though potatoes are by far their favorite food.

Enemies of the Colorado potato beetle include: assassin bugs, praying mantises, parasitic wasps, tachinid flies, and damsel bugs.

Adult Colorado Potato Beetle. ***Photo Credit****: Clemson University-USDA Cooperative Extension Series, Bugwood.org*

Colorado Potato Beetle Larva. ***Photo Credit:*** *Whitney, Colorado State University, Bugwood.org*

Cucumber Beetle. Both the striped and spotted cucumber beetle is a serious pest in Virginia. Both species measure about ¼" long. Cucumber beetles feed on cucurbits such as cucumber, melon, squash, watermelon, and pumpkin and are considered to be one of the most destructive insect pests of these crops. The striped cucumber beetle may also feed upon asters, roses, potatoes, corn, and peanuts, particularly when cucurbit plants are unavailable. Adult cucumber beetles chew ragged holes in foliage and can completely defoliate and destroy young seedlings. The striped cucumber beetle also can transmit a deadly bacterial wilt and mosaic virus. In addition to leaf feeding, adults can chew the stems, flowers, and rinds of fruit. Predators of the cucumber beetle include assassin bugs, parasitic wasps, tachinid flies and parasitic nematodes.

Striped Cucumber Beetle, Clemson University- USDA Cooperative Extension Slide Series, Bugwood.org

Spotted Cucumber Beetle, Clemson University-USDA Cooperative Extension Slide Series, Bugwood.org

Mexican Bean Beetle adults are coppery brown with black spots. They look very much like large lady beetles and in fact are closely related, but unlike lady beetles, they feed on leaves, not on other insects. Shortly after adults arrive in the bean patch, they lay yellow-orange egg masses on the underside of bean leaves. These eggs hatch into bright yellow, spiny, oval larvae which feed; molt several times as they grow;

and pupate on the underside of leaves. Feeding damage from adults and larvae can reduce yield and injure pods if numbers are high. A parasitoid wasp Pediobius foveolatus has been found to be an effective biological control.

Multiple Life Stages of the Mexican Bean Beetle, Clemson University – USDA Cooperative Extension Slide Series, Bugwood.org

The **Japanese Beetle** is a major pest of lawns and ornamental plants in Virginia. Adult beetles feed on more than 275 species of plants but especially like plants in the rose family. Grubs (larvae) feed on the roots of turf grasses such as Kentucky bluegrass, fine fescue, ryegrass, and bentgrass.

Japanese beetle, USDA Agricultural Research Service, Bugwood.org

Bagworm Caterpillars make distinctive 1.5 to 2 inch long spindle-shaped bags that can be seen hanging from the twigs of a variety of trees and shrubs. Sometimes the bags are mistaken for pine cones or other plant structures. Bagworms are perennial pests of juniper, arborvitae, spruce, pine, cedar and other conifer species. They also attack deciduous trees. Female moths cannot fly but the larvae can disperse. Very small caterpillars can spin strands of silk and be carried by wind, an activity called “ballooning.” Larger larvae may crawl to adjacent plants. Bagworms construct protective bags for overwintering and from which young larvae will crawl out next year.

Bagworm cocoon. ***Photo Credit:*** *William Fountain, University of Kentucky, Bugwood.org*

Eastern Tent Caterpillars (Malacosoma americanum) have been numerous and obvious the past few weeks in Iowa. I have noted large numbers of them on ornamental shrubs planted along the interstate highways.

Eastern tent caterpillars make "tents" of silk in the crooks of branches of the tree or shrub they are feeding on. The caterpillars use the tent for protection from weather, predators and parasites and move out of the tent to feed on the leaves during the day. Tents start out very small but enlarge as the caterpillars feed and grow and add to the tents, making them more obvious in the landscape.

Caterpillars feed on the buds and foliage of a variety of trees and shrubs but prefer apple, crab apple, wild plum, cherry, and similar trees.

Eastern Tent Caterpillars on Tent. ***Photo Credit:*** *David Cappaert, Bugwood.org*

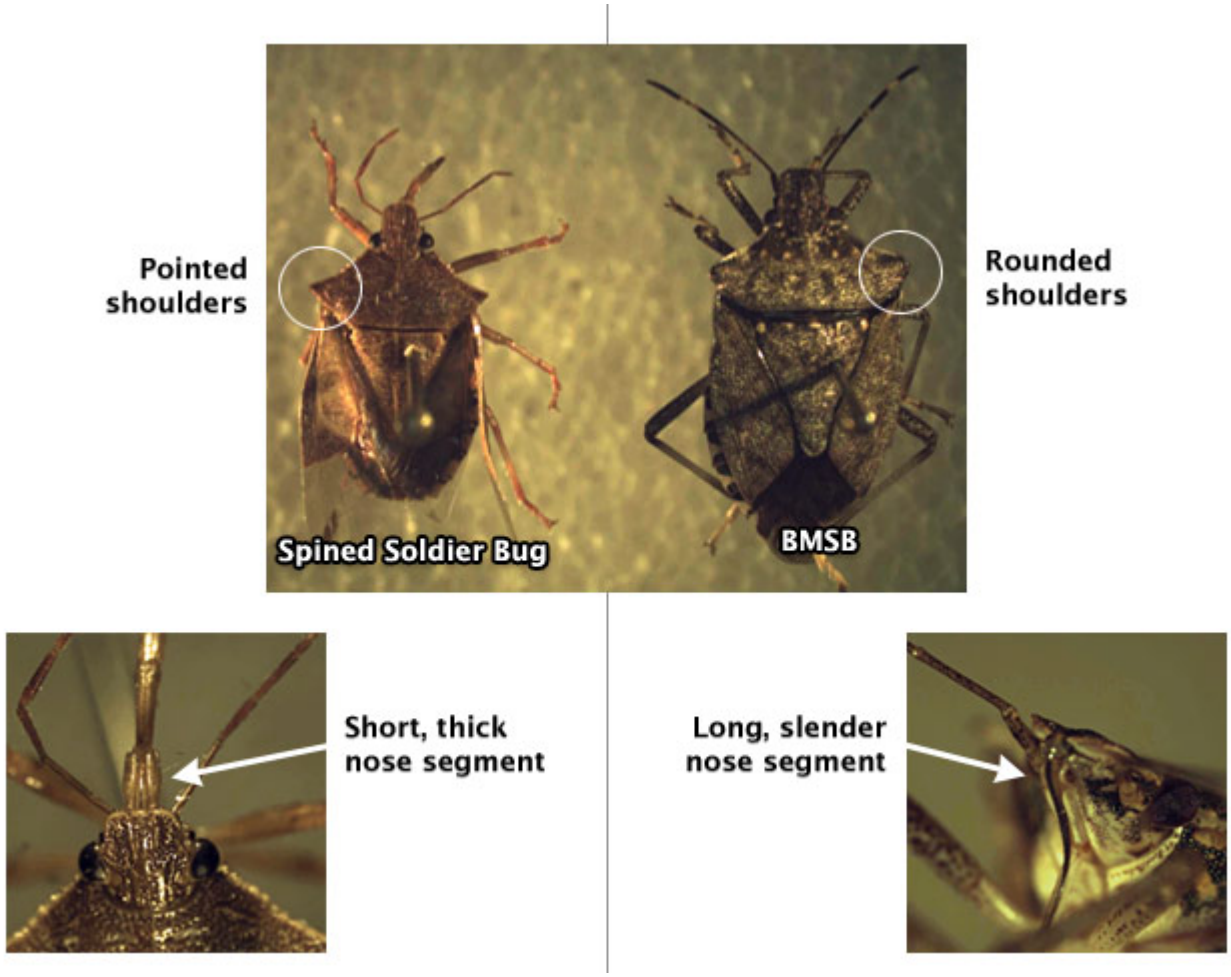
The **Brown Marmorated Stink Bug** (BMS) arrived in this county from Asia in the 1990s and has become both a nuisance in the home landscape and a problem for plants. It feeds on many fruits, vegetables, berries, grapes, roses, and more. Presently there are no known native predators. For more information check out our article, "Brown Marmorated Stink Bug," in the November 2016 issue of *The Garden Shed*.

Brown Marmorated Stink Bug, Russ

Ottems, University of Georgia,
Bugwood.org

The Diversified Garden

A colony of aphids, cutworms, or squash bugs may appear overnight but it takes time to build up an army of beneficial insects, and this build-up has to start early in the gardening season. The results are not instantaneous but the benefits in the garden are cumulative over time. As the plantings mature and resident populations of beneficial insects become established, the need for chemical pesticides and other aggressive insect control techniques will diminish. One of the gardener's most difficult challenges is to resist the urge to spray or dust insecticides until the particular pest problem has been identified. Now when I go on patrol in the vegetable garden, I will go armed with a hand lens and an insect reference book. Before I squash that bug between my forefinger and thumb or that egg mass attached to a leaf, I will want to know if it is a foe or a friend. And this is not as easy as it sounds. There are several bad insects that are very similar to beneficial insects. Two that come to mind are the Mexican bean beetle (bad) and the ladybug (good); the brown marmorated stink bug (bad) and the spined soldier bug (good).



BMSB and Spined Soldier Bug. ***Photo Credit:*** *Brent Short , USDA, ARS, AFRS*

Remember what we discussed at the start of this article: In nature there is no such thing as a good bug or bad bug; it's all about balance. When a pest infestation breaks out and overwhelms our landscape, something

has been thrown out of balance. This balance can be attributed to the loss of native habitat (both our friends and foes need a home); non-native (alien) pests being introduced; and the regular use of synthetic, broad-spectrum pesticides that are very efficient in killing beneficial insects and pollinators. In general, using fewer, more controlled chemical solutions results in a more diverse population of beneficial insects. Sometimes in the heat of battle I forget that if we nuke all the bad bugs, there is nothing to sustain the good bugs so that they can attack the next bad bug infestation.

The good bug and bad bug balance can also be negated by the introduction of alien pests that have no native adversaries. The brown marmorated stink bug, the Asian gypsy moth, the emerald ash borer, and the hemlock ash borer are just a few alien pests that come to mind.

An excellent way to attract beneficial insects into your landscape is to provide some elements of a native habitat in and around your landscape. This will improve the abundance and diversity of both pollinators and the natural enemies of pests. A garden with a good diversity of local and native flora will soon attract a good diversity of insects. Check out our article "Insectary" in the April 2015 issue of *The Garden Shed*.

Often when we think about a pending insect infestation, we overlook a very important component — the plant itself. The first line of defense in warding off a bad bug attack is having a healthy plant. Insects are attracted to a weakened or stressed plant. This weakened condition can be the result of a lack of water and/or a lack of nutrients. A strong, unstressed plant has a greater chance of surviving an insect attack.

Thanks for joining us in *The Garden Shed* and we look forward to your visit next month.

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Helenium — A great choice for the late summer garden

By Patsy Chadwick | August 2017 - Vol. 3, No. 8

Helenium may be one of the most interesting wild flowers you've never heard of. Although widely distributed across North America, surprisingly, it is not as well known as it deserves to be. Curiously enough, this native North American perennial is commonly found in Europe where it was introduced in 1729. It eventually underwent extensive hybridization by British and German horticulturalists. In fact, Britain's Royal Horticulture Society (RHS) is probably responsible for a resurgence of interest in this plant as a result of their perennial yellow daisy trials. Those trials were conducted between 1999 and 2001 and included 56 *Helenium* entries. Of those entries, 13 were awarded the RHS's Award of Garden Merit at the end of the trial period. This award is essentially the Society's "seal of approval" that the plant performs reliably in the garden. Coming full circle, some of those award winners eventually found their way back to American soil and are now more widely distributed through the nursery trade here.

Most sources state that *Helenium* was named in honor of Helen of Troy. Legend has it that the plant sprang from the ground wherever her tears fell. As Allan Armitage points out in his book "Herbaceous Perennial Plants," this explanation sounds a little far fetched, considering the plant is of North American origin (whereas Helen of Troy was not). Nevertheless, the flower is sometimes referred to as Helen's flower. But it is more commonly known as Sneezeweed because of its historical use as a form of snuff. American Indians used the dried leaves and flowers of this plant to induce sneezing as a way to relieve headaches and loosen

up head colds. The snuff was also allegedly used to rid the body of evil spirits although there's no proof that it worked.

DESCRIPTION OF THE HELENIUM GENUS

Helenium belongs to a genus of about 40 herbaceous perennials, annuals, and biennials that are found mostly in North, Central, and South America. It is an upright clumping perennial wildflower that grows 3 to 5 feet tall and 2 to 3 feet wide. Some of the compact cultivars top out at around 2 feet. An adaptable plant, it will grow in any site that has sun or part sun and wet to moist soils. Hardy in USDA zones 3 – 9, it grows in the wild along stream banks and in wet meadows or other wetland areas.

Bloom time varies by species but, in general, *Helenium* blooms from late summer into fall when most other perennials are done for the season. The dense clumps of narrow, toothed, lance-shaped foliage are crowned by an abundance of daisy-like flower heads in hues of golden yellow, burnt orange, and various shades of deep red. The flower petals are arranged in a single row of ray-like petals around a raised dome-shaped central disk. Each petal has distinct tooth-like indentations on the edges, which give rise to another common name, dog-tooth daisy. The three lobes on the edges help distinguish *Helenium* from *Rudbeckia* or other yellow coneflowers.

Helenium, like *Solidago* (goldenrod), has an undeserved reputation as a cause of hay fever and fall allergies. The flowers of this species are pollinated by insects rather than wind and have heavy, sticky pollen that cannot be easily inhaled. It blooms at the same time as ragweed, which is the true culprit.

Helenium attracts a variety of pollinators to the ornamental garden. It is particularly valuable in the late summer garden as a nectar plant for bees, butterflies, moths, and beetles.

HELENIUM SPECIES

The following describes a small sampling of the *Helenium* species found in the United States.

H. autumnale – Known as common sneezeweed, this species is native to eastern North America. It typically blooms for 8 weeks or more in late summer until frost. Of the nearly 40 species belonging to the *Helenium* genus, *H. autumnale* and its numerous hybrids have the greatest color and diversity. The native form of this plant produces bright yellow flowers, whereas its cultivars appear in various shades of yellow, orange, copper, and red.

- 

Helenium autumnale

H. bigelovii – This related species, commonly called Bigelow's sneezeweed, is native to western North America and may be found in the wild in Oregon, California and Arizona. It bears 2" wide yellow flowers on plants that are 2' to 3' tall.

Helenium bigelovii

H. flexuosum – This eastern sneezeweed species, commonly called purple-headed sneezeweed, is native throughout the entire eastern and mid-western parts of the U.S. The 1.5" flowers on this 1' to 3' plant have drooping yellow petals. It is distinguished from other *Helenium* species by its prominent purplish-brown center disks.

Helenium flexuosum

H. hoopesii – This sneezeweed species is native to the western states of the U.S., where it is commonly referred to as Mountain *Helenium*, orange sneezeweed, or owl's claws. This long-blooming 28" to 30" tall species produces large, 3" yellow flowers with orange centers. It grows from a taproot, so propagation from seeds is the best approach. Most *Helenium* hybrids contain some genes from *H. hoopesii.*

Helenium hoopesii

H. virginicum – Native to Virginia and Missouri, this rare wild flower is categorized as a threatened species under the Federal Government's Endangered Species Act of 1973. In Virginia, it is categorized as an endangered species believed to exist in only two counties (Augusta and Rockingham) along the western edge of the Blue Ridge Mountains in the Shenandoah Valley. It bears bright yellow flowers on 2' to 4' tall stems.

Helenium virginicum

HELENIUM CULTIVARS

With lively autumnal colors ranging from golden yellow to burnt orange, copper brown, or mahogany red and variations in between, this native herbaceous perennial is certain to be a welcome addition to the late summer ornamental garden. Of the cultivars listed In Allan Armitage's "Herbaceous Perennial Plants" (Third Edition), 'Crimson Beauty', 'Marti Gras', and 'Wyndley' are perhaps best suited for smaller garden spaces, in his opinion. They are some of the shortest and sturdiest of the *Helenium* cultivars. The following are examples of the many *Helenium* cultivars available both in the U.S. and in Europe.

- 'Butterpat' – Yellow, an old favorite commonly found in garden centers, 4 – 5' tall.
- 'Coppelia' – Coppery orange, reputed to have sturdy stems, 3' tall.
- 'Crimson Beauty' – Mahogany brown, 2 – 3' tall.
- 'Dark Beauty' – Bright red, white ray bases, 6' tall.
- 'Kugelsonne' – Butter yellow, 3 – 4' tall.
- 'Marti Gras' — Yellow flowers aging to orange, rich chocolate brown centers, 3 – 4' tall.
- 'Moerheim Beauty' – Mahogony red, one of the best of the older varieties with large, eye-catching multicolored flowers, 3 – 4' tall.
- 'Pumilum Magnificum' – Soft yellow, 4 – 5' tall.
- 'Red and Gold' – Red and gold, 3 – 4' tall.
- 'Riverton Beauty' – Golden yellow, 3 – 4' tall.
- 'Ruby Tuesday' – Burgundy flowers with mahogany centers. A profuse blooming and compact variety, reaching 20" to 30" tall.
- 'The Bishop' – Large, deep yellow flowers and dark centers, blooms earlier than other varieties, 3' tall.
- 'Wyndley' – Coppery brown, 2 – 3' tall.
- 'Zimbelstern' – Yellow rays, red and yellow bicolor center, 3 – 4' tall.

Helenium 'Moerheim Beauty'

Helenium autumnale 'Pumilum Magnificum'

Helenium 'Wyndley'

Helenium 'Ruby Tuesday'

CULTURAL REQUIREMENTS AND MAINTENANCE OF HELENIUM SPECIES

Helenium thrives very nicely in blazing hot sun. However, it has wide-spreading, shallow roots that are happiest in moisture-retentive soil that has been amended with compost or other organic matter. Moist soil or even poorly drained soil is fine with this plant because the moisture helps keep its roots cool. An established plant can tolerate drier growing conditions, but flower size may be smaller. Therefore, it's generally best to provide supplemental watering during hot, dry weather. A layer of mulch is also beneficial for keeping the roots cool and retaining moisture in the soil.

If you don't have a sunny site, no problem. *Helenium* can take partial shade but the colors may not be as good. Reds, in particular, may not be as saturated.

While compost is recommended for this plant, fertilizer is not. It is a fast-growing species and fertilizers can cause tall, weak stems that flop.

When the plants reach 6 to 8 inches in spring or early summer, pinch them back to encourage strong branching and denser growth. They may also be pinched back later in the growing season but bloom time may be delayed.

If you do not cut back the taller selections to make them shorter and sturdier, they may need to be staked to keep them from flopping over. This is particularly true if they are being grown in an exposed or windy site. If you know the variety you're growing is prone to weak stems, it's wise to stake the plant before it becomes very tall. Hot weather can promote tall, weak growth.

Once the plant begins to bloom, deadhead spent blossoms regularly to prolong flowering. If snipping off each blossom individually seems like too much effort, you can shear about 4 to 6 inches off the top of the plant instead. Deadheading the cultivars will also remove the possibility of dissimilar plants sprouting up within the clump.

Cut the plant back to the ground in fall after flowering is complete.

HELENIUM PROPAGATION

In time, *Helenium* clumps will become denser with decreased flowering. To maintain plant vigor, dig up the plant in spring or fall and divide it. The clumps are easy to divide and benefit from division about every 3 to 4 years.

Helenium may also be propagated by seed. If starting seeds indoors, sow them in spring about 8 to 10 weeks before planting them outdoors. Just barely cover them with soil and keep them moist until they sprout. Note: Seeds from cultivars will not come true to the "parent." If that's a concern, then stick with either divisions or buy fresh plants. On the other hand, if you like to experiment, the seeds from cultivars may prove to be very interesting.

PESTS AND DISEASES OF HELENIUM

Although generally pest resistant, slugs and snails may damage the emerging plant foliage in spring. This is generally a short-term problem and unlikely to affect the plant over the long haul.

Mildew may affect the plant, in which case, the best approach is to cut the plant back by half or two-thirds after it finishes blooming. This will help prevent further mildew outbreaks.

For the gardener plagued with deer or rabbit problems, this plant is unpalatable to herbivores. Do note that this plant, including its flowers, foliage, and seeds, are poisonous if ingested and can potentially cause vomiting or convulsions.

USES OF HELENIUM IN THE LANDSCAPE

Helenium is good for naturalizing and generally looks best planted as a grouping or as a mass planting. It pairs well with other perennials and grasses including asters, *Boltonia*, Joe Pye Weed (*Eupatorium*), *Liatris*, *Monarda*, late blooming salvias, goldenrod (*Solidago*), tall sedum, switch grass (*Panicum virgatum*) or big bluestem (*Andropogon*). As a general rule, it looks best planted with other "hot" colors but it also looks good planted near blue or purple-flowering plants. Try it in:

- Informal prairie or meadow settings. Combined with Echinacea, asters, and other daisy-like flowers that like similar growing conditions, it will attract a broad range of beneficial insects to the garden.
- Cottage gardens, where the taller varieties look best in the middle or back part of the border.
- Butterfly gardens as a source of late summer nectar for bees and butterflies.
- Water-wise landscapes, swales, bioretention basins, and rain gardens.
- Moist soils bordering ponds or other bodies of water.
- Sunny mixed-perennial borders.

- Flower arrangements. It holds up well as a cut flower.

SUMMARY

Although *Helenium* is native throughout all of North America, it is not all that widely known to most gardeners. That may change depending on the outcome of two prestigious plant evaluation programs that are currently underway. Just this year, the Chicago Botanic Garden's Plant Evaluation Program embarked on a 4-year comparative field trial of 39 *Helenium* species and cultivars. A report of their findings and recommendations of top performers to gardeners and the horticulture industry will presumably become available at the end of the study in 2021. Coincidentally, the Mt. Cuba Center in Delaware also began a *Helenium* field trial this year. According to their website, their 3-year trial of 43 selections will focus on the horticultural characteristics of "sturdiness, bloom time, bloom quantity, and resistance to diseases like powdery mildew and rust." In addition, the study will assess the ecological value of this plant to pollinators. The results of their trial will be released in 2019. If you don't want to wait for the results of these plant trials, try growing one or two Helenium species or cultivars now. You won't be disappointed.

RESOURCES

Herbaceous Perennial Plants, A Treatise on their Identification, Culture, and Garden Attributes, Third Edition *(Armitage, Allan M., 2008)*

Perennial Combinations (Burrell, C. Colston, 2008)

The Well-Tended Perennial Garden (DiSabato-Aust, Tracy, 2006)

Chicago Botanic Garden Plant Evaluation Program (chicagobotanic.org/research)

Mt. Cuba Center Field Trials on *Helenium* (mtcubacenter.org/trials/helenium)

Piedmont Virginia Native Plant Database (www.albemarle.org/NativePlants)

"Virginia Sneezeweed (*Helenium virginicum*), U.S. Fish and Wildlife Service's Environmental Conservation Online System Species Profile (ecos.fws.gov)

"Virginia Sneezeweed," Virginia Natural Heritage Resources Fact Sheet (dcr.virginia.gov)

The Ornamental Garden in August

By Patsy Chadwick | August 2017 - Vol. 3, No. 8

It's August and many of those beautiful ornamental plants that graced the June and July landscape are just a distant memory now. This is the month when we rely on tough-as-nails annuals, heat-loving tropicals, and late summer-blooming perennials to keep the garden looking interesting and colorful. However, the weather at this time of year presents many difficult challenges to the gardener. August often competes with July for being the hottest, muggiest month of the year in the Mid-Atlantic states. Needless to say, when we most need it, rain is often conspicuous by its absence in August. So, rather than sing the blues, what's a gardener to do? First, let's take care of the basics. Even if you don't have much in bloom in August, you can improve the appearance of your garden if you:

- **Stay on top of routine maintenance chores** such as weeding and watering.
- **Monitor** plants for diseases and pests.
- **Deadhead annuals and perennials**. Deadheading not only improves the appearance of plants but also encourages some species such as coneflower, garden phlox, and salvia to continue blooming. Keep in mind that some dried flower heads on plants such as tall sedum, globe thistle, astilbe, and coneflower can look attractive throughout fall and winter and you might want to leave them in place.
- **Tidy up daylilies** by removing yellowed or dried flower stalks all the way to the ground and all browned or yellowed foliage. Cutting the spent flower stalks back also triggers reblooming daylilies to produce more blossoms.
- **Trim away yellowed or tattered hosta leaves** as well as any that have been heavily damaged by insects.
- **Cut back leggy or spent annuals** and give them some fertilizer to revitalize them. Within about two weeks, the annuals should produce fresh, new foliage and another round of blooms.

The Ornamental Garden in August

TIPS FOR CHOOSING HEAT- AND DROUGHT-TOLERANT PLANTS

While it can be challenging to keep the August garden looking fresh and attractive, the job is made easier with the selection of heat- and drought-tolerant plants. Also, foliage plants can often carry the garden through the month as well as or better than flowering plants. Some characteristics to look for when choosing drought-tolerant plants include:

Gray or silver-hued foliage – This characteristic is normally a good indication that the plant evolved to withstand drought conditions. Examples of plants with gray or silvery foliage include wormwood (*Artemisia*), silver ponyfoot (*Dicondra argentea*), sea holly (*Eryngium*), lavender cotton (*Santolina chamaecyperissus*), snow-in-summer (*Cerastium tomentosum*), Russian sage (*Perovskia*), and many succulents and cacti.

Display of Drought-tolerant Artemisia, Dicondra argentea, and Salvia species at Longwood Gardens

Fuzzy or woolly-looking foliage – The leaves of many gray or silver-leaved plants may also be covered with tiny hairs, giving the plant a fuzzy, woolly, or hairy look. The hairs reflect solar radiation, which helps to cool the leaf surface. In addition to slowing evaporation, they also capture moisture on the leaf surface and help offset the effects of drying winds. Plants with fuzzy or woolly-looking leaves include dusty miller (*Senecio cineraria*), lamb's ear (*Stachys byzantine*), silver sage (*Salvia argentea*), and licorice plant (*Helichrysum petiolare*).

Closeup of Fuzzy Stachys (Lambs Ear) Foliage

Small Leaves – A number of drought-tolerant plants have fine or lace-like foliage. The smaller leaf surface area offsets the loss of water through the leaves. Examples include wormwood (*Artemisia*), beardtongue (*Penstemon*), lavender (*Lavendula angustifolia*), rosemary (*Rosemarinus officinalis*), lavender cotton (*Santolina chamaecyperissus*) and some salvia species.

Santolina (Lavender Cotton) with drought-tolerant lace-like foliage

Thick, fleshy leaves – The cells within the thick, fleshy leaves of some plants, particularly succulents, evolved to store water as a survival strategy during periods of sparse or no rainfall. Many of these plants are also able to store water in their stems and roots. Examples include aloe, *Portulaca*, *Kalanchoe*, and sedum.

Succulent display with thick, drought-tolerant foliage

Waxy-coated leaves – All plants have a thin waxy coating called a cuticle on their leaves, but those plants that have evolved with a thicker waxy coating are better equipped to retain water by limiting transpiration. Examples include agave, ivy-leaved geranium, camellia, many citrus trees, and some houseplants, such as jade plant and schefflera.

Jade plants in foreground display thick, waxy-coated drought-tolerant leaves.

Taproots – Plants with taproots have a distinct advantage over plants with shallow root systems. When moisture is scarce, taproots are able to penetrate well below the surface of the soil in search of water. The common grapevine is a classic example of this phenomenon. It is capable of sending its roots 20 feet down in unrestricted soils. Other examples of drought-tolerant plants with taproots include butterfly weed (*Asclepias*), false indigo (*Baptisia*), globe thistle (*Echinops*), and fall-blooming Anemone species.

Long taproots help these Asclepsia tuberosa plants tolerate drought conditions.

Native plants – In general, consider using plants that are native to your geographical area. They have evolved using a variety of strategies for coping with the environmental conditions inherent in that specific region. Examples in central Virginia include beebalm (*Monarda*), yarrow (*Achillea*), black-eyed Susan (*Rudbeckia*), and blanket flower (*Gaillardia*).

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Native plants like this Echinacea (Cone Flower) cope well with hot, dry weather.

WHAT TO DO WHEN THE REALITY OF YOUR ORNAMENTAL GARDEN DOESN'T LIVE UP TO YOUR DREAM FOR IT

The end of the summer is a good time to take stock of how well your ornamental garden is doing. So take a stroll through your garden and take notes about any plantings that appear:

- **Overcrowded**. Sometimes, we fail to take into consideration the mature size of a plant and don't space it properly when we plant it. In other cases, a plant may grow well beyond the size listed on the plant tag. The result is a crowded garden that doesn't look very attractive. More importantly, overcrowding is not good for the health and well being of plants.
- **Less vigorous looking than in previous years**, have smaller blooms, and are separated or dead in the middle. These are all indications that the plant needs to be divided. The cooler months of autumn or spring are generally the best time to divide most plants. However, bearded irises may be divided now that they have stored up energy in their rhizomes all summer. For information on dividing irises, see Clemson Cooperative Extension's publication HGIC 1167, Iris. Daylilies may also be divided in late August. Just keep the soil moist throughout the autumn while the plants are getting re-established. See VCE publication 426-030, Daylilies in Virginia for further information on growing daylilies.
- **Marred by powdery mildew and other fungal diseases**. Hot weather and high humidity encourages fungal diseases on many perennials, shrubs and trees. Your best course of action is to avoid the problem in the first place by keeping your plants healthy. This means giving them the growing conditions best suited to them in terms of soil, drainage, light, air, and spacing. Remove, bag, and dispose of diseased foliage, blossoms, and other plant litter that might harbor pathogens capable of re-infecting the plant. While good information on plant diseases is available from a variety of sources, a Connecticut Agricultural Experiment Station publication entitled "Identification and Management of Diseases of Perennials in the Landscape" provides a good basic overview and photographs of KEY diseases that the typical gardener might face.
- **Damaged by insect pests**, such as Japanese beetles, blister beetles, or aphids. It helps to learn the major insect pests and diseases associated with the plants in your garden. The more attuned you are to the signs of insect damage, the better equipped you will be to diagnose a problem and either prevent it in the first place or treat it before it gets out of hand.

- **Stressed by prolonged heat or lack of water**. It's important to monitor moisture levels at this time of year. In times of drought, your first priority is to keep newly planted trees, shrubs, and perennials watered. Woody plants are long-term investments. Failure to keep them properly hydrated in their first year or two can cause them to struggle for years to come. Your second priority should be to keep established plantings hydrated. Your third priority should be annuals, which only live one season. They are a short-term investment. So, if you're rationing water, then give annuals bottom priority and don't feel guilty about it.
- **In need of support.** Tie up, cage, or stake any plants that have fallen over. Make a note to stake them earlier next year before they have a chance to fall over. Better yet, many plants can be pruned back early in the growing season to reduce their height. They may bloom a week or two later than normal, but pruning will result in shorter stems that may not require support of any kind.

AUGUST INSECTS THAT MAY VEX YOU AND POTENTIALLY STING YOU

WASPS AND BEES

There is a tendency to group all stinging insects under the general category of "bees." While there are some similarities, significant biological and behavioral differences exist between the wasp and bee families. For example:

- Wasps and their related species are more slender than bees and have fewer hairs on their bodies
- Wasps feed on other insects, whereas bees primarily feed on plant pollen and nectar.
- Wasps do not have barbs on their stingers and can sting repeatedly. Bees do have barbs on their stingers. They can only sting once and then they die.
- Not all wasps and bees sting. Only the females have stingers. The males do not. Bees and wasps that generally sting in defense of their nests may be grouped into a category called "social" bees and wasps. Because their stings are very painful, this is the group of stinging insects that seem most intimidating to humans. Wasps belonging to this category include paper wasps, yellow jackets, and hornets. Paper wasps build gray paper nests that are similar in appearance to a honeycomb when they are viewed from below. Yellow jackets usually build their nests underground or occasionally in the cavities of hollow trees and buildings. Hornets build large gray paper nests in trees or shrubs and sometimes under the eaves of buildings.
- Another category of social wasps includes species that do not sting in defense of their nests. In fact, they rarely sting unless they are being handled. This category Includes spider hunter wasps, cicada killers, and mud daubers, which are all ground-dwelling wasps.
- The social bees include the major categories of honey bees, bumble bees, and carpenter bees. Honey bees live in colonies and are very social. Bumble bees are social and nest in existing cavities that are generally in the ground. They are only aggressive when defending their nests. Carpenter bees are not social and dig solitary nests in the ground. The female carpenter bee can inflict a painful sting but is aggressive only if handled or molested.
- Solitary bees, such as sweat bees, mining bees, and leaf-cutting bees, generally nest in the soil or occasionally in natural cavities in wood.

Wasps and bees are among the most beneficial of all the insect species. They are critical to the pollination of many plants, particularly our food crops. According to the American Beekeeping Federation, the honey bee alone is responsible for directly or indirectly pollinating one third of all the foods Americans eat. Because wasps and bees are so important as pollinators, they should be left alone unless they become a menace.

To avoid being stung by one of these creatures:

- Stay alert when you're working in your yard or garden, particularly for stinging insects that nest in the ground.
- Always look before reaching into tall grass, under shrubbery, or into other blind spots where bees or wasps might be nesting.
- Avoid taking food or beverages outside where you are working.
- Always wear shoes when working outside.
- Avoid wearing perfumes or other scented products outdoors.
- Stay calm if a stinging insect lands on you. Either don't move or move very slowly and the insect will most likely fly away without harming you.

For more information on stinging insects, see the University of Missouri Extension's publication G7391 Bees and Wasps or the University of Maryland Extension's Bulletin 248 Common Stinging Insects: Wasps and Bees.

BITING MIDGES

Late summer seems to be the time mosquitos and other biting insects are out in full force. One of the peskiest of these insects is the biting midge, a tiny, blood-sucking fly that is an opportunistic biter of humans and animals alike. This insect is not to be confused with the non-biting midge, which resembles a mosquito. The biting midge is not currently known to transmit diseases to humans but it can make you miserable if you're outdoors when these pests are actively flying about. Commonly called by the appropriate nickname "no-see-ums," a bite from one of these diminutive pests can cause a range of reactions in humans, including a burning sensation, small reddish-color welts at the site of the bite, and itching. Both male and female midges will feed on plant sap and nectar but egg production requires a protein source. So, the female midge, similar to the female mosquito, obtains protein by consuming the body fluids of other small insects or through a vertebrate blood meal. That means you and your pet as well as livestock and wildlife. Only the female midge bites. The male biting midge does not have mouthparts that are capable of biting. The most effective way to avoid being bitten is to stay indoors when these insects are most active. Depending on the species, some midges are active during the daytime. Others are active around dusk and throughout the evening hours.

Forage Radishes — A hard-working cover crop

By Cleve Campbell | August 2017 - Vol. 3, No. 8

Several years ago when my wife and I were visiting her brother in Indiana, I was rudely awakened one morning by the sound of an airplane swooping over the house. Now, we are not talking about just one swoop! After the seventh swoop, I had to crawl out of bed to check out all the commotion. It was a plane flying over a soy bean field, so I assumed it was spraying some herbicide or chemical, and I ducked back into the house. After all the noise had cleared later that morning, I asked my brother in-law what the plane was spraying. He calmly responded, “Radishes and winter rye.”

I’m not a professional farmer but I have planted my share of winter rye as a cover crop, and I’ve grown a pound or two of radishes in my garden plot, so I was certain that plane was flying over a soybean field, not a field of rye or radishes. “Aren’t those soy beans growing in the field?” I asked. He gave me a stare and calmly responded, “Those are soybeans, and the plane was sowing my winter cover crop, a mixture of rye and radishes.”

I have used cereal rye for years in the garden as a cover crop, but using radishes as a cover crop was something new. A gardener is always looking for new information such as a new variety, a better way of doing things, or, as the old cliché goes, “a new tool for the toolbox.” Naturally, when one mentions radishes, I think of those nice round red radishes such as ‘Cherry Belle’ or the mild ‘French Breakfast’. I’ve even grown an heirloom variety called ‘Watermelon’. But to be honest, I had no clue why anyone would plant radishes like these as a cover crop. I soon learned that the varieties I was thinking of were not what was being sown as a cover crop.

My brother-in-law informed me they were “tillage” radishes, a variety called ‘GroundHog’. They grow large roots and will continue to grow into the late fall until they are killed by cold weather. The rye would continue to grow into the spring. I knew that my brother-in-law, sometimes known as “The Frugal Farmer,” would not

spend money on a radish cover crop unless there was some benefit. I couldn't wait to find out more about tillage radishes to determine if they might have a place in my garden as a cover crop.

Forage radishes (*Raphanus sativus* var. *longipinnatus)* are members of the Brassica family, which also includes arugula, mustard, and cabbage, to name just a few. Forage radishes are also known as Tillage radishes, Daikon radishes, and Japanese radishes. They are marketed under various cultivar names such as 'GroundHog', 'Nitro', 'Sodbuster', and 'Bio-till'.

Oilseed radishes (Raphanus sativus var.*oleiformis*) are another type of radish grown as a cover crop. They are related to the forage radish but have a stubbier taproot, more branches, and tend to be somewhat more winter hardy than the forage radish. Oilseed radishes are marketed under cultivar names such as 'Adagio' and 'Colonel'. As the name implies, oilseed radishes were originally grown for oil. Often the names oilseed and forage ('Daikon') are used interchangeably, and that can be confusing because they are different. However, most of the traits and growing recommendations are the same for both types of radishes.

Oilseed radish (left) and forage radish (right).

Photo Source: *Maryland Cooperative Extension, Fact Sheet 824*

Alleviation of Soil Compaction

Forage radishes are excellent at breaking up compacted soils, and have earned the nickname "bio-drills." Planted in the early fall, 3 to 10 weeks before the first freeze, the roots of forage radishes can penetrate compacted soils more deeply than other cover crops such as cereal rye. Under ideal conditions, the thinner part of **the taproot can grow to a depth of 6 feet or more during the fall!** The thick fleshy part of the taproot can grow 12 to 20 inches (including 2 to 6 inches protruding above ground), creating vertical holes and zones of weakness that tend to break up surface soil compaction. After the plants die in the winter and the roots decompose, the open root channels can be used by the roots of your vegetable crops to grow through the compacted layers of soil. The channels created by the roots tend to remain open at the surface, improving water infiltration and soil warming in the spring. The channels also provide an access route for subsequent roots to reach subsoil moisture, resulting in greater plant resilience under drought conditions. The decomposed roots of the forage radishes improve the soil's porosity (air spaces) and the general physical soil condition (tilth).

Radish Holes after Winter Kill. ***Photo Source:*** *Joel Gruver, Western Illinois University*

Weed Suppression

A good stand of radishes — more than 5 plants per square foot — has been shown to eliminate nearly all winter annual weeds. Weed suppression from fall-planted radishes typically lasts into April but does not extend much further into the summer planting season.

Nutrient Scavenger

The deep root system, the rapid root growth, and the heavy feeding of forage radishes combine to make them an excellent scavenger of residual nitrogen after the summer growing season. Radishes take up nitrogen from both the topsoil and from deeper soil layers and then store the nitrogen in their shoots and in their root biomass. Because radishes do an excellent job of cleaning up nitrogen left over in the soil from summer crops, they help prevent nitrogen from leaching into groundwater during fall, winter, and spring.

Unlike cereal rye (annual winter rye), whose residues decompose slowly and continue to hang on to nitrogen for extended periods (thus immobilizing the nitrogen), radish roots decompose and release nitrogen rapidly. This means that early spring crops can get an early boost from the nitrogen captured by the radish crop.

In addition, forage radishes have also been shown to be excellent scavengers of potassium (K) and phosphorus (P) left over from the past growing season.

Effects on Nematodes

Research has provided evidence that the residues from radishes reduce the number of plant parasitic nematodes such as root knot nematodes.

Seeding

It is difficult for the home gardener to determine the ideal seeding rate, but several seed packets I reviewed suggested rates of ¾ lb. to 1 lb. per 1,000 square feet. Follow the seed company's recommendation listed on the seed packet and adjust the sow rate after a season or two of experience.

The recommended depth for seed planting is ¼ to ½ inch, however, seed can be broadcast (remember my brother in-law's air plane method?) and left uncovered. The recommendation is to sow uncovered seeds about 50 per cent more thickly. So, if the recommendation is to sow 1 lb., sow about 1½ lbs. if the seeds will not be covered with soil.

Radishes germinate rapidly, emerging within 3-4 days when environmental conditions are favorable. Seed broadcasted on the soil's surface can establish well if followed by a timely rain. Forage radishes do not tolerate very wet soil, so low spots that collect standing water should be avoided. The radishes are tolerant of frost until temperatures dip below 25ºF. It takes several nights of temperatures in the low 20s to kill forage radishes.

Cautions

Deer will be attracted to your forage radish crop. Also, during warm spells in winter and in early spring,

decomposing radishes may release a pungent rotten-egg odor.

Since forage radishes are in the Brassica family, it's best to avoid planting them in areas where you will be planting other Brassica members such as cabbage, cauliflower, broccoli, kale, kohlrabi, turnip, or mustard.

Summary

Another great tool in the cover-crop tool box, forage radishes can provide multiple benefits including: alleviation of soil compaction, weed suppression, nutrient capture (N, P &K), and erosion control. They can also be mixed with other cover crops such cereal rye to add more organic material to your soil.

Thanks for joining us in *The Garden Shed* and we hope you stop by again next month.

Resources:

"Radishes- A New Cover Crop for Organic Farming,"
http://articles.extension.org/pages/64400/radishes-a-new-cover-crop-for-organic-farming-systems

"Forage Radish: New Multi-Purpose Cover Crop For the Mid-Altantic," Maryland Cooperative Extension, Fact Sheet #824, https://enst.umd.edu/sites/default/files/docs/FactSheet824 Weil et al 2009.pdf

"Radishes: A New Cover Crop Option," American Society of Agronomy, Crops and Soils,
https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_022940.pdf

"Forage Radishes," Cornell University, http://covercrops.cals.cornell.edu/forage-radish.php

The Vegetable Garden in August

By Cleve Campbell | August 2017 - Vol. 3, No. 8

“The month of August is a busy month in the vegetable garden.” This must be about the fifth month in a row that the *Monthly Tips and Tasks* article has highlighted the “busyness” of whichever month we’re in. Perhaps you’re beginning to believe that *every* month in the vegetable garden is a busy month. Well, as a vegetable gardener, I must say that certainly seems to be the case! Let’s begin with the short version of the August to-do list: continue to harvest vegetables, remove spent spring and summer crops, and weed. Now is also the time to plant fall crops and cover crops.

Speaking of **weeds**, I am always amazed at how they continue to pop up week after week and year after year. I am often asked, “Where do they come from and why so many?” They can be blown in by the wind, washed in by surface water, and introduced by birds and other wildlife. And the weed-seed inventory can also be increased with the application of organic matter through compost and manure. One of my biggest gardening surprises was the day I learned that the majority of weeds come from seeds we gardeners plant ourselves. Whoa, hold on! Gardeners plant weeds? Every time a weed is allowed to go to seed, it replants itself in our garden. Okay, by now you’re thinking, “It’s August, it’s hot and I get sweaty just *walking* to the garden! How are a few weeds going to seed in the garden going to make a difference?” Well, you are going to be surprised!

A garden friend once remarked, “Certain weeds have mastered every survival skill except learning to grow in straight rows! And it’s as if they are the home team; they always win because they bat last.” One of the survival skills that weeds have truly mastered is their ability to produce an abundant seed crop. How abundant you ask? Many common weeds have the ability to produce thousands of seeds that are deposited on the earth. Many of these seeds have a protective coating and can remain fertile for up to 40 years or more after they are added to the weed “seed bank.” A seed bank is simply the collection of weed seeds in the soil. Let’s look a little closer at that seed bank.

A single weed plant can produce a great number of seeds. Examples of individual plants that produce a hefty number of seeds include: red pigweed (*Amaranthus retroflexus* — 117,000 seeds per plant), common purslane (*Portulaca oleracea* — 52,000 seeds per plant), shepherd’s purse (*Capsella bursa-pastoris* — 38,000), common lambsquarters (*Chenopodium album* — 28,000) and yellow foxtail (*Setaria glauca* — 12,000).

This annual collection of seeds, if present in the garden or in the seed bank, makes weeds a tough adversary. It is estimated that the seed bank can be depleted by 80-90 percent within 2-3 years of weed control. However, the seed bank can be replenished with a single year of no control or ineffective control. Did you ever wonder about the origin of that old gardening proverb, “**One year of seeding makes seven years of weeding**?” Think of that weed seed bank in the garden waiting to sprout!

Common Purslane (Portulaca oleracea) a single plant can produce up to 52,000 seeds.
Photo Source: Oregon State University

August is a transition month: the vegetable garden is moving from late spring and summer crops to cool weather or fall crops. The gardener who fails to plant a fall garden is often missing out on a remarkable growing season. Here in central Virginia, we can harvest fresh produce well into the fall and often into early winter. No matter how ragged the summer garden looks, a fall garden offers us not only a second growing season, but also a second chance to plant those early spring crops that failed in the summer heat. August in central Virginia is fall planting season, the time to plan and plant a fall garden. Timely planting is the key to success.

Red Pigweed (Amaranthus retroflexus) a single plant can produce up to 117,000 seeds. Photo Source: Maine.gov

The following planting chart was created by using the Virginia Cooperative Extension Publication No. 426-334, “Fall Vegetable Gardening.”

August 1-10		August 11-20	August 21-31	
Beets				
Brussels Sprouts*				
Broccoli*		Broccoli*		
Cabbage*		Cabbage*		
Carrots				
Cauliflower*		Cauliflower*		
Chard, Swiss		Chard, Swiss		
Collards		Collards		
Cucumbers		Cucumbers		
Chinese Cabbage*		Chinese Cabbage*		
Endive		Endive		
Kale		Kale	Kale	
Kohlrabi		Kohlrabi	Kohlrabi	
Lettuce, bibb		Lettuce, bibb	Lettuce, bibb	
Lettuce, leaf		Lettuce, leaf	Lettuce, leaf	
Mustard		Mustard	Mustard	
Peas, Garden		Peas, Garden		
		Radish	Radish	
Rutabaga		Rutabaga		
Spinach		Spinach	Spinach	
Turnips		Turnips	Turnips	
		Cover Crops:		
Buckwheat		Buckwheat	Buckwheat	
* Denotes Transplants				
The suggested dates may vary for different areas.				

More Gardening Tips and Tasks For August:

- When **choosing vegetables for the fall garden**, select those that are **semi-hardy**, as they will tolerate a light to moderate frost, and look for those with **quick maturity** (fewest days to harvest). This information will be listed on the **seed packet** or in the **seed catalog**.
- **Vegetables that can be planted in August** include leafy greens such as lettuce, spinach, collards, kale, and mustard. Radishes, turnips, beets, and carrots can all be started from seed in August. Chinese cabbage, broccoli, cauliflower, and Brussels sprouts can be transplanted in August and still have enough time to produce a good harvest. When selecting plants for transplanting at the local gardening center, be sure you are selecting edible (not ornamental) varieties of cabbage and kale.
- **Fall plants often have fewer insect problems** because they avoid the peak insect activity period of midsummer. However, some insects, such as cabbage worms and corn earworms, may be worse later in the year than in the summer; vigilance is still required. Avoid some pests and diseases by planting crops of different families than were originally grown in that section of garden.
- When planting fall crops, **prepare the soil by restoring the nutrients removed by spring and summer crops**. A light layer of compost or a small application of an organic or complete

fertilizer will provide the nutrients needed by your fall crops.

- Dry soil can make working the soil difficult and can also inhibit seed germination during the late summer. **Plant fall vegetables when the soil is moist,** either after a rain or after you've watered the area thoroughly the day before planting. Plant the seeds slightly deeper than recommended for spring planting. Once planted, water them in thoroughly, and then use mulch or a covering of compost to prevent the soil from crusting.
- **Watering properly** is the key to conserving water in the heat of the late summer. One inch per week applied all at one time will wet the soil 6 to 8 inches deep and insure good yield from your mature crops. Two inches of organic mulch such as leaves or straw will cool the soil and reduce surface evaporation of water. Water the garden early in the day so the foliage dries before nightfall. **Wet foliage at night increases susceptibility to fungus diseases.**
- When **mulching around young seedlings**, care should be taken not to cover the seedlings. Young seedlings need as much sunlight as possible; mulch should cover the soil, not the young plants.
- **Pick summer squash and zucchini every day or two** to keep the plants producing. If you are going on vacation this month, harvest all your vegetables beforehand and then arrange for someone to pick fast-maturing crops such as squash and okra while you're off loafing. Otherwise, your vegetables will become over-mature and stop producing,
- **Potatoes continue to grow as long as the tops are green**. Dig only as many as you need for immediate use. The tubers will keep better in the ground than in a warm, dry area
- **Consider planting a cover crop.** A cover crop such as annual rye decreases erosion of the soil during the winter, shades out weeds, adds organic material when it is incorporated into the soil in spring, improves the soil structure, and adds valuable nutrients. Cover crops can be sown between rows of fall vegetables a month or less before expected harvest. The cover crops will get a head start and will not interfere with vegetable plant growth. Buckwheat will be killed by frost but can be sown as a cover crop up to 6-8 weeks before a killing frost, usually about the 3rd or 4th week in October. For more information on the attributes of growing buckwheat check out the "Buckwheat" article in our August 2016 issue of *The Garden Shed*.

Buckwheat planted between corn rows.

- Garden vegetables that become over-ripe are easy targets for some pests. **Remove ripe vegetables as soon as possible.**
- **Having trouble locating your tools** when working in the garden? Paint the handles of your garden tools a bright color other than green or tie a piece of bright orange surveyor's tape around the handle.

During the hot dog days of August, one of the last things a vegetable gardener wants to think about is planting more crops. But look ahead to the fall garden which offers the satisfaction of a prolonged harvest of fresh vegetables, savings in food costs, and making full use of your gardening space and growing season.

Thanks for visiting us in *The Garden Shed* and we look forward to your visit next month.

Sources:

"Why So Many Weeds? The Weed Seed Bank," Colorado State University Publication

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“August Monthly Tip Sheets – August Vegetables,” https://albemarle.ext.vt.edu/programs/horticulture-natural-resources.html

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Grilled Sausage and Potato Salad with Spinach, Red Onion, Brewmaster’s Mustard Vinaigrette

By Cate Whittington | August 2017 - Vol. 3, No. 8

When my son attended school in Chapel Hill, North Carolina, I fell in love with a local gourmet market called Foster’s Market. Sally Foster, its owner, has published several cookbooks and I love everything I have tried from them! Every summer when the potatoes and onions come tumbling in, I turn to *Sara Foster’s Casual Cooking* for a very basic salad that lends itself to improvisation. The Brewmaster’s Mustard dressing should not be omitted as this is what gives the salad its oomph, but you may leave out the sausage and add in whatever else is on hand, from cucumber to summer squash to cheese and olives. Easy to assemble ahead of time, this is a colorful and appetizing winner for small or large crowds. *Serves 4-6*

Ingredients

1 pound small red potatoes, gently scrubbed

Kosher salt

1 pound Kielbasa or Italian pork sausages (spicy or sweet), cut into 2 inch pieces

4 cups loosely packed spinach, washed, drained, trimmed

1 red onion, thinly sliced

1 cup grape tomatoes or small cherry tomatoes, halved

2 tablespoons chopped fresh flat leaf parsley

Sea salt and freshly ground black pepper

Brewmaster's Mustard Vinaigrette

3 tablespoons red wine vinegar

1 tablespoon Brewmaster's Mustard*

1 shallot, minced

1/3 cup extra virgin olive oil

Salt and freshly ground black pepper

*Brewmaster's Mustard is a brand name, native to North Carolina. To make your own, combine 2 tablespoons whole-grain mustard with 2 teaspoons dark beer and 1/2 teaspoon brown sugar.

Directions

- Prepare a hot fire in a charcoal or gas grill (OR heat a grill pan or cast-iron skillet over medium heat until hot).
- Place the potatoes in a large saucepan and add water to cover by 2 inches. Bring the water to a boil over high heat and add salt. Reduce the heat and simmer the potatoes for 12-15 minutes, until they are tender when pierced with the tip of a small knife. Drain the potatoes, transfer them to a large bowl, and set aside to cool.
- Meanwhile, make the vinaigrette. Whisk the vinegar, mustard, and shallot together in a small bowl. Gradually whisk in the olive oil, season to taste with salt and pepper, and set aside.
- Grill the sausage for about 10 minutes, turning often, until light brown and cooked through. Remove from the grill and set aside to cool slightly.
- Add the sausage, spinach, onion, tomatoes, and parsley to the bowl with the potatoes. Drizzle the salad with the vinaigrette, season to taste with salt and pepper, and toss until the spinach is wilted slightly. Serve warm or at room temperature.

Resources: Sara Foster's Casual Cooking, 2007