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Growing Plants From Seed You Collect

By Susan Martin | September 2017-Vol 3. No.9

Last year, a friend from high school sent me a packet of seeds she had saved from her zinnias. I had visited her at the height of the summer season in upstate New York and admired the abundance of zinnias in her beautiful garden. When I received her seed packet in the fall, I was excited about sowing the seeds in spring and watching them grow. And they did grow! In return, I'd promised to send her some seeds from my garden. And that pledge brings me to the topic of this article: growing plants from seed you collect.

Why Save Seed

Purchased seed packets are not that expensive for a small-garden home owner, so why go through the effort of collecting and storing seeds? It's fun to share plants from your garden by sending seeds through the mail to a far-away friend. A lot of gardeners are naturally curious and like to experiment for the joy of learning new things first hand. There's also just something wondrous about seeing something bloom that was started from a tiny seed saved from your own garden. If you have a large garden area, starting plants from collected seed can also be an economical way of filling the space. Or, perhaps you've found a variety of heirloom tomato that you find particularly tasty. Saving seed from that plant is a way to ensure that you will enjoy that variety again next summer. Seed-saving is essential for maintaining unusual or heritage vegetables and

flowers. It is also a great way to propagate many native plants.

Let's Start With Pollination

Before we start to discuss which plants are good seed suppliers, it might be helpful to start very briefly with a reminder of how pollination works. The plant's male reproductive organ is the stamen. The pistil is the female part. The top of the pistil is called the stigma, which is often sticky. Pollen must be moved from the stamen to the stigma. When pollen from a plant's stamen is transferred to that same plant's stigma, it is called **self-pollination.** Pollen is transferred from one plant to another through either cross-pollination or open-pollination.

Cross-pollination is when one plant pollinates a plant of another variety. **Cross-pollination can only occur between varieties, not between different species.** If two different varieties of the same species are grown near to each other in the garden, cross-pollination by wind or insects can occur. There will be no effect on this year's fruit or flower, but **the seeds will be affected.** If those seeds are planted, the resulting plants won't be "true-to-type" since they will carry the traits of two varieties. Sometimes, cross-pollinating is used intentionally in the garden to create new varieties. Gardeners produce hybrids through cross-pollinating by hand

Open-pollination is when pollination occurs mainly by insects, birds, and wind. Because there are no restrictions on the flow of pollen between plants, open-pollinated plants are more genetically diverse. As long as pollen is not shared between different varieties within the same species (cross-pollinated), then the seed produced will remain true-to-type year after year. **All heirloom varieties are open-pollinated.**

Which Seed To Save

Among the more important decisions every gardener makes is whether to choose **open-pollinated, heirloom, or hybrid seed varieties.** For seed-saving purposes, the most significant distinction among these types is that gardeners should save true-to-type seed from open-pollinated and heirloom varieties, but **not seed from hybrids**. Let's look at the differences between heirlooms and hybrids.

Heirloom varieties are open-pollinated. This means that unlike hybrids, seeds you collect will produce plants with characteristics of the parent plant. And that's key to an heirloom's survival. The goal is to ensure that *all* the variety's genes are transmitted from each generation to the next. Any changes to an heirloom variety are undesirable from a preservation standpoint. Any selection for or against any of the variety's traits would change the variety's overall genetic composition. This means that when collecting seeds from heirlooms, you want to take seeds from many different plants of the same variety. You don't want to select seeds from the strongest, healthiest plants, for example, or the ones with the biggest blooms.

A hybrid plant is a cross between two different species of plants and is identified by an X in the plant name. Hybrids may also occur between different genera, subspecies, varieties and cultivars. **Hybridization** is a controlled method of pollination in which the pollen of two different species is crossed by human intervention. Hybrids offer the advantage of taking the best qualities of each parent plant. Because they are from a cross, the seeds produced by hybrids will not grow "true," i.e., seedlings grown from a hybrid could exhibit traits of one or both parent plants or be something totally surprising. Sometimes hybrid seed is sterile and does not grow at all. Keep in mind that a lot of newly introduced perennials are hybrids and their seeds won't grow true to type. These plants should be propagated by division, not by seed, if you want plants to stay true to the original. Gardeners who use hybrid plant varieties must purchase new seed every year.

Will My Zinnias Look Like Her Zinnias?

Now let's go back to the original gift of zinnia seeds from my friend's garden. If her zinnias are heirloom zinnias, that is open-pollinated, the seeds she sent to me will produce zinnias that are true to the parents. But if her zinnias are hybrids, the zinnias I grow could look very different from my friend's in terms of height, color and size of bloom. Or the seeds could be sterile.

This spring, I planted the gifted zinnia seeds right next to purchased, hybrid zinnia seeds. The gifted zinnias are definitely shorter and the blooms seem to be flatter than the ones from purchased hybrid seed. This is not a reliable "experiment," however, since I don't have a picture of my friend's original zinnias or any detailed information for comparing the two generations of her zinnias. For comparing the gifted zinnias to my purchased-seed zinnias, I would need to make sure that I was comparing the same variety of zinnias, and there are many different varieties. The proximity issue does have implications for collecting next year's seed.

What Will Happen Next Year?

Because I planted my hybrid zinnias right next to my friend's seeds, there will certainly be cross-pollination from bees and wind. Some vegetables, such as corn, need to be separated by more than a mile. Some beet varieties require as much as 5 miles, and even that doesn't guarantee avoiding cross-pollination. If my friend's zinnias were heirloom, their seeds would now be tainted by cross-pollination and would no longer be true to their underlying characteristics. Next year, I plan to purchase hybrid zinnia seed for one of my gardens and heirloom zinnia seed for another location. The two gardens are about 125 feet apart. This may or may not be enough to keep the heirloom seeds true, but I'll save some seed from the heirloom variety to plant as an experiment.

Cultivars and Nativars

There is a strong interest in growing native plants to help build up ecosystems that are suited to our local environments. Plant breeders, however, seek to improve even the native species and we now have the option of planting native cultivars or "**nativars**." This means that different varieties of plants have been selected for certain characteristics and bred selectively through cross-pollination by human intervention so as to produce desirable plant characteristics. A plant label that includes part of the name written in single quotes indicates a cultivar.

Open-pollinated, "straight species" native plants are not hybrids, so the seed will remain true. There are, however, many cultivars of native plants which might still be sold under the "native" label. Plants grown from the seed of these cultivars will not be true to type. For example, the straight species Echinacea is purple coneflower, *Echinacea purperosa*, but many different colored coneflowers have now been developed. Many cultivars are beautiful and offer characteristics such as better disease resistance or double blooms. Some nativars are not as attractive to pollinators or caterpillars but other nativars are actually more

attractive. More studies are being conducted on how straight species natives and native cultivars compare in this respect. In addition, if cultivars are sterile, i.e., not seed-producing, they won't contribute seed to a natural habitat garden designed to support birds and other wildlife. All of these pros and cons need to be recognized and assessed for inclusion in our own gardens.

Methods of Preparing Seed

Most flowers and herb seeds are prepared by a **dry seed** method. First, the seeds must be located, which fortunately is pretty obvious, by looking at the flower petals. The petals, whose job is to attract pollinators, are usually in front of the ovary or surrounding it. After the flowers are pollinated, the petals start to wither and fall away and the seed pod or seed head begins to swell with seeds. When you open the pods, the seeds will be inside. Cleome or spider flower, *Cleome hassleriana,* is an example of a plant with a very obvious seed pod.

Cleome

Sunflower, Helianthus, Asteraceae family

The Asteraceae family, also called Compositae family, is the largest family of flowering plants. If the flower has a green, yellow, brown, or black "eye" in the center, it is likely a member of the Asteraceae family. This eye is made up of lots of tiny flowers and each flower produces a seed. The seeds develop in the eye and form a seed head. The sunflower is an example of a plant with a very large seed head. Zinnias, rudbeckias, coneflowers, and daisies are all part of this family. Other Asteraceae flowers, such as marigolds, have tight bunches of petals with no eye, but the seeds develop right in the center.

Plants in the Lamiaceae (mint) family may produce many tiny flowers along a stem. An inflorescence (group of flowers) is a shape in the mint family that resembles a bottle brush. Anise hyssop and basil are examples. The flower head comprises lots of tiny flowers which produce very small seeds.

Anise hyssop, Agastache foeniculum, Lamiaceae family

All of these plants represent dry seed collection, meaning that the seeds are dry when mature. Allow the seed to mature and dry as long as possible on the plant. Seeds should be harvested on a dry day when the pods or husks have dried. After harvesting, store the pods or heads in a dry place and wait until they are thoroughly dry. You can place cut flowers from the Asteraceae and Lamiaceae families stem-side up in large paper bags and allow their pods and seeds to dry out. Shake the bag once in a while to release the seeds. The husks should easily crumble between your hands. Cleaning dry seeds usually involves simply drying and crumbling the pods or husks, then screening or “winnowing” the seeds to separate them from the chaff. Place the seeds and chaff in a bowl and swirl or shake gently. Remove the larger pieces of chaff by hand.

Wet seeds are found in such plants as tomatoes, eggplants, and many squashes. Allow the fruits to fully mature on their plants before harvesting. Tomato seeds can be “fermented” before cleaning. This process can dramatically improve their ability to sprout.

Fermentation removes germination-inhibiting substances from seed coats, makes them more permeable to water, and also helps reduce or control seed-borne diseases (for healthier seedlings). To prepare seeds for fermenting, simply squeeze or scoop the seeds—together with the pulp that surrounds them—into a jar with a little water. There is no need to include more pulp than naturally comes with the seeds. Store this seed/pulp mixture in a warm place (75 to 85º F) for 2 to 4 days. Fermentation will be evidenced by bubbling and/or by the formation of a white mold on the surface of the mixture. Watch closely, as seeds left fermenting too long (especially above 80º F or so) may germinate. Once the seeds start to swell from taking on water, they will have begun their internal process of germination. Once this process starts, the seeds are no longer viable for storage. Odor from the fermentation process is normal.

Now it’s time to clean the seeds. Pour the seeds and pulp into a bowl and add water. Healthy seeds will sink to the bottom of the bowl, while dead seeds and most of the pulp will float. Use your fingers to gently separate the seeds from the pulp. Then, to remove the pulp and dead seeds, carefully pour the extra water with the floating pulp and dead seeds from the bowl. Pour quickly enough for dead seeds and pulp to pour off the top, and slowly enough so that the heavier, good seeds remain safely on the bottom. Repeat this rinsing and pouring process several times.

After cleaning, be sure to dry the seeds thoroughly before storing them. Simply spread the seeds on sheets of paper or paper plates and allow them to air-dry for a few days. Do not use plastic; it could create a breeding ground for mold or fungus.

Storing Seed

After drying, put the seeds in a suitable container, **label**, and store in a cool place. Suitable containers could include purchased seed packets, envelopes, medicine bottles, baby food jars, or any other containers that seal out moisture.

Many gardeners store seeds in the refrigerator. If you're short on space, you could store seeds in a garage or cool basement over the winter months and then put them in the refrigerator during the "shoulder" months, the warm months in the fall and early spring. You don't want the seeds to start germinating from warmth and/or humidity. Different seeds have different life spans. Most dry seeds can be kept for 2 to 4 years in correct storage conditions, i.e., dark, dry conditions below 39ºF.

Sowing Seed

There are four environmental factors which affect seed germination: water, oxygen, light, and temperature. Some seeds will germinate over a wide range of temperatures, whereas others require a narrow range. Generally, 65 to 75°F is best for most plants. Check temperature and light instructions for each type of seed. Once the seeds have germinated, seedlings do best with about 16 hours of sunlight per day. Grow lights will probably dramatically increase the chance of success. When starting seed in the home, supplemental light can be provided by fluorescent fixtures suspended 6 to 12 inches above the seeds. An adequate, continuous supply of water is important to ensure germination and to ensure the health of the seedlings.

If you want to set out seedlings in the spring, you should consult sources about germination times (how long it takes to go from seed to seedling) and when seedlings should be set outside. For example, a snapdragon germinates in 5 to 10 days on average and should be seeded indoors about 10 weeks before the last frost. There is a 50% chance of a last frost occurring on April 7 in our area. By April 16, the probability drops to 10%, so in order to have seedlings ready to go, you would need to plant snapdragon seeds indoors by about January 20.

Some annuals, such as cleome and zinnia, are particularly good for sowing fresh seed. Rather than collecting and storing seed in the fall and planting in the spring, you can spread the fresh (naturally dried) seed in the fall. Sow fresh seed from your favorite annuals in the fall just by shaking out the dried seed heads and look for seedlings in your garden next spring. Just be sure to note where you sowed so that the seedlings don't get weeded out during spring clean-up!

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Provençal Tian

By Cate Whittington | September 2017-Vol 3. No.9

Q: What is a tian?

A: An earthenware dish that goes from oven to table AND a baked, layered vegetable dish native to Provence, France.

When considering the tian, think casserole or ratatouille. There are many variations on a theme when talking about tians, but all highlight late summer vegetables such as zucchini, yellow squash, red potatoes, eggplant, and tomatoes. Daniel Gritzer, renowned New York chef, defines a tian as “any casserole cooked in an earthenware vessel by the same name, but these days it almost always refers to some kind of layered vegetable dish that’s gratinéed in the oven.” Finding many tian recipes bland and watery, Daniel Gritzer set out to find the perfect way to develop concentrated, intense flavors in the dish. “Ultimately,” he says, “I found that the **best method was to sauté each sliced vegetable in a very hot skillet,** working in batches small enough to guarantee that they’d brown before they risked overcooking and turning to mush. I also found that **the ideal slice thickness is somewhere between one-eighth and one-quarter of an inch**—any thinner, and the slices shrink to almost nothing as they cook, making them incredibly difficult to work with later.”

The creation of a tian, whether lined in rows in a rectangular dish or layered in a circular pattern in a round dish, is up to you. Tomato sauce may be spread on the bottom of the dish, with more spooned on top, if desired. Some people make a first layer of sautéed green beans and onions and then place a second layer of multicolored vegetables on top. **Thyme, garlic, and olive oil are traditional seasonings in Provence.**

Baking: No matter what precooked vegetables you decide to incorporate into your dish, you will want to bake the dish for about an hour. Preheat the oven to 400 degrees and bake uncovered for about 15 minutes. Lower the heat to 350 degrees and bake for an additional 45 minutes, or until the vegetables are tender. Cheese (Parmesan or goat are popular choices) may be added to the top layer about halfway through the baking time. Cool to room temperature and serve, if desired, with torn basil leaves.

Many chefs swear that tians, a wonderful accompaniment to potluck suppers, improve with age and are best

served as leftovers. So, experiment with your garden produce and find what works best for you!

Resources:

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Gomphrena — An Antidote for the Late Summer Garden Blahs

By Patsy Chadwick | September 2017-Vol 3. No.9

Keeping the ornamental garden looking fresh and colorful can be challenging in late summer and early fall. Hot, humid temperatures and lack of rain can linger well into autumn, stressing even the best-maintained garden. Summer-blooming perennials are generally done by now and the fall-blooming perennials are just getting started. Fortunately, a number of drought-tolerant annuals can help bridge the gap. Zinnias, marigolds, annual salvias, cosmos, floss flower, or cleome are all tough, dependable, drought-tolerant annuals. But if they seem common and ho-hum to you, perhaps *Gomphrena* (pronounced gom-FREE-nah) will be more to your liking.

Gomphrena, commonly known as globe amaranth, is an old-fashioned cottage garden plant. Although perennial in USDA zones 9-11, it must be treated as an annual north of Zone 9. A source of constant bloom from early summer until frost, it is at its most glorious in September and October when it is loaded with masses of blooms. This low-maintenance annual was born for hot, dry weather. In fact, its reputation for being able to withstand blistering high temperatures may have inspired the whimsical notion that it was originally planted at the gates of Hades. Now that's hot!

A native of Central and South America, *Gomphrena* has been planted in ornamental gardens for centuries. Although not native to this country, it has a long history of use in North American gardens. Introduced in Europe in 1714, this plant found its way to Virginia as early as 1737. John Custis grew it in his Williamsburg garden that year. Thomas Jefferson first planted the seeds at Shadwell, his boyhood home, on April 2, 1767. It continues to be grown at Monticello to this day and is one of the most asked-about flowers in the Monticello gardens.

Huge Gomphrena Display at Monticello

Besides being a charming ornamental plant, *Gomphrena* is reputed to have a number of beneficial health benefits. Practitioners of folk medicine claim that is has antibacterial, antifungal, antioxidant, detoxifying and purifying properties. It has long been used in folk medicine to treat a variety of illnesses such as diabetes, coughs, and urinary retention. Of its many purported health benefits, it is perhaps best known historically for its use in treating hypertension. Modern-day clinical research appears to support its therapeutic use for this purpose.

DESCRIPTION OF GOMPHRENA SPECIES

Gomphrena is one of 90 related species belonging to the Amaranth family. *Gomphrena globosa* is the species most commonly grown in this country. It is a 12” to 24” tall annual bedding plant with stiff, jointed, and branched stems that give the plant a bushy appearance. Its 4” to 6” oblong leaves grow opposite one another and are slightly hairy looking when they are young. The 1” to 2” globe-shaped flower heads resemble clover blossoms and appear on upright spikes from summer until frost. The individual flowers within the flower heads are inconspicuous, but the stiff, papery bracts that form the flower head of the species and its cultivars are quite colorful and come in shades of white, pink and purple. The eye-catching magenta color is the most popular variety among gardeners. Because the blossoms dry well, this plant is often described in plant catalogs as an “everlasting.”

Magenta Gomphrena Display

Gomphrena haageana, an amaranth species that is closely related to *G. globosa*, bears the distinction of being native to North America. Commonly referred to as Rio Grande globe amaranth, this tender perennial species is native to Texas, New Mexico, and Northeastern Mexico. It holds up particularly well in windy sites and blistering heat. Although closely related to *G. globosa*, this taller, lankier species with bright orange bracts averages 24" to 30" in height. Its true flowers are tiny, insignificant yellow trumpets that are best appreciated when seen close up. Crosses between *G. globosa* and *G. haageana* have significantly broadened the color palette to include white, pale pink, orchid pink, rose, lavender, magenta, purple, orange and red.

Orchid Pink Gomphrena Display

GOMPHRENA HYBRIDS AND CULTIVARS

Starting in the 1990s, plant breeders began paying more attention to this old-fashioned plant and embarked on a number of hybridizing programs. Field trials conducted by Mississippi State University, Louisiana State University's Hammond Research Station, and Cornell University in Ithaca, New York, among others, resulted in the identification of a number of superior cultivars now available to the public. 'Lavender Lady', 'Ping Pong Purple', 'Pink Zazzle', and 'All Around Purple' are just a few of the many excellent cultivars or hybrids to choose from. A few other *Gomphrena* choices include:

- 'Bicolor Rose' – This charming selection, also known as 'Audray bicolor rose', is a cultivar of *G. globosa*. It has dusty-rose bracts that fade to white at the top of each bloom. At 36" tall, 'Bicolor Rose' is one of the tallest of the *Gomphrena* cultivars.
- 'Strawberry Fields' – This is the most common cultivar of *G. haageana*. It produces large, brilliant orange-red bracts with tiny yellow flowers resembling strawberry seeds on 1' to 3' plants. You may either love or hate the bright orangey-red of this plant. It's all a matter of personal preference.
- 'Fireworks' – This *G. globosa* cultivar is unique in that it has large, looser-looking, hot pink blooms tipped with bright yellow stamens that are particularly interesting when viewed up close. The dramatic plants are 3' to 4' tall and wide, much larger than the common species. This impressive, award-winning plant was named a Mississippi Medallion plant in 2010. The gardening staff at Chanticleer Gardens in Wayne, Pennsylvania teamed this taller, wispier form of *Gomphrena* with wiry-looking *Verbena bonariensis* in their cut flower garden for a truly captivating display of color and texture.
- 'Buddy Series' – This dwarf, 8" to 12" tall and wide, mounded *G. globosa* cultivar series is available in three colors: 'Buddy Purple', 'Buddy Rose', and 'Buddy White.' This shorter form is best used at the front of the border. While it is recommended as a dried flower, it has short stems, which may make it more difficult to create a bouquet.
- 'Gnome Series' – The densely-branched, compact members of this *G. globosa* series grow only 6" to 10" tall and are suitable as edging plants or as a mass planting. This series is available in purple, white, or orchid-pink.
- 'Quality-In-Seed (QIS) Series' – This series, with its *G. haageana* parent, adds carmine, red, and orange to the mix of available *Gomphrena* colors. The stems tend to be long and strong, making them an excellent choice for a cutting garden.

HOW TO GROW GOMPHRENA

Select a sunny site for *Gomphrena*. It can tolerate some shade but will flower best in full sun.

Once established, this easy-to-grow plant is low-maintenance, drought-resistant, and heat-tolerant.

Plant in moist but well-drained soil. While it will survive dry soil, *Gomphrena* appreciates being watered periodically during very hot, dry weather. When preparing the soil for planting, incorporate some compost. As long as the soil is moderately fertile, *Gomphrena* doesn't require much, if any, fertilizer. Just don't over fertilize. Otherwise, the plant will push out a lot of foliage but few blossoms.

Sow the seeds directly in prepared garden beds after soil temperatures warm up in the spring. The seeds need temperatures of 70°F to 75°F to germinate. Or, if you prefer, start seeds indoors approximately 6 to 8 weeks before the last frost date. Seedlings generally emerge in about 14 to 21 days. If you're an impatient gardener, speed up germination by soaking the seeds in warm water for a day or two before planting them. Once the seedlings are large enough to plant, harden them off and plant outdoors after the last frost date. Some sources indicate that *Gomphrena* seeds have a low germination rate, so you may want to plant more seeds than you need.

Some of the taller cultivars may need to be staked to keep them from falling over. To avoid this problem, pinch back young plants when they are about 6" tall. Pinching encourages a bushier habit and more flowers. Cutting the flowers often encourages more blooms, but deadheading is not necessary.

Gomphrena is generally free of pests and diseases, although it may occasionally be bothered by powdery mildew, gray mold, and fungal leaf spots during prolonged, cool, damp weather.

Deer typically leave this plant alone but butterflies like it.

USES FOR GOMPHRENA IN THE LANDSCAPE AND ELSEWHERE

Although not native to North America, neither the *Gomphrena* species nor its cultivars are invasive or aggressive. They may self-seed, but not extensively, and seedlings are easily removed if not wanted in the garden. A native of hotter climates, it holds up very well in Virginia's hot, humid summer weather and is a source of brilliant color in the late summer-to-fall garden. For season-long color, use the plant in:

- **Annual beds**. *Gomphrena* can be very impressive when displayed as a mass planting of one color or in a couple of shades of the same color, such as purple and lavender-pink. It also combines well with other annuals, particularly those with contrasting colors. The purple cultivars, for example, contrast well with yellow flowering annuals. The pink or rose cultivars contrast nicely with dark purple or burgundy coleus foliage.
- **Borders**. Depending on the cultivar, plant shorter selections at the front of the border and taller ones in the middle of the border. Spiky-looking annuals, such as 'Victoria Blue' salvia or Celosia, provide a nice contrast to the bushy form of the Gomphrena.
- **Container gardens**. The taller selections can serve as an accent plant or "thriller" in a sunny container garden. The shorter selections serve as an excellent "filler" plant.
- **Cutting gardens**. *Gomphrena* makes an excellent cut flower. When used in floral arrangements, the blossoms last about a week. As a bonus, the cut flowers sometimes take root in the vase.
- **Cottage Gardens**. *Gomphrena* combines well with other annuals and perennials in an informal setting such as that found in many cottage gardens.
- **Rock gardens**. Because this plant is very heat tolerant, it's a good choice for the hot dry growing conditions generally associated with rock gardens.
- **Dried flower arrangements, potpourri, or craft projects**. The colorful bracts hold their shape and color well when dried and will last for several years. To dry blossoms, cut the flower stems when the blossoms are at their peak. Remove foliage, bunch the stems loosely, and hang

them upside down in a warm, airy place out of direct sunlight for about 2 to 3 weeks to dry.

Whether you choose the classic *Gomphrena* species or one of the many hybrids and cultivars that are available, this useful plant will please you with its cheerful, long season of colorful blooms and easy maintenance. It's a tough plant that will keep on blooming through the hottest summer weather well into fall.

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The Ornamental Garden in September

By Patsy Chadwick | September 2017-Vol 3. No.9

September marks the end of summer and the beginning of the autumn equinox. Daytime temperatures may still be hot and humid but night-time temperatures are beginning to cool down. As the seasons change, it's time to devote more time to the garden for tackling end-of-summer maintenance tasks and preparing for cooler weather ahead. While you're at it, look for gaps in the border where color is missing and consider options for making next year's fall garden more exciting.

PLANTS THAT PROVIDE LATE SUMMER/EARLY AUTUMN COLOR AND INTEREST

Some gardeners equate their late summer ornamental garden to a "dead zone" where very little appears to be in bloom. But that needn't be the case. An easy solution is to plant groupings of cushion mums or pansies throughout the border for instant color. For a longer lasting and more creative solution to the problem, think outside the box. Besides the usual asters and chrysanthemums, lots of other plants offer both color and interesting texture. To amp up the glitz factor in your late summer garden, consider adding some of the following plants:

- Anise hyssop (*Agastache ssp.*)
- Artemisia
- Beautyberry (*Callicarpa*)
- Blue mist flower (*Caryopteris*)
- Boltonia
- Bugbane/black cohosh (*Actaea racemosa*)
- Coral bells (*Heuchera*)
- Culver's root (*Veronicastrum virginicum*)
- Dahlias
- Goldenrod (S*olidago*)
- Globe amaranth (*Gomphrena*)
- Joe Pye weed (*Eupatorium*)
- Lamb's ears (*Stachys*)
- Lantana
- Mexican bush sage (*Salvia leucantha*)
- Monkshood (*Aconitum*)
- Ornamental peppers
- Perennial Sunflower (*Helianthus*)
- Pineapple sage
- Pink Muhly grass (*Muhlenbergia*)
- Red spider lilies (*Lycoris radiata*)
- Russian sage (*Perovskia*)
- Sneezeweed (*Helenium*)
- Stonecrop (*Sedum*)
- Toad lilies (*Tricyrtis hirta*)
- Turtlehead (*Chelone*)
- Zinnias

Hot Pink Zinnias Liven Up the September border.

For shadier gardens, include plants with interesting or colorful foliage such as coleus, fern species, variegated Solomon's seal (*Polygonatum*), variegated hostas (unless you have a deer problem), Japanese forest grass (*Hakonechloa*) or wild ginger (*Asarum*).

SEPTEMBER GARDEN MAINTENANCE

It's important to continue all those routine gardening maintenance tasks that you handled over the summer months. As long as the weather continues to be mild, weeds will continue to grow, plants will need to be watered, and spent flowers will need to be deadheaded.

Weeding – Crabgrass was particularly prolific this summer, thanks in part to the very hot, dry weather that it seems to prefer. Now that the weather is cooling down a bit, don't ease up on your weeding tasks. In addition to keeping the crabgrass under control, stay alert to common ragweed (*Ambrosia artemisiifolia*) in your landscape and remove it before it produces flowers. Just as summer weeds come to the end of their normal growing season, cool-season weeds (for example, henbit and chickweed) are beginning to appear among your plantings. If not removed this fall, they will overwinter in your landscape and resume growing next spring. A few minutes spent weeding now will significantly reduce the number of weeds facing you next spring.

Watering – If there's no rain in the near-term forecast, continue to provide supplemental water to your perennials, shrubs and trees. This is particularly vital for new plantings. Until the ground freezes, newly installed plantings need at least 1 to 2 inches of water per week while they are establishing roots.

Deadheading – To keep hanging baskets and container gardens blooming until the first frost, regularly remove spent flowers. Continue to deadhead perennials to coax more blooms from them before the frost finishes them. Also, focus on removing and discarding dead and diseased foliage that might otherwise harbor pathogens or pests over the winter.

SEPTEMBER GARDENING ACTIVITIES

With so much to do in the late summer garden, here's a check list of activities that should be handled now:

Save Seeds. Collect seeds from your favorite annuals and perennials for use in next year's garden. Don't forget to label and date the container so that you can correctly identify the seeds next spring. Keep in mind that seeds collected from hybrid plants are unlikely to be identical to the "parent" plant.

Cut "Everlasting" Flowers. Collect sprigs of celosia, globe amaranth, statice, strawflower, and other plants

that dry well. Bundle them loosely and hang them upside down in a dry, well-ventilated space away from direct sunlight.

Make Stem Cuttings. While you can certainly dig up and overwinter wax begonias, geraniums, coleus, and other bedding plants, it's usually more effective to root stem cuttings. They don't take up as much room and they're generally easier to keep alive over winter than a full-size plant. If you are new to stem cuttings, here's how to do it:

- Fill a clean container with a moistened sterile potting mixture.
- Select a healthy stem or branch and cut a 3" to 6" long piece of it with a sharp knife just below a leaf node.
- Remove any leaves or flower buds from the portion of the stem that will be below the soil line.
- Dip the cut end of the stem in a rooting stimulant.
- Using a pencil or other pointed instrument, make a hole for the cutting in the potting mixture.
- Insert the cut end of the cutting and gently tamp soil around it to hold it upright.
- Cover the entire container with a clear plastic bag.
- Place the container in a warm spot that has bright but not direct sunlight.
- Check the potting soil regularly and mist it with warm water as needed to keep it moist but not soggy.
- Once the cutting resists a gentle tug, that's a sign that roots have begun to form.

Install new trees and shrubs. Autumn is the optimum time to install new trees, shrubs, and perennials in your landscape. Here's why:

- The soil is generally warm enough to allow the new plants to establish roots before the plant goes dormant.
- The cooler air temperatures exert less stress on the plant, allowing more energy to go into root development than just coping with hot weather.
- Cooler weather means photosynthesis slows down, requiring less water to keep the plant alive and functioning.

Divide Perennials. Many perennials can be divided either in spring or in fall. However, as a general rule of thumb, spring-blooming plants should be divided in the fall and fall-blooming plants thrive best when divided in the spring. Most perennials benefit from being divided every 3 to 5 years although some may need to be divided sooner. Some clues that a plant needs to be divided include:

- Smaller-sized flowers than normal.
- A dead space in the center of the plant.
- Less vigor than in past years.
- Allotted space is too small for the size of the plant.
- Sparse foliage at the bottom.

Not all plants can be divided. For example, false indigo (*Baptisia*), milkweed (*Asclepias*), monkshood (*Aconitum*), and balloon flower (*Platycodon*) have taproots, which are difficult to divide without severely injuring or killing the plant.

SEPTEMBER CREEPY CRAWLIES

Banded Woolly Bear Caterpillar – According to a common urban myth, the color bands on the harmless woolly bear caterpillar are a predictor of just how mild or severe the winter will be. If the black bands on either end of this bristly-looking caterpillar are longer than the center reddish band, the winter will be harsh.

Conversely, a wider center band supposedly indicates that the winter will be mild. In reality, the wideness of the center band has more to do with the age of the caterpillar than its ability to predict the weather. Woolly bears, also called “woolly worms,” become very active in autumn as they search for protected places to spend the winter. They may be handled but the bristles covering their bodies are prickly to the touch and may cause a rash on sensitive skin. This amazing little creature produces a cryoprotectant in its tissues, which allows it to survive harsh winter weather even when frozen solid. In spring, it becomes active again and briefly resumes feeding before pupating. It spins a cocoon using silk and its own body hairs. After about 2 weeks, it finishes its metamorphosis and emerges as an adult Isabella Tiger moth.

Spiders – Friend or Foe? The sight of sunlight sparkling on early morning dew is uncommonly beautiful at this time of year, particularly when it reveals a surprising number of spider webs glistening in the landscape. Spiders are both fascinating and fear-provoking. On the one hand, these shy creatures fascinate us because of the fragile, yet strong and elegant, silken webs they spin. On the other hand, spiders are scary looking. They have eight eyes, eight legs, and are related to ticks and mites. Many people fear them in the mistaken belief that they are all poisonous. In reality, most spiders are harmless to humans. However, two spiders in this area of Virginia are poisonous — the black widow spider and the brown recluse spider. A bite from either one of these dangerous species can cause serious symptoms requiring prompt medical attention. Very efficient predators, spiders feed entirely on other insects or animals that are small enough for them to catch. In fact, they play a significant role in helping to control many pest insects. For that reason, give them a wide berth if you are afraid of them, but give them credit for the beneficial role they play in our gardens.

LATE SUMMER HOUSEPLANT CARE

Start preparing houseplants for the return indoors.

- If your houseplants are currently in a sunny location, move them into a shadier spot so that they can adjust to lower light levels. You’ll want to move them indoors before night-time temperatures drop below the mid-50s.
- Before moving houseplants indoors, wipe down the containers to remove cob webs, dirt and debris.
- Thoroughly inspect each plant for insects, such as scale, white fly, or mealy bug.

Acclimate patio plants such as tropical Hibiscus for overwintering indoors. Before you move a tropical Hibiscus indoors, cut it back to about 6” tall. Inspect it for insects. This plant is particularly prone to white flies. Once the plant is indoors, position it near a bright window where it will get plenty of light. Lightly water it over the winter months.

Organic Matter — The Gardener's "Silver Bullet"

By Cleve Campbell | September 2017-Vol 3. No.9

Some gardeners are **just plain lucky;** the soil in their gardens is dark and beautiful, and each year they produce a bountiful vegetable harvest. Now my luck is somewhat different. No matter how many times I have moved my garden, the spot I select turns out to be right on top of a mound of hard, red clay. I still cringe at the pain shooting though my knees as I attempted to push a spade into the clay of my current garden. I often think that the soil in my garden site is better suited for making ceramic pots than for growing vegetables. No matter how many gardeners, extension agents, or books I consulted on the subject of how to break up the cement structure of my garden soil, the addition of organic matter is always the solution that bubbles to the top.

So what's the mystery behind the silver bullet — organic material — for turning your garden plot into a mean vegetable-producing machine?

Soil comprises four **components**: mineral matter, water, air, and organic matter. In Virginia, the typical organic matter level of ordinary, well-drained soil is from 0.5% to 2.5%. A soil with organic matter greater than 3% would be considered very high for a cultivated field. Due to relatively large amounts of organic materials being commonly added to our gardens, the organic matter in garden soils can be raised into the range of 5% to 10%.

Soil Quality

Soil quality is the product of **two factors**: **tilth and fertility**. Tilth refers to the physical condition of the soil, and how well it allows for essential plant processes including seed germination, root growth, water infiltration, drainage, and root aeration. By that definition, the hard, compacted clay soil in my garden has a poor tilth. Fertility refers to the nutrients that are held in the soil and are available to plants.

Now how does organic matter play a role in soil quality? Organic matter serves as a reservoir of nutrients and water in the soil, improves soil tilth by helping to reduce compaction and surface crusting, and increases water infiltration into the soil. Organic matter is often referred to as the thread that holds the physical, chemical, and biological properties of soil together.

What is Organic Matter?

Organic matter is often thought of as the plant and animal residues we incorporate into the soil or those endless wheel barrels of leaves that I place around my vegetable plants in the spring to smother out weeds and hold in moisture. Well, that stuff is actually **organic material not organic matter.**

Organic **matter** is composed of plant and animal tissue that is in different stages of **decomposition** within the soil. To be exact, organic matter is organic material that has decomposed into humus. **Humus** (not to be confused with Hummus, that middle eastern chickpea dish) is organic material that has been converted by microorganisms to a resistant state of decomposition. Humus is simply organic material that has been completely decomposed into organic matter. Organic **material** is unstable in the soil, changing form and mass as it decomposes. As much as 90 percent of it disappears quickly because of decomposition; whereas, **organic matter is stable in the soil and has decomposed until it is resistant to further decomposition.** Usually only about 5 percent of organic matter is reduced to the mineral level yearly. That rate can increase if temperature, oxygen and moisture conditions become favorable for decomposition. It is the stable organic matter that is analyzed in soil tests.

The Importance of Organic Material and Matter

Organic matter and material provide a variety of benefits to soil, including improvement in the physical, chemical, and biological properties of the soil. Some of the main benefits are:

- **Organic material placed on the surface**: Mulch, leaves, straw, and grass clippings help reduce erosion by **protecting the soil from rain run-off**. Surface residues also provide a barrier to weeds and reduce water loss by reducing evaporation from the surface of the soil.
- **Maintenance of adequate soil structure**: Belowground residues are beneficial when it comes to soil structure. They directly influence soil structure by preventing soil compaction. During the breakdown of organic material by microorganisms, compounds are formed that are resistant to decomposition. Compounds such as gums, waxes, and resins, combined with the mycelia, mucus and slime produced by microorganisms, help bind together soil particles as granules or aggregates. A well-aggregated soil tills easily, is well-aerated, and has a high water-infiltration rate. Belowground residues supply energy to microbes and invertebrates. The decomposition of aboveground and belowground residues results in the release of proteins and improves the soil structure or aggregation. Better soil aggregation means improved permeability for water and roots.
- Organic matter helps maintain a **stable soil pH**: This helps keep the soil in the in the ideal pH range of 6.5-7.0 which is optimum for most vegetable gardens.
- **Regular supply of plant nutrients and maintenance of soil fertility**: Plants obtain essential nutrients (nitrogen, phosphorus, potassium) from decomposing organic matter. While the non-living part of organic matter (humus) does not directly provide nutrients, humus improves soil fertility by holding plant nutrients so they remain available for growing plants and do not leach

from the soil.

- **Coating of soil particles**: The presence of adequate amounts of soil organic matter in soils can help to coat the soil particles (whether they be sand, silt, or clay). Coating of soil particles facilitates aggregation, which provides pores and channels in the soil that allow rainfall or irrigation water to pass through the soil. Aggregation also reduces the runoff of water and nutrients, and soil erosion. Soil aggregates also protect the soil from compaction so it is easier for plants to grow.
- **Supply of energy to soil microorganisms**: Organic matter is the main source of food for several microorganisms (bacteria, fungi, actinomycetes). When fresh organic matter (e.g., plant tissues, organic wastes) is added to the soil, these microorganisms start the decomposition process. During this process, nutrients are released, soil aggregates are formed, and humus is created. Organic matter also acts as an energy source to specialized soil bacteria so that they can convert nitrogen gas in the atmosphere to plant-available nitrogen.
- **Protects Water Quality and the Environment:** Organic matter acts like a sponge for water. More water goes into the soil, and less water runs off the soil surface. Because surface water is reduced, pesticides and fertilizers are retained in the soil instead of washing into nearby streams and rivers. In addition, soil organic matter binds selected harmful pollutants like residual pesticides and trace elements so that these constituents cannot escape from the soil.

Research reveals that plant deficiency diseases usually are less severe in soils that that are well-supplied with organic matter. Evidence shows that that organic matter increases the vigor of plants, but various soil microorganisms become more active in the presence of an abundance of organic matter. For example, certain kinds of fungi that live in decaying organic matter have been found to kill harmful nematodes.

So what does this all mean for turning my vegetable garden into a mean production machine? Research points out that a small increase in the percentage of organic matter in the soil can result in more productive crops. For example, a study in Michigan demonstrated potential crop-yield increases by about 12% for each 1% increase in organic matter. Researchers in Maryland observed an increase of approximately 80 bushels of corn per acre of when organic matter increased from 0.8% to 2%.

It is estimated that each 1 percent increase of organic matter helps the soil hold 20,000 gallons more per acre, or doing the math, a little less than ½ gallon per square foot (20,000 gallons/43,560 square feet=0.4591 gallons per square foot). In theory, this means that for every 1 percent increase in the organic material in my 5′ by 200′ raised bed, the soil has the capacity to hold an additional 459 gallons of water!

How to Build Organic Matter in Soils?

The amount of organic matter in soil is the result of two processes: the addition of organic materials (roots, surface residue, compost, etc.), and the loss through decomposition. Soil organic matter is continuously produced and broken down by living soil microorganisms, insects, and worms as they consume it for food. Microbial activity and decomposition rates of organic matter are enhanced in warm, wet conditions.

Regular additions of organic residues are needed to maintain a consistent amount of organic matter in soils. In a natural ecosystem, this addition is achieved by the constant recycling of organic matter as plants and animals leave residues or die. In an urban landscape, this cycle is often disrupted when plant trimmings and residues are removed and sent to the landfill.

For a gardener, the most common and rapid way to build soil organic matter is to add plant or animal residues back to the soil. Grass clippings and leaves contribute nutrients and organic matter if these organic sources are directly returned to the soil. Alternatively, these materials can be composted (along with plant clippings and some food waste) and then returned to the soil. Another option is to purchase organic

amendments (e.g., composted manures, biosolids, or yard waste) from a lawn and garden store or a local composting facility. Animal manures are also an excellent source of nutrients and organic matter and can be successfully added to soils **once manures have been well composted.** Avoid adding raw manures to the soil in your landscape as these uncomposted materials may burn plants and may also have an offensive odor. For more information on using manures, check out *The Garden Shed* article on "Manure".

Another often overlooked way of adding organic matter to the soil is the use of cover crops. Cover crops provide a relatively easy way to add organic matter to the soil. The mat of roots formed by the cover crop is often more valuable than the above-ground biomass. Both winter (annual rye) and summer cover crops (buckwheat) can be used. For more information on cover crops, see *The Garden Shed* article titled "Cover Crops."

Keep in mind that whenever the soil is tilled, it can be detrimental to the structure of the soil. Tilling exposes organic matter to air and increases the rate that organic matter mineralizes. It also increases the risk of organic matter being lost by erosion.

Building soil organic matter is a slow and gradual process. First, the amount of residue and organic matter need to be increased. This extra amount will increase the species and diversity of macro– and micro–organisms in the soil. These organisms then will actively decompose organic matter. It may take a decade or more for organic matter levels to significantly increase. Fortunately, the beneficial effects of the changes in organic matter can be seen after just a few additions of organic residues/compost.

Generally, the greater the organic matter level, the better the overall soil tilth or soil quality, as nutrient- and water-holding capacities increase, and improved aeration and soil structure enhance root growth. Increasing the percent of organic matter in a soil can reduce the need for watering, improve plant vigor, and increase crop yields.

Thank you for stopping by *The Garden Shed* this month, and we hope to see you again next month!

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The Vegetable Garden in September

By Cleve Campbell | September 2017-Vol 3. No.9

The "Dog Days of August" are finally behind us. September in the Piedmont is a month that transitions into fall with hot summer days but cooling nights. It's also a month that confronts the gardener with mixed feelings. After a long season of planting, weeding, harvesting, and battling an ever-changing list of pests, I sometimes wish that the season would just come to an end! At other times, I want to extend the growing and harvesting season into winter. But, mixed feelings or not, there are always gardening tasks to do, and here is my list for September. Let's begin with the short version of the **September To-Do List**: continue harvesting vegetables, continue removing spent spring and summer crops, plant fall crops and cover crops, and, of course, continue weeding.

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. September in central Virginia is a continuation of fall planting season and a time to begin preparing the garden for winter by planting cover crops in vacated areas of the garden.

The following planting chart was created by using the Virginia Cooperative Extension Publication 426-331, "Fall Vegetable Gardening."

September	**1-10**	**September 11-20**	**September 21-31**
Beets		Beets	
Endive		Endive	
Kale		Kale	
Lettuce, bibb		Lettuce, bibb	Lettuce, bibb
Lettuce, leaf		Lettuce, leaf	Lettuce, leaf
Mustard		Mustard	Mustard
Radishes		Radishes	Radishes
Spinach		Spinach	Spinach
Turnips		Turnips	Turnips
		Cover Crops:	
Winter Rye		Winter Rye	Winter Rye

Plant garlic in our area during the month of October. Remember, many retailers quickly exhaust their inventories of the most popular varieties before October. **If you haven't purchased garlic for fall planting, time is running out.** A few garden centers in our area sell garlic bulbs for fall planting, but the varieties are somewhat limited. However, an online search for "Garlic Bulbs for Sale" will bring up numerous sources. For additional information, check out the article on growing great garlic in the October 15 issue of *The Garden Shed.*

September is an excellent time to sow **cover crop**s in bare areas of your garden. For additional information on cover crops, refer to the September 2015 issue of *The Garden Shed*.

Give your tomato plants one last feeding. Compost tea or fish emulsion should give them the extra energy

they need to make that final push at the end of the season. **Pinching off small green tomatoes and any new flowers** will channel the plant's energy into ripening the remaining full-size fruit.

Plant some **cool-season vegetables** such as radishes, spinach, kale, mustard and collards.

Collect herbs from your herb garden for freezing and drying. If you don't have access to a dehydrator, herbs can be dried quickly in a microwave oven. Simply place the herbs between two paper towels and heat for a minute. Remove them from the oven, cool, then test to see if the leaves are crisp. If not, return them to the microwave for a few more seconds. Store in sealed jars in a dark place so they will keep their color and flavor.

Pot up chives, parsley, and other herbs, and bring them into the house to extend the growing season.

Remove any diseased plants from the garden and burn them or bag and dispose of them to prevent spreading disease to future plants. Only compost healthy plants.

Take a tour of your own vegetable garden and **make notes** on this year's varieties, successes, challenges and chores, so that you can learn for next year. **Make a sketch** showing the location of this year's plants to be used next spring for rotating your crops.

Continue to weed your garden to prevent the weeds from going to seed and germinating over the winter and spring.

Remove all two-year-old canes from **raspberry and blackberry plants** to reduce overwintering of disease. Fertilizers containing potassium, phosphorus and magnesium or calcium can be applied but do not cultivate or irrigate at this time of the year.

Keep the **strawberry patch** weed free. Every weed you pull will help making weeding easier next spring.

Fall weed control around fruit trees is crucial because **weeds act as hosts to overwintering insects.**

Thanks for joining us in ***The Garden Shed —*** hope to see you again next month!

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