October 2020-Vol.6 No.10

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The October To-Do List

By Susan Martin | October 2020-Vol.6 No.10

Spring seems a short time ago on the one hand, and eons ago on the other. Spring gardens cheered us up and gave us something productive to do. Summer gardens continued to keep us busy, although a temperature record of 35 straight days over 90^{0} F shortened the working hours to early morning. Now it’s

time for ornamental gardeners to start tidying up. Let's look at the long list of tasks that we should tackle this month. But smile–it's great to be outside in October!

TEMPERATURE

A few tasks depend on **first frost/freeze temperatures.** According to National Climatic Data Center for the Albemarle County station, the projected first frost/freeze dates are shown below:

Temperature	**10%**	**20%**	**30%**	**40%**	**50%**	**60%**	**70%**	**80%**	**90%**
Fall 32°	13-Oct	19-Oct	24-Oct	28-Oct	31-Oct	3-Nov	7-Nov	11-Nov	17-Nov
Fall 28°	24-Oct	30-Oct	2-Nov	6-Nov	9-Nov	13-Nov	17-Nov	21-Nov	27-Nov
Fall 24°	12-Nov	18-Nov	22-Nov	25-Nov	29-Nov	3-Dec	7-Dec	11-Dec	17-Dec

According to Virginia Cooperative Extension, the **first projected frost for USDA Hardiness Zone 7a** based on past averages is **October 15-25.** This range of first frost dates is a little less risky than the guideline for the first frost date given in the above chart. This highlights the different ways of interpreting this chart based on what you consider "risky." If you're willing to take a chance of earlier-than-expected frost, you'd move out to the right side of the chart. If you want to minimize damage from a first frost, you'd play it conservatively and move to the left. As an example, let's say your garden is on the south side of the house, in a nice, protected warm spot. You can probably push the first frost date out a little further, perhaps to the end of October. If your garden is on an elevated spot and more open, you might want a more conservative date, and you could move closer to October 13.

Here's a chart from the USDA National Water and Climate Center which summarizes the effects of cold temperatures on plants and vegetation:

- 32 to 29 degrees F is a **light freeze**: Tender plants killed, with little destructive effect on other vegetation.
- 28 to 25 degrees F is a **moderate freeze**: Widely destructive effect on most vegetation with heavy damage to fruit blossoms, tender and semi-hardy plants.
- 24 degrees F and less is a **severe freeze**: Heavy damage to most plants. At these temperatures, the ground freezes solid, with the depth of the frozen ground dependent on the duration and severity of the freeze, soil moisture, and soil type.

Now let's look at specific October tasks, including some that will be be affected by temperature.

TASKS

- **Annuals**: If you don't like handling limp plants, remove tender annuals that die with the first frost, such as zinnias, plume celosia, impatiens, lantana, begonias, and coleus. Semi-hardy annuals such as petunia, pansy, and calendula can tolerate cool temperatures and a moderate frost (to about 28^0 F).

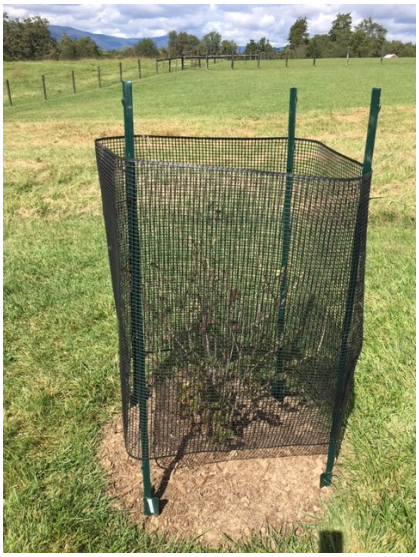
Remember, soil doesn't freeze as quickly as the air. **Plant roots will still grow if soil temperature is above 40^0 F.** A "hard frost" or "killing frost" comes when the temperature drops further, below 28 degrees F, for about 5 hours. This will kill the top growth of most perennials.

- **Perennials: Divide and transplant perennials.** Recommendations differ regarding how late into the fall you can divide and transplant perennials. It would be nice to be able to say, "Transplant by X date," but it's not that clear cut. Most recommendations cite 4-6 weeks before the first freeze (24^0 F) so that plants can set roots. This means that **perennials should be**

divided starting in September and finished by about mid-October. This can also differ by hardiness of plants. More tender plants need a longer adjustment period.

- **Cut back perennials,** leaving some seed heads for self-seeding and for birds. Flowers such as coneflowers, rudbeckia, and agastache offer such seeds. See the October 2015 issue of *The Garden Shed* for a very helpful list of perennials that should not be cut back, and those that can be cut back.
- **Ornamental grasses**: Since many ornamental grasses are attractive in the garden during winter, cutting them back is usually done in late winter or early spring. Not cutting them in fall also helps protect the crown over winter.
- **Spring-Flowering Bulbs:** Continue to plant spring-flowering bulbs until the ground freezes. Bulbs do best if planted about **one month before the first freeze.** According to average data for our area, bulbs would best be planted up to November 1.
- **Tender bulbs**, including dahlia, canna lily, elephant ear (*Colocasia*), caladium, begonia (*Begonia tuberosa*), and gladiolus, are planted in the spring for summer bloom but cannot survive cold winter temperatures and must be **dug up after the tops are browned** each fall. Allow to dry, clean off soil, and store in peat moss or vermiculite in a cool location free from frost. Remember to label stored plant material carefully. The Missouri Botanical Garden is a good resource for highlighting requirements specific to different plants.
- **Forcing Bulbs to Bloom Indoors:** Depending on desired bloom time, pot up bulbs between September and December. A simplistic, but not guaranteed flowering schedule, is to plant in mid-September for late December flowers, mid-October for flowers in February, and mid-November for March/April flowers. In other words, expect about a three month wait period before a planted bulb blooms. For detailed instructions and a list of instructional videos, see the VCE publication, "Fooling Mother Nature: Forcing Flower Bulbs for Indoor Blooms."
- **Pruning:** In general, **DON'T PRUNE shrubs**. According to the shrub pruning calendar published by Virginia Cooperative Extension, the only shrubs listed for pruning in October are potentilla and sumac. There are a few shrubs listed for November. Shrubs that bloom on new wood can be pruned in late winter. Shrubs that bloom on old wood can be pruned right after they bloom in spring or summer. Check the calendar if you have questions on particular shrubs.
- **Cleaning Up Perennial Beds:** Be sure to clean up from around your perennial flowers, particularly around plants that are prone to fungal infections, such as rose and peony. If left on the ground, leaves and stems can harbor diseases and provide convenient places for pests to spend the winter. **Bag up diseased plant material and discard;** don't add it to the compost pile.
- **Mark the Spot**: As you clean out the flower beds, mark the spots where late-starting perennials will come up next spring. It's also very helpful to mark the spots where you've planted bulbs.
- **Plant Fall Seeds:** According to the Clemson Cooperative Extension (USDA Hardiness Zone 8a), these are the hardy and semi-hardy annuals that can be planted as seed in the fall for spring bloom: Allysum (*Lobularia maritima*), Annual Phlox (*Phlox drummondi*), Cornflower (*Centaurea cyanus*), Foxglove (*Digitalis purpurea* 'Foxy'), Larkspur (*Consolida ambigua*), Poppy (*Papaver* spp.), Pot Marigold (*Calendula officinalis*), Stocks (*Matthiola incana*), and Sweet Peas (*Lathyrus odoratus*). Check individual seed packets for information on fall planting in our zone, USDA Hardiness Zone 7a .
- **Bring in Houseplants:** Bring in houseplants **when nighttime temperatures fall to 55º F**; wash off pots and hose off foliage or wipe with a wet cloth. Soak the pot in a tub of lukewarm water for about 15 minutes to force insects out of the soil. Check to see if roots are pushing through the bottom of the pot; if so, the plant needs to be repotted. If plants have gotten leggy over the summer, remove them from the container, and prune the top and roots in equal proportions. Replant in a cleaned pot with fresh potting soil (not garden soil).
- **Help Houseplants Adjust:** Plants will need to adjust to the lower indoor light level; be careful

not to overwater. If plants are dropping leaves, they may not be getting enough light. Place them in a south-facing window, if possible, or at least in an east-facing window. Place pebble trays with water below plants that benefit from humidity.

- **Start Plants from Cuttings:** It's a good time to take some cuttings from plants that have grown large over the summer. It's also easier to store cuttings from larger annual plants, such as coleus or begonia, that you want to plant outside next spring. Either root the cuttings in water, or dip them in root hormone, and place in soil. For detailed guidance, read this month's feature article Creating New Plants From Cuttings/Garden Shed Nov. 2020.
- **Prepare Seasonal Indoor Bloomers: Start conditioning photoperiodic plants now** for rebloom around the holidays. Photoperiodic means they react in a certain way to the daily cycles of daylight and darkness. By manipulating the amount of light they receive, you can control their bloom schedule. Such plants include: **amaryllis, Christmas cactus, kalanchoe, and poinsettia.** For specific instructions, refer to these articles in The Garden Shed, October 2016, or The Garden Shed, December 2019.
- **Trees and shrubs:** The best time to plant deciduous trees and shrubs in the fall is after the heat of summer diminishes, but before the ground has frozen. **Mid-October through mid-November** is a good planting guide in our area, although trees can be planted earlier in the fall as well. Newly installed woody plants do best when soil temperatures range from 55-75^0 F. Root development typically stops when the soil temperature drops below 40^0 F.
  Deer Protection: Protect shrubs and young trees susceptible to deer damage.
- 

Deer protection Photo: Susan Martin

- **Leaves: Shred or chop fallen leaves** and compost them or save them to use as mulch on next year's garden.

FERTILIZING LAWNS

The best time of year to fertilize a lawn depends on the type of grass in the lawn. If you have **cool-season grasses** (grow better in spring and fall), such as tall fescue, Kentucky bluegrass, and perennial rye-grass, it is best to **fertilize in the late summer/early fall from August 15th through November.** If you have **warm-season grasses** (grow better in summer), such as bermudagrass or zoysiagrass, fertilize from March to August. **Never apply lawn fertilizer to frozen soils.** Adding ¼ – ½" of compost as a "top dressing" provides organic matter and improves the overall health of the soil. **A soil test is the only way to determine if the soil needs lime, phosphorus (P), or potassium (K)** and fall is an excellent time to do a test. The soil-testing labs are usually less busy. Apply nutrients as recommended by a soil test and you'll be

taking a huge first step towards protecting water quality.

The one nutrient that won't be analyzed in a soil test is nitrogen (N). The reason is that N levels change rapidly in a soil and test results usually have little meaning by the time you receive the report. The test results will provide recommendations on **appropriate N application levels suitable for the grass and location.**

Mow until the lawn stops growing. Grass that is too long is more susceptible to damage over the winter.

Read the VCE publication "Fall Lawn Care" and refer to the VCE maintenance calendars for cool-season turfgrasses and warm-season lawns in Virginia.

For information and how-to tips on lawn management, see the September 2020 *Garden Shed* article, "Responsible Lawn Management in the Era of Climate Change."

LIME APPLICATIONS

One of the most important factors for the lawn is soil pH. This is a measurement of the acidity or alkalinity of the soil and is a major determining factor for proper nutrient absorption by turfgrass roots. In our area, the soil tends to naturally be more acid, meaning a pH of less than 7.0 and usually much lower, but a soil test is the only way to determine if the pH level needs to be shifted. The optimum pH for turf growth is 6.0 to 6.8. If the pH level falls below 5.5, turf growth will be compromised. Most vegetables, fruits, and ornamental plants grow best when the pH is slightly acidic, between 5.5 and 6.5. Multiple lime treatments may be required to bring the pH to the desired level. Fall and spring are generally the best times for lime applications. Fall has an added advantage, as rain, snow and cycles of freezing and thawing help lime break down and begin to work. For more information, read this article, "Does Your Lawn or Garden Need Lime?" from North Carolina Cooperative Extension.

MULCHING

Mulch is often applied in spring, but check on mulch levels in fall as well. Mulching helps prevent soil erosion; insulates the soil; retains water to keep roots moist; and prevents root heaving caused by freezing and thawing temperatures. **Mulch boxwoods and broadleaf evergreens before the ground freezes. Mulch deciduous trees and shrubs, and perennial beds after the ground freezes, but before the coldest temperatures arrive**. See the Charlottesville Area Tree Stewards guidelines for mulching around trees.

For more tips on what to do this month, see the **Monthly Gardening Tips** under **Gardening Resources**, pmgarchives.com/Monthly Gardening Tips#October. We also recommend reviewing **"The Ornamental Garden in October,"** from past issues of *The Garden Shed:* October 2015, October 2016, October 2017, October 2018, and October 2019.

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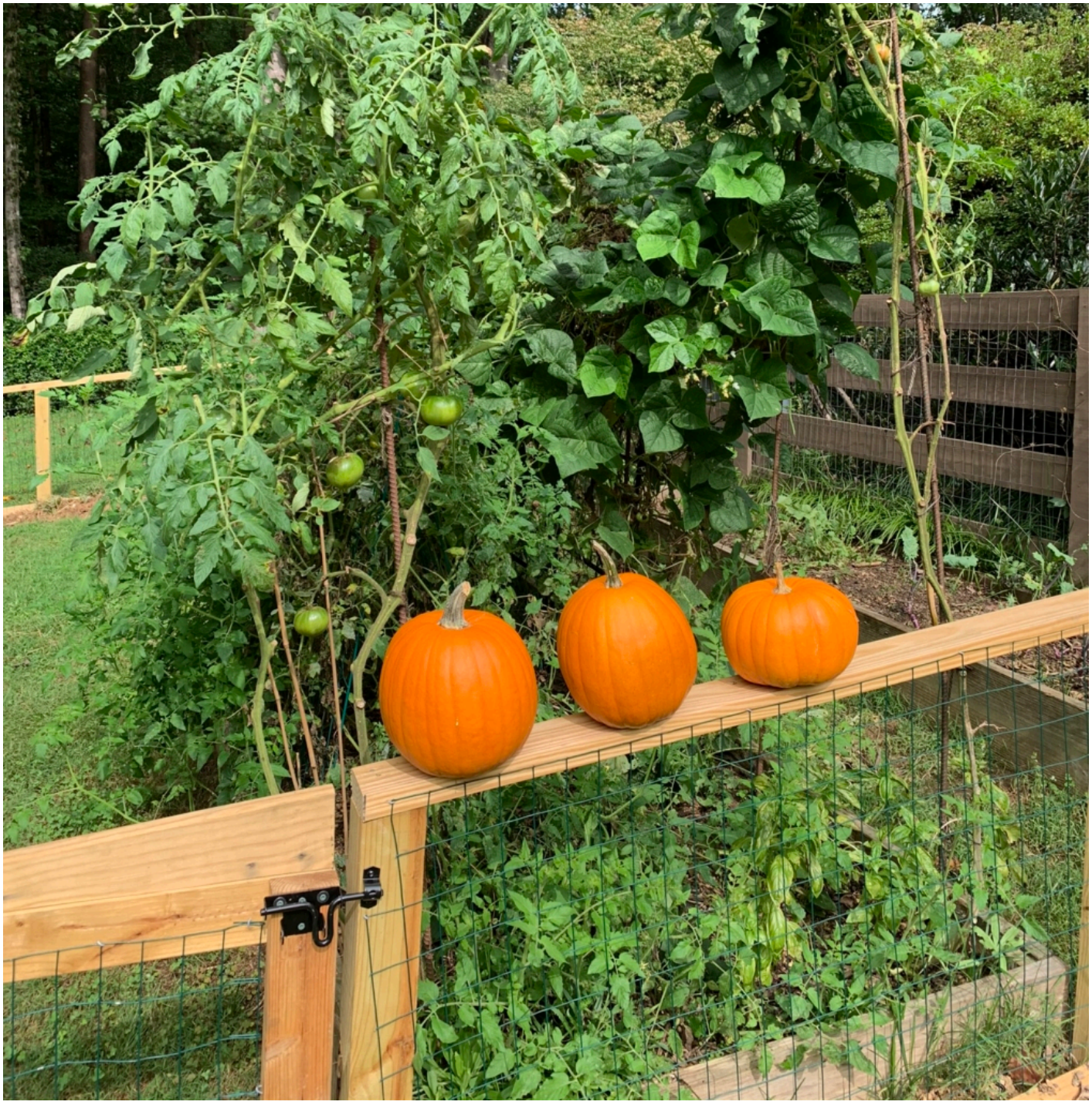
Feature photo: Pink Muhly and Little Bluestem Grasses Photo: Susan Martin

October in the Edible Garden

By Ralph Morini | October 2020-Vol.6 No.10



October is here and it’s harvest season. But it is so much more. Many of us are coaxing fall plantings along, trying to extend the gardening season. If you are finished for the year then you may be doing cleanup, adding compost or mulch to your soil, or planting a cover crop to keep living roots in the ground through the winter. It is also a good time to reflect on the past growing season to extract lessons that will help you improve your results next year.

Looking back, the weather has been a real challenge this year. With late frosts, a dry, scorching July and a very wet August, it has been a challenge to keep plants healthy. As I write in mid-September, temperature and moisture have moderated and my fall vegetable crop is growing pretty well. I've expanded my vegetable patch for next year and plan on seeding a mixed cover crop shortly to add some organic matter and structure to our native orange clay. I'm also getting ready to put row covers over my fall greens to help keep them healthy and growing into the winter. Walking out to the garden to cut fresh kale or salad greens in December is its own special reward.

Whatever your situation, enjoy the cooler weather, the fall colors, and the prospects of a fresh start next spring.

Fall Crops

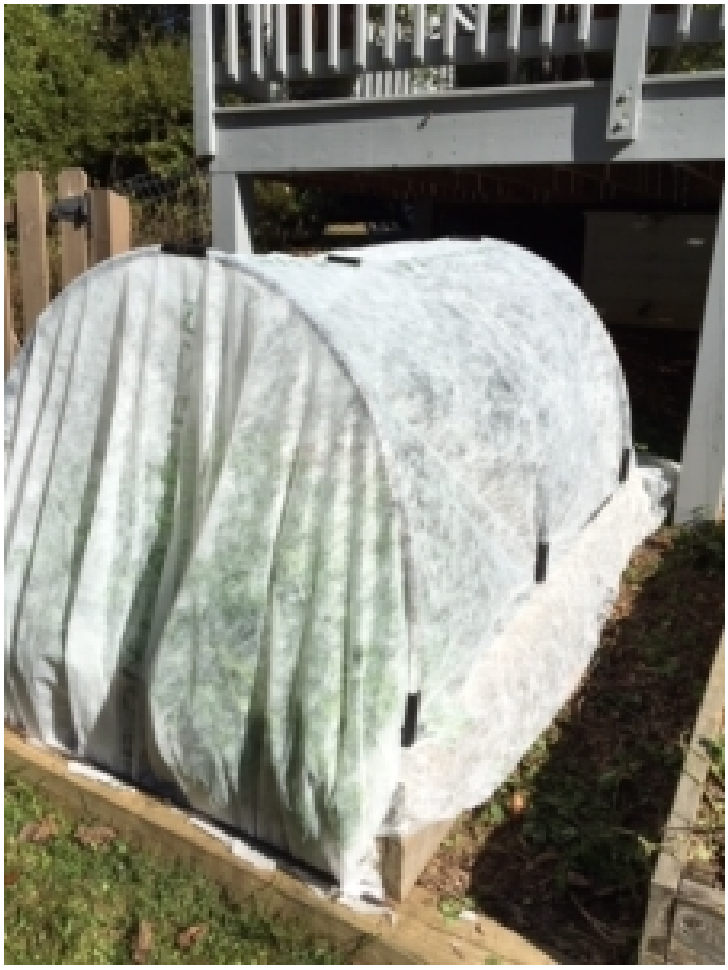
If you planted crops for fall harvest last month, you may already be harvesting fast-maturing plants like some lettuce greens and radishes. According to the VCE Vegetable Planting Guide, those of us in Hardiness Zone 7a are still able to plant radishes, mustard and spinach as late as mid-October. That's cutting it close, but if the warm weather we've had so far this year continues, there is a good chance of success. On the other hand, this year's weather has been unpredictable, if it's been anything. For the record, the average first frost for Zone 7a is October 15-25. Be sure to keep your eye on the weather and bring in or protect your warm weather crops when that first frost comes around.

Frost preparation:

To get a better understanding of frost damage and which vegetables are or aren't susceptible to it, refer to the article Identifying and Preventing Freeze Damage in Vegetables from the Michigan State University Extension.

Obviously, harvesting ahead of frost is a sure way to avoid frost damage. If you want to nurse plants further into the fall, there are a couple of options:

- **Wet your soil:** there is some evidence that watering ahead of a frost will keep the air temperature just above the soil up to 5 degrees warmer than dry soil and will maintain the differential overnight.



DIY Row Cover: Photo: Ralph Morini

- **Cover your plants:** If you are looking for more certainty, cover the crops that aren't cold hardy. Spun polyester row cover fabric is a proven choice, although gardeners use everything from newspapers to buckets to commercially available water-jacketed individual plant covers. Fabric cover protection varies from 2 to 6 degrees Fahrenheit depending on soil conditions and fabric used. Air space between cover and plants increases the protection vs laying the cover directly on the vegetation. Spun fabric covers let light and water through and can be left in place. Most other options need to be removed during the day after the temperature is above freezing. For more information on row covers please check out the Garden Shed article: *Row Covers: A Season Extender with Benefits*.

Cold frame: Photo: "Large Cold Frame With Props" by Ofer El-Hashahar, CC BY-SA 2.0

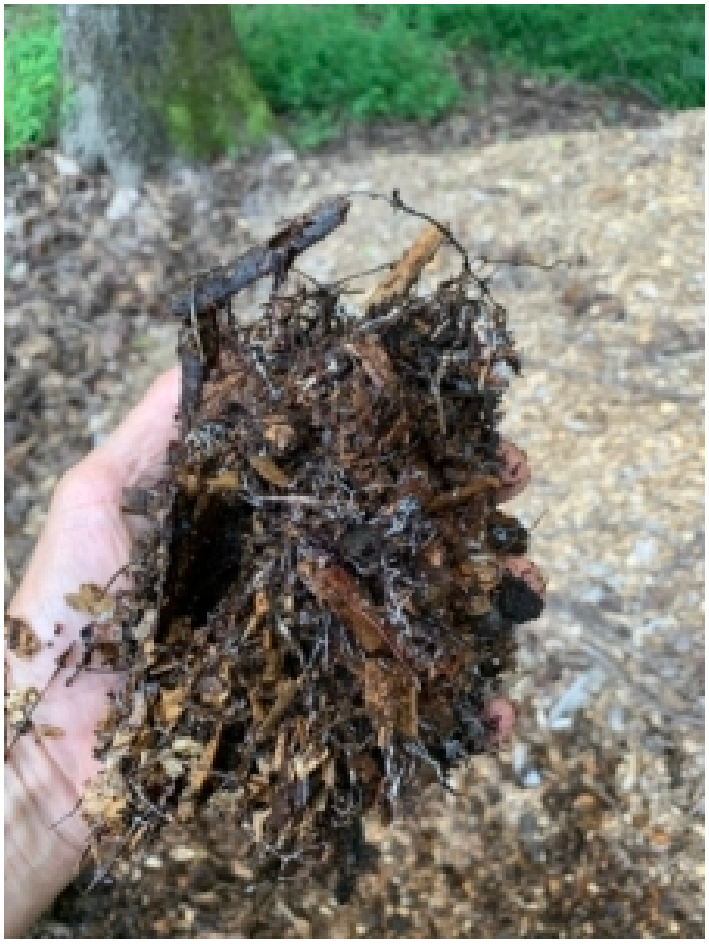
- **Cold Frames**: For a more permanent way to combat both spring and fall frosts, consider building a cold frame. Tips on construction and on using cold frames are available in the Virginia Cooperative Extension publication titled *Season Extenders*.

Other October Tasks:

- **October is the time to plant garlic and shallots** for harvest next year. Check out this September 2015 Garden Shed article titled *Garlic* for guidance.
- **Harvest tender herbs** (basil) before the first frost. They can be hung to dry in a cool dark place or the leaves can be frozen for use at a later time.
- **If you are thinking about planting a fruit tree, fall is the time to plant**. You may be able to save a little money by catching a sale at local garden centers. Water the newly-planted tree thoroughly to provide sufficient moisture and prevent winter damage. Add a 3-inch layer of organic mulch, leaving a 3-4" gap around the tree base, to retain soil moisture and moderate soil temperature. Research has shown that roots will continue to grow until the soil freezes, which is typically late November in Virginia. Stake and wire newly-planted trees only if necessary. Use a piece of rubber hose around the guy wires to protect the trunk. The guy wires should be tied loosely enough so that the tree is able to move a little in the wind. The supports and stakes should be removed once the tree becomes established, usually in a couple of months.
- **Pick up dropped fruit from under fruit trees** so that deer and rodents will not be attracted to the fruit or your growing tree. Raking and disposing of diseased leaves will help keep insects and diseases under control next season.
- High grass and mulch are a haven for rodents whose gnawing can severely damage trunks. Keep the grass mowed around new trees. **Be sure that mulch is raked back 3-4 inches away from the base of the tree.**
- **Tomatoes** need an average daily temperature of 65º F or higher in order to ripen. If daytime temperatures are consistently below this temperature, pick the fruits that have begun to change color and bring them inside to ripen. Placing them in a paper bag with a banana or two will

speed the process.

- **Harvest sweet potatoes** before frost because cold soil temperatures can reduce their quality and storage life. Removing the vine first can make the digging a lot easier. Also, take care when digging sweet potatoes because their skin can bruise very easily.
- When removing disease-infested plants or debris, **do not place this refuse on the compost pile.**The disease pathogens may continue to live in the compost pile and be transmitted when the compost is applied to the garden. Best to burn or bag and landfill it.
- After frost, cut back **asparagus foliage** to within 2 inches of the ground.
- There is still time to plant a **cover crop**. A cover crop protects the soil over the winter, stores unused nutrients to prevent them from leeching, and adds organic matter in the spring when tilled under. These Garden Shed articles from September 2015 and August 2017 can provide guidance.



Aged wood chips with fungal mycelia, a good winter soil mulch: Photo: Ralph Morini

- If you aren't into cover crops, or wait too long to plant, cover the garden soil with a few inches of mulched leaves or aged wood chips. Mulch reduces nutrient leaching and carbon loss and moderates temperature variation.
- If you haven't kept up with **garden documentation**, this is your last chance. It's a good idea to diagram the garden along with specific crop locations. Crop rotation is an important organic tool for minimizing insect and disease issues passing from one season to the next.
- **Vegetable crops in the same botanical family are often susceptible to the same diseases and insects**. For crop rotation to be effective, gardeners should not plant vegetables belonging

to the same family in the same location for at least three years. Crop rotation in a small garden may be difficult. However, we should rotate our vegetable crops as best we can.

Thanks for stopping by *The Garden Shed*; we look forward to your visit next month.

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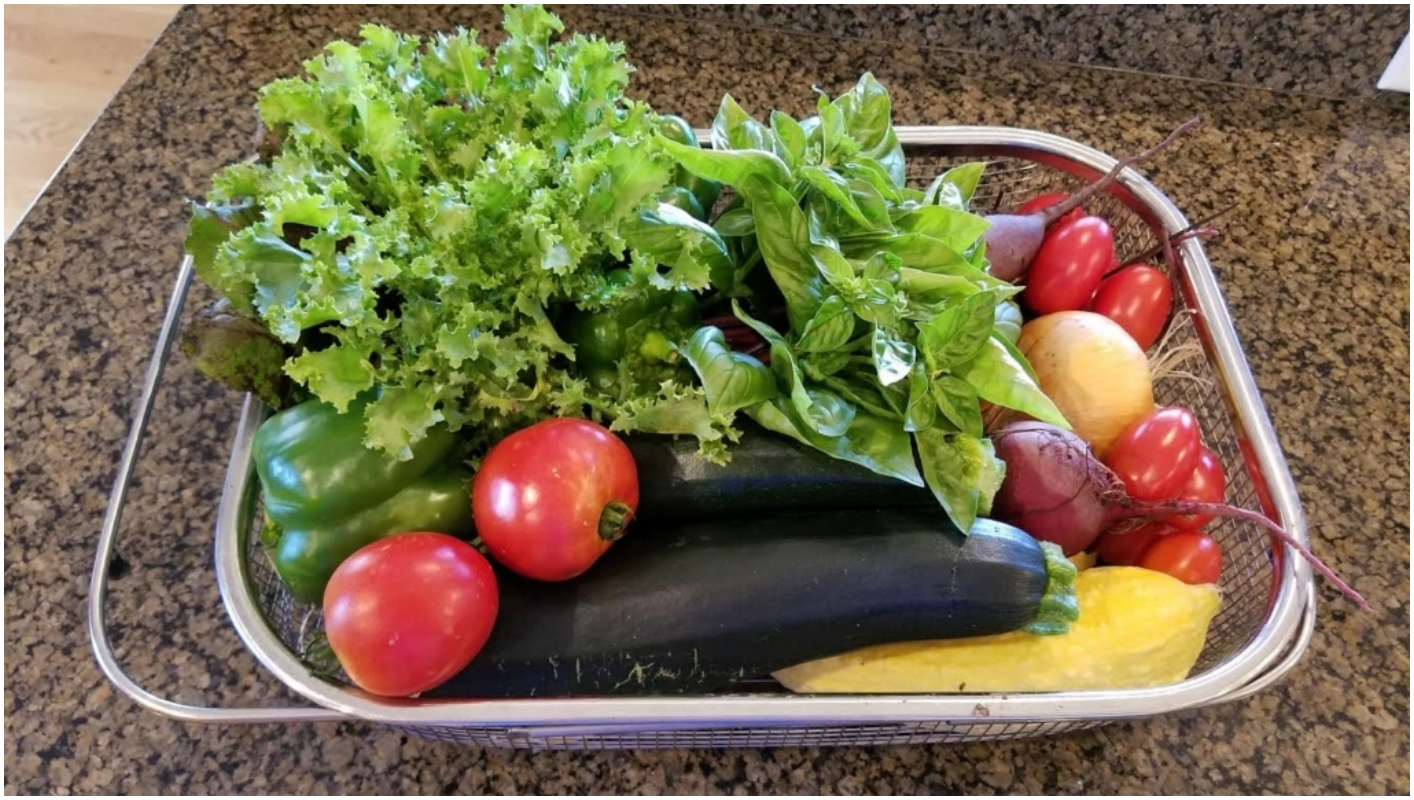
Guidelines for Harvesting Vegetables

By Patsy Chadwick | October 2020-Vol.6 No.10



Many experienced gardeners agree that the more you garden, the more there is to learn. This is especially true with growing vegetables. Seed packets and plant tags for transplants generally provide good information on how to grow vegetables. They also list the number of days before maturity. However, those projections are not always a reliable indicator of vegetable maturity and ripeness. A chilly spring can delay ripening, whereas warmer-than-normal weather might hasten ripening. Soil fertility, lack of precipitation, or too much precipitation may also affect maturity. As a result, it is sometimes difficult to judge when to harvest vegetables for best quality.

Knowing the projected number of days to maturity is a good place to start. While that's a good target to shoot for, in the absence of any other guidance, it is up to the gardener to determine when a vegetable is at its peak of perfection. Fortunately, vegetables often provide clues as to their state of maturity. It's just a matter of interpreting what those clues mean.

VEGETABLE HARVESTING PRINCIPLES

The following general principles are intended to give the gardener a framework for when and how to harvest vegetables:

- **Harvest for peak flavor and nutrition**. Many vegetables, such as beans, peas, summer squash, and turnips, are at their peak of taste and nutrition when they are tender and immature. Other vegetables, such as tomatoes, melons, and winter squash need to be allowed to completely ripen on the vine so that their flavors can become fully developed.
- **Harvest for size**. Size is generally a reliable indicator of maturity, but it takes a little practice

to know when some vegetables are just right for picking. Because there may be some variance in vegetable varieties, always check seed packets or any information that is provided with purchased transplants for guidance on mature vegetable sizes.

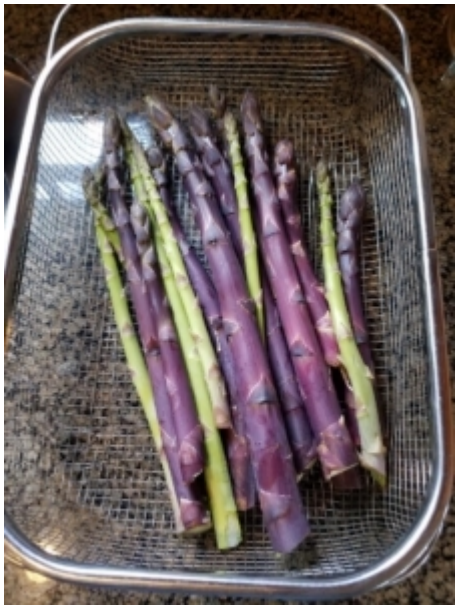
- **Harvest often.** One of the biggest mistakes a gardener can make is neglecting to harvest vegetables regularly. Unpicked beans can go from tender to tough in no time at all. A zucchini that was just 2 inches long a couple of days ago can be an overripe 2-foot long club today. Keep in mind that the goal of the plant is to reproduce. If vegetables are allowed to grow to full maturity and are not harvested, the plant will stop producing.
- **Harvest with the right tools.** Some crops, such as lettuce, kale, and peas can be either pinched or gently snapped off with your fingers. Vegetables that don't easily separate from the plant should be cut off. A dedicated pair of scissors is ideal for snipping off some vegetables, such as beans. A sharp knife or hand pruners should be used to harvest crops with tougher stems, such as eggplants and cucumbers. A garden fork is an ideal tool for harvesting potatoes and root crops.
- **Harvest under the right conditions**. Vegetable quality is at its highest at the time of harvest and begins to decrease rapidly thereafter. The best time of day to harvest most vegetables is in the early morning after the dew dries. This is when they are at their sweetest and juiciest. Avoid picking vegetables in the heat of the day, especially leafy vegetables, which can wilt immediately.
- **Handle plants with care**. Keep vining plants properly trellised so that the weight of maturing vegetables doesn't cause the plant stems to bend or break. Avoid tugging or ripping a vegetable from the plant. This can damage the plant and provide an entry point for diseases. Also avoid working among vegetables during wet weather to inadvertently spread fungal and other diseases among plants.
- **Harvest the outer (larger) leaves of leafy vegetables first**. Lettuces and some other leafy vegetables sprout from the center of the plant. Unless you are harvesting the entire plant, pick the larger, outer leaves first and leave the tiny new growth in the center to continue developing.

HARVESTING GUIDELINES BY CROP

The list of vegetables below is by no means complete, but it does include crops that are commonly grown by home gardeners in central Virginia.

Arugula: Cut or pinch off individual leaves when they are about 2 to 3 inches long. Young leaves have the best flavor, but older leaves are edible until the plant starts to bolt. Once bolting starts, the leaves can develop a bitter taste.

Asparagus: Harvest the spears of this perennial vegetable when they are 6 to 8 inches tall and the tips are tightly closed. Bend the spears until they break, or cut them with a sharp knife at or just below the soil surface. Be careful not to cut adjacent spears that have not yet emerged. Harvest for about 4 to 8 weeks. Stop harvesting once the emerging spears appear thinner and the tips become loose and open. Leave some spears to develop into foliage for photosynthesis. TIP: If you have never grown asparagus before, count on a minimum of three years before asparagus plants become fully productive.



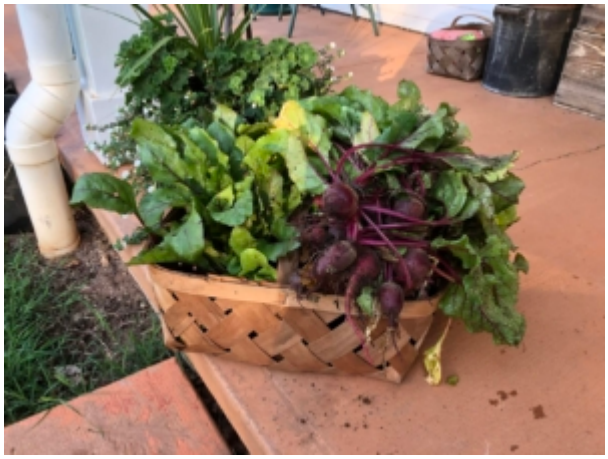
Jersey Knight and Purple Passion asparagus spears freshly-harvested. Photo: Pat Chadwick

Beans (Snap): Harvest pole or bush beans when the pods are about the thickness of a pencil and the interior beans are small and underdeveloped. The pods should easily snap into two at that stage. Avoid harvesting very slender, immature pods because they haven't had a chance to develop much flavor. Also avoid pods that bulge with the outline of the beans within. Those beans are over-ripe and will be tougher and less flavorful. Let those pods continue to mature on the vine and harvest them as dry beans (see below).

Snap beans ready for harvesting. Photo: David Garth

Beans (Dry): Harvest mature pole or bush beans in the autumn as the pods begin to dry out and turn yellow. Pull or snip the pods from the vine. Spread them out on a flat surface indoors for 2 to 4 weeks to finish drying. Once the pods feel completely dry and the beans inside are hard and shiny, shell out the beans and store for use later.

Beets: Pull or dig up beet roots when they are about 1½ to 2½ inches in diameter. Larger roots are edible but are not as flavorful and can be woody. Beets prefer cool growing conditions but should be pulled before the first hard freeze.



Freshly-harvested beets.
Photo: David Garth

Bok Choy: Harvest once the plant reaches maturity (about 12 inches or more for the full-size variety and about 6 to 8 inches for the dwarf varieties). Bok choy may be harvested in several ways:

- Sever the entire plant from the roots at the base with a knife.
- Cut the outer leaves individually with a knife. The inner leaves will continue to grow and the plant will continue to sprout new growth.
- Cut all the stems off about 1 inch above the soil line. Within a few days, new leaves will appear, which can then be harvested a leaf at a time. If left alone, an entirely new head will develop.

Broccoli: Harvest the head when it is 3 to 6 inches in diameter and dark green with tightly closed buds. Use a sharp knife to cut the stalk about 6" below the head. Smaller heads will form as side shoots below that point. TIP: It is unlikely the broccoli grown in home gardens will produce heads as large as those grown commercially for sale in grocery stores.

Brussels Sprouts: Harvest the sprouts when they are 1 to 1½ inches in diameter, firm, and tightly closed. Start harvesting at the bottom of the stalk with the most mature sprouts and move up. Either twist off the sprout from the stalk or cut it off. Brussels sprouts develop better flavor after one or two light frosts. TIP: Harvesting is easier if you remove the leaf below the sprout first and then twist or cut off the sprout.

Cabbage: Harvest when the head is about the size of a softball or a little larger, solid, and firm to the touch. Cabbage is at its tastiest at this size. You can tell if the head is firm by simply giving it a gentle squeeze. If left on the plant too long, the mature head can continue to grow and split open, usually from excessive water uptake.

Chinese Cabbage (Also called Napa Cabbage): Harvest once the head feels firm and dense when pressed. If it feels soft and gives a bit under pressure, it's not filled out yet. Cut the head off above the outer leaves.

Carrots: Harvest most carrot varieties when they are about an inch in diameter. Carrots tend to grow right at or slightly above the soil line, so it's easy to check the size visually. If the soil is very loose, then pull one up by the foliage to check. If the soil is hard and dry, then gently pry the carrot out of the soil using a garden fork. TIP: Harvest spring-planted carrots as soon as they are mature. Otherwise, they may become bitter and fibrous in the summer heat. Fall-planted carrots can be safely left in raised beds over winter with a generous layer of straw on top to protect them from cold weather.

Cauliflower: As this plant reaches its projected maturity date, watch it closely. It can quickly go from perfect to past peak. Harvest it when the head is regular in shape and the "curds" that make up the head have not separated or turned yellow. Cut the stem with a sharp knife just below the head but leave some of the leaves attached to help prevent the head from drying out. If you wait too long to harvest cauliflower, the heads will start to open up and the plant will bolt.

Chard (Also called Swiss chard): Harvest once the leaves are about 6 inches long. Snip off the individual leaves from the outside of the plant, leaving the middle or heart of the plant to continue producing more leaves. Another harvesting method is to cut the entire plant about an inch above the soil. The plant will push up a fresh round of leaves providing a second harvest.

Collards: Harvest tender, 6- to 8-inch long, dark green leaves using scissors, pruners, or a knife. Older leaves can be tough and stringy. Start with the larger lower leaves and work up the stalk, leaving the smaller leaves alone to continue growing. TIP: The flavor of collards improves after a frost.

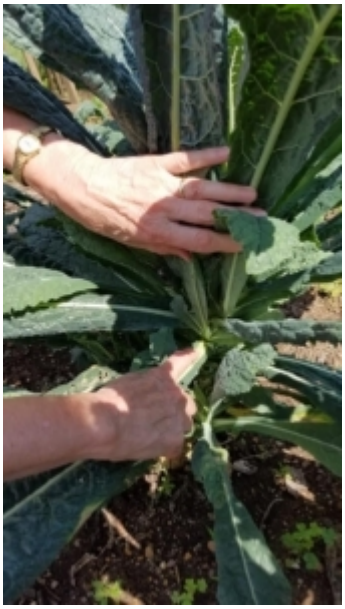
Corn: Start testing corn for ripeness when the silks begin to turn dry and brown. The silks on a ripe ear will be greenish at the top of the ear and dry and brown at the ends. Feel the tip of the ear through the husk. If it feels rounded all the way to the tip, it's ready to harvest. If it tapers (feels thinner) at the tip, it's not ready. You can also pull the husk away from the end and nick a kernel with your fingernail. If it's ready to pick, the kernel will be plump and will exude a milky substance when nicked. Pick corn from the stalk early in the morning when the sugar content is at its highest. Refrigerate it in the husk until you're ready to cook it.

Cucumbers: Cut pickling type cucumbers from the vine with a knife or pruners when the cucumbers are between 2 and 6 inches long. Harvest slicing and burpless type cucumbers when they are about 6 to 8 inches long. The skin should be dark green and look glossy. If the skin is dull or yellowish at the blossom end, the cucumber will be full of seeds and past it's prime.

Eggplants: Cut eggplants from the plant using pruners or a sharp knife. Leave a little of the stem attached. Harvest after they have reached about half of their projected mature size. The skin should be glossy and uniform in color. If the skin is dull and the eggplant feels soft to the touch, it is overripe. The goal is to harvest them before the seeds mature.

Garlic: Harvest garlic bulbs when the tops start to dry. Lift the entire plant from the soil with a garden fork or gently pull by hand, being careful not to bruise the bulbs. Brush off the soil and place in trays with screens or slatted bottoms. Cure in a warm, shady place with good air circulation for about two to three weeks. Remove tops when dry. Mature bulbs are best stored under cool, dry conditions with good ventilation.

Kale: Harvest individual leaves once they are 6 to 8 inches long. Snap the leaves off using your fingers or use a knife or scissors to harvest the larger outer leaves at the bottom of the plant and work your way up the plant. Harvest "baby" kale leaves for salads when they are 2 or 3 inches long.



Lacinato kale being harvested, starting at bottom of plant. Photo: Pat Chadwick.

Kohlrabi: Harvest when the globes are approximately 2 inches in diameter. Although the globes can grow larger, overly mature Kohlrabi can be tough and fibrous. Sever the globe from the root with a sharp knife or pull the entire plant and cut off the leaves and roots.

Leeks: Harvest leeks when they are about 1 inch in diameter. Use a garden fork to loosen the soil around the leek and pull it from the ground.

Lettuce (Head): Heads are ready to harvest if they feel full when gently squeezed, are moderately firm, and are about 6 inches in diameter. The actual size depends on the variety of lettuce being grown. Use a knife to sever the entire head from the roots.

Lettuce (Leaf or Mesclun): Start harvesting once the leaves are large enough for salads – about 3 to 4 inches tall. Use scissors to snip off individual outer leaves as soon as they are large enough for salads. The plant will continue to produce new leaves from the inner portion of the plant. Continue harvesting until the plant sends up a central stem signaling that the plant is starting to bolt. The leaves will develop a bitter flavor at that point. An alternative harvesting method is to cut off all the leaves 1 inch above the soil, after which the plant will continue to grow and provide another harvest or two. TIP: Lettuce tastes best when picked early in the day. However, if you must pick it in the heat of the day, immediately refresh it in cold water for 30 minutes. Dry it off, wrap it loosely in paper towels or a clean dish towel to absorb moisture, place it in a plastic bag, and chill it until you are ready to use it.

Melon (Cantaloupe): Harvest cantaloupe (also called muskmelon) when the stem pulls easily (slips) from the melon with gentle thumb pressure. If the stem must be forcibly separated, then the melon is not ripe. Other indications of ripeness include scent (a sweet aroma when sniffed), touch (the melon should yield slightly at the blossom end when pressed), or color (the rind changes from green to buff or yellow. For best flavor, harvest in the morning after the dew has dried.

Melon (Honeydew): This melon is ripe when the flower end softens slightly and the rind turns completely white or yellow. Cut the melon from the vine with a knife or pruners. Unlike cantaloupes, a honeydew melon will not separate easily from the vine when mature. TIP: Whereas cantaloupes will continue to ripen after they are harvested, an unripe honeydew melon will not ripen after it has been cut from the vine. Harvest honeydew melons mid-morning after the dew has dried for sweetest flavor.

Melon (Watermelon): Harvest when the rind on the underside of the melon turns from greenish white to a cream or yellow color. Another indication of ripeness is when the melon rind on top becomes dull rather than glossy. Cut the melon from the vine with a knife or pruners leaving 2 inches of stem attached. TIP: This takes practice, but you can tell if a watermelon is ripe from the sound it makes when you rap it with your knuckles. A metallic ringing sound indicates the melon is not ripe, whereas a hollow or dull thunk sound indicates the melon is ripe.

Mustard Greens: Use scissors or a knife to harvest individual outer leaves when they are young, tender,

and mild tasting. The inner leaves will continue to grow and the plant will produce more greens. Another approach is to cut the entire plant about 3 inches from the soil. The leaf stubs will re-grow. TIP: Mustard greens grown in the fall garden can tolerate a light frost, which will sweeten their flavor.

Okra: Check the growing instructions for the variety being grown. While most okra varieties should be harvested when the pods are just 2 or 3 inches long, some varieties will stay tender at a larger size. Cut the pods off with pruners or a sharp knife, leaving about ¼ inch of stem. If a pod is difficult to cut off the stem, it's too old and should be discarded. TIP: As a general rule, an okra pod is ready for harvest about 4 to 6 days after the flower wilts. The pods need to be picked every 1 or 2 days. Otherwise, the plant will stop producing.

Onions (Green): Harvest green onions (also known as scallions) when tops are about 6 inches tall by simply pulling them out of the soil. Grasp the onion just above the soil line and pull straight up.

Onions (Bulb): Harvest bulb onions when they are about 1 to 2 inches in diameter and after two-thirds or more of the tops have dried and fallen over. Use a garden fork to gently dig up the onions. Cure them in preparation for storage by either hanging them up or spreading them out in a well-ventilated space out of direct sun for 1 to 2 weeks. They will be finished curing when the necks are thoroughly dry. At that point, cut off the tops, brush off any soil, trim the roots with scissors or pruners, and store the bulbs in a cool, dry, well-ventilated space. Tip: If you're not sure an onion is ready for harvesting, pinch the neck. If it feels soft or pliable, it is mature. If it feels stiff, it is immature.

Parsnips: For the best tasting parsnips, harvest them after a few frosts. Cold temperatures concentrate the sugars in parsnips, making them sweeter tasting. Alternatively, leave them in the ground all winter covered with a thick layer of straw or other organic mulch. Harvest them in early spring before new top growth appears. If you harvest any later, they lose flavor and texture. Use a garden fork to loosen the soil around the roots before pulling them out of the ground. Cut off the foliage about ¼ inch above the top of the root. Store as you would carrots — either refrigerated or in a root cellar.

Peas: Snip the pods off the vine with scissors, pruners, or with a gentle tug with your fingers. It's important to harvest daily or every other day. Overripe peas left on the vine will signal the vine to stop producing. Harvesting methods differ depending on the type of pea being grown:

- **Snow Peas** – Pick as soon as the thin, dark green, edible pod reaches a mature length but before the sweet, tiny peas in the pod fill out.
- **Sugar Snap Peas** – Harvest when both the edible pod and the sweet, tasty peas are plump and the pods snap like a bean pod.
- **Shelling Peas** – Also referred to as "garden" peas or "English" peas, harvest when the tough, stringy, inedible pods are still green, plump, and firm to the touch, indicating that the peas inside have filled out the pod. To make sure the peas are at their best, simply do a taste test right in the garden: Pop open a pod and taste the peas inside. Mature peas will taste sweet, juicy, and flavorful.

Peppers (Sweet): Peppers may be harvested either ripe or unripe. Always cut them off the plant using scissors, pruning shears, or a knife. You can try twisting or breaking them off from the plant, but you are likely to damage the plant if you do. Here's an interesting dilemma with peppers: On the one hand, a green pepper does not taste as sweet as it does if allowed to fully ripen (that is, turn red, yellow, orange, or whatever color it's meant to be at maturity). However, the plant will continue to produce as long as you keep picking the peppers when they're green. On the other hand, if peppers are left on the vine to ripen fully, you will be rewarded with sweeter tasting fruits, but the plant will produce fewer peppers.

Peppers (hot): As with sweet peppers, hot varieties may be harvested at any stage by cutting or pruning the fruit from the stem. Bear in mind that mature (red) hot peppers are generally hotter tasting than when they are at their green stage. TIP: If you are new to growing hot peppers, protect your hands when handling them. The capsaicin oil in the peppers may cause a burning sensation if it comes in contact with your skin or mucous membranes. Wear gardening gloves as a precaution or wash your hands immediately after harvesting before touching your face or eyes.

Potatoes: Harvest an early crop of tender "new" potatoes after the plant has flowered (about six to eight weeks after seed potatoes were planted). Gently probe or dig the soil around the plant and remove one or two potatoes. Leave the rest for a larger crop later. To harvest the main crop of potatoes for storage, leave them in the ground for about two weeks after the plants have died back to allow the potato skins to thicken. Then, using a garden fork, dig straight down about 8 inches out from the center of the plant before angling the fork inward. Carefully unearth the potatoes so that you don't pierce them with the fork or bruise them. Consume any damaged potatoes right away because they won't store well. Store the remaining potatoes in shallow bins to cure in a dark, dry place at 55° F for about two weeks. After they are cured, store them in a root cellar or other dark place at about 40° F.

Pumpkins: Harvest when the pumpkin is a deep, uniform color, the stem has begun to dry, and the rind cannot be dented when pressed with a thumbnail. Use a sturdy knife, long-handled loppers, or pruning shears to sever pumpkins from the vine. Pumpkins store better if they are harvested with a portion of the stem still attached. So, leave about 3 inches of stem attached but don't carry the pumpkin by the stem. If the stem breaks off, the pumpkin is not likely to cure very well. Spread pumpkins out to cure so they do not touch one another in a dry, well-ventilated place at 75° to 80° F for about 10 days. Then store in a single layer (not touching) in a cool, dry, well-ventilated place at about 50° to 55° F.

Radishes: Harvest spring radishes when they are small and mild tasting – about 1 inch in diameter. Radishes left in the ground too long develop a hot, sharp taste and become pithy in texture. To harvest, pull them out of the ground by their foliage if the soil is loose. If the soil is hard and dry, use a garden fork to lift them out of the ground.

Rhubarb: Start harvesting established plantings of this perennial plant in mid-spring when leaves are fully mature. Pull the stalk upwards with a sideways twisting motion and away from the center of the plant. Avoid cutting the stalks as the cut may damage the crown of the plant and may provide an entry point for disease. Continue to harvest stalks until about mid-summer, at which point they start to become stringy. Do not remove more than two-thirds of existing stalks at any given time. Over-harvesting can rob the plant of vigor. Rhubarb leaves are not edible. They contain oxalic acid, which renders them mildly toxic, so cut them off the stalk along with about 1 to 2 inches of the stalk just below the leaves. Eat ONLY the stalk after it is cooked. TIP: Remove and discard any frost-damaged leaves in spring. The stress of freezing can cause oxalic acid in the leaves to migrate into the stalk.

Rutabagas: Rutabagas are ready for harvest when roots are 4 or 5 inches in diameter. Cool weather helps to develop the full flavor of this vegetable, so harvest them after a couple of hard frosts but before the ground freezes. Pull or carefully dig up the roots with a garden fork. Cut off the leaves an inch above the fleshy root. Wash off any soil and dry the roots quickly. Store in a humid root cellar at temperatures just above freezing or in the refrigerator in a plastic bag.

Shallots: Using a garden fork, gently dig up mature, dry shallot bulbs when they are 1 to 1½ inches in diameter and the tops have turned brown and flop over, usually in mid- to late summer. Cut off the tops and cure the shallots in a warm, dry place for about a week. Store in mesh bags in cool, dry conditions.

Spinach: Once they are about 3" long, start harvesting leaves from the outer part of the plant. Small leaves

of this size have more flavor than large, heavily puckered leaves. Also, the tender young stems are easy to pinch off from the plant with your fingers, whereas older leaves tend to be more fibrous and need to be snipped off with scissors or pruners. Continue harvesting leaves until the plant sends up a flower stalk. That's your signal that the plant has finished growing and is bolting. The leaves will taste bitter at that point.

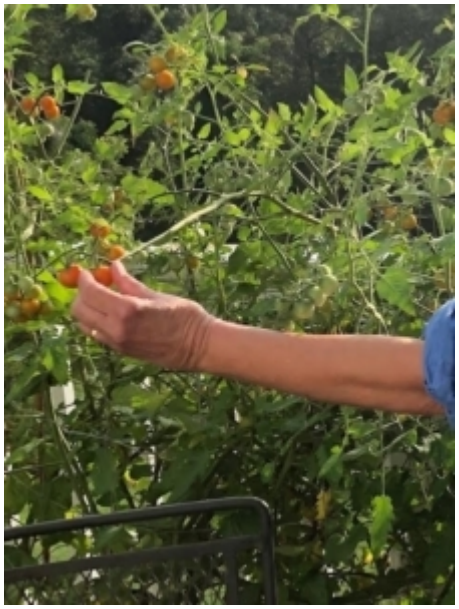
Squash (Summer): Harvest when small and tender for the best flavor and texture. Flavor is lost once the skin toughens and the vegetable becomes seedy. Wait until mid-morning after the dew has dried to harvest summer squashes. Cut from the vine with a knife or pruners. Harvest DAILY. Squash can go from ideal harvest size to overly mature in a matter of a day or two.

- **Straightneck squash** — Harvest when 6 to 8 inches long. Beyond that point, the skin can become a little tougher.
- **Crookneck squash** – Harvest when a little smaller than straightneck varieties because they develop a thick skin earlier than straightneck varieties.
- **Scallop or pattypan squash** – Harvest when 3 to 4 inches across.
- **Zucchini** – Harvest when about 6 to 8 inches long and 1½ to 2 inches in diameter.

Squash (Winter): Winter squash is mature when fruits are fully colored, vines are starting to shrivel and dry, and the rind is hard and resistant to scratches with fingernails. Use pruning shears to cut the matured winter squashes from the vine but leave an inch or more of the stem attached. Cure in the sun for about 10 days to completely harden the rinds. If there's a chance of frost or rain, move the squash to a shed or garage for protection. Store the cured squash in a cool (50 to 55°F), dark and dry location. TIP: Buttercup and banana squash store longer than butternut and acorn squash.

Sweet Potatoes: Yellowed foliage is an indication that sweet potatoes are ready for harvesting. Harvest any time after they reach usable size (which depends on the variety being grown) but before the first frost. To harvest, cut back the vines with pruners. Use a garden fork to gently lift the roots from the ground. The goal is to avoid bruising the roots. Cure the roots in the sun for a day and then move them to a shady area at about 80°F for 7 to 10 days.

Tomatoes: Harvest when fully vine-ripened but still firm. Ripe tomatoes generally separate from the plant with slight upward pressure. However, if they don't separate easily, sever them from the vine with scissors or hand pruners to avoid damaging the plant. TIP: Before a killing frost, harvest unripened tomatoes from the vines and bring them indoors to finish ripening at room temperature. After washing and drying the tomatoes, wrap each one separately in newspaper, and place them in a single layer on a flat, wide tray or in a cardboard box. Space them so that they are not touching one another.



Testing grape tomatoes for ripeness. A ripe grape tomato releases in response to light downward pull. Photo courtesy of Cathy Caldwell.

Tomatillos: Pick off the vine once the husk enclosing the tomatillo splits open. The fruit will be bright green and will feel firm. Tomatillos are overripe when they turn yellow and will taste bitter.

Turnips: For a sweeter, milder flavor, harvest when the roots measure 2 to 3 inches in diameter, depending on the variety. Larger turnips may have a strong, unappealing flavor. Harvest before the ground freezes. Either pull up by the foliage or use a garden fork to ease them from the soil.

RESOURCES:

"Asparagus," Virginia Cooperative Extension (VCE) Publication 426-401

"Beans," VCE Publication 426-402

Growing Chinese Cabbage and Bok Choy in Home Gardens," University of Minnesota Extension Publication 790564

"Cole Crops or Brassicas," VCE Publication 426-403

"Notes on Harvesting and Handling Melons," VCE Publication 2906-1308

"Melons," Iowa State University Extension Publication PM1892

"Onions, Garlic and Shallots," VCE Publication 426-411

"IPM Series: Potatoes," University of Maryland Extension Publication HG55

"Potatoes, Peppers, and Eggplant," VCE Publication 426-413

"Specialty Crop Profile: Pumpkins: VCE Publication 438-100

"Specialty Crop Profile: Rhubarb," VCE Publication 438-110

"Growing Rutabagas in the Home Garden," University of Georgia Cooperative Extension Circular 942

"Homegrown Summer and Winter Squash," University of Georgia Cooperative Extension Circular 993

"Tomatoes," VCE Publication 426-418 426-418

The Vegetable Gardener's Bible (Smith, Edward C., 2009)

Vegetable Gardening in the Southeast (Wallace, Ira, 2013)

A Celebration of Heirloom Vegetables (Yepsen, Roger, 1998)

Master the Art of Vegetable Gardening (Mattus, Matt, 2018)

Upcoming Events

By Susan Martin | October 2020-Vol.6 No.10

PIEDMONT MASTER GARDENER *GARDEN BASICS* CLASSES ON ZOOM
Fall Classes
Saturdays, 2:00 – 3:30 PM

October 17
"Bring in the Birds!" with Leigh Surdukowski.

Go beyond the feeder and make your yard a paradise for birds. Fill out a registration form by October 12.

November 21
"Water-Wise Gardening" with Deborah Harriman.

Become a steward of the environment by managing water efficiently in your landscape. Fill out a registration form by November 16.

Classes are **FREE** but registration is required. **To register**, fill out the appropriate registration forms above by the deadline indicated for each class.

2021 EXTENSION MASTER GARDENER VOLUNTEER TRAINING VIA ZOOM
Hosted by Virginia Cooperative Extension – Rapidan River Extension
For residents of counties: Charlottesville/Albemarle, Culpeper, Greene, Madison, Orange, and Fluvanna

Master Gardeners are volunteer educators, in partnership with Virginia Cooperative Extension, dedicated to working through community outreach education and promoting science-based, environmentally sound horticulture practices and sustainable landscape management.
Please join one of our **upcoming orientation sessions on Zoom:**

October 8, 6:00 – 7:00 PM
October 15, 6:00 – 7:00 PM
October 22, 6:00 – 7:00 PM

TO REGISTER AND RECEIVE A ZOOM LINK, contact VCE Culpeper County at **540-727-3435** or **CAMILLA@VT.EDU**

For More Info and Details on Applying
Albemarle/Charlottesville residents:
https://pmgarchives.com/volunteer/become-a-master-gardener
or bbthierwechter@gmail.com
For additional Albemarle/Charlottesville
orientation sessions, contact bbthierwechter@gmail.com
Fluvanna County residents: https://www.fluvannamg.org/
or sue.tepper2@gmail.com
Culpeper, Greene, Madison, and Orange Residents: https://www.rapidanrivermastergardener.org/
or camilla@vt.edu

See this flyer for further information.

BLUE RIDGE PRISM
Partnership for Invasive Species Management

TREATING INVASIVE PLANTS, FALL WORKSHOPS VIA ZOOM
(Cost is $10 per person)

Wednesday, October 7 (1:00 – 4:00 pm) – REGISTER HERE
Thursday, October 22 (1:00 – 4:00 pm) – REGISTER HERE

BLUE RIDGE PRISM QUARTERLY MEETING VIA ZOOM
FREE AND OPEN TO ALL
Wednesday, October 21
1:00 – 4:00 PM

Registration is required. See this link to register.

Rod Walker will update on PRISM initiatives, achievements, and goals. This update will be followed by two presentations.

Forest Health Update – Katlin Dewitt (Forest Health Specialist) from Virginia Department of Forestry will share information on the state of Virginia forests and recent invasives work. She will discuss forest health pests and how to identify and control them, as well as work involving goats for invasive control.

Spotted Lanternfly – Mark Sutphin (Horticulture Extension Agent with Virginia Coooperative Extension in Frederick County) will discuss the Spotted Lanternfly (SLF). This is a new invasive insect pest that first arrived to Virginia in 2018. Currently, the only known population in Virginia exists in Winchester, as well as the counties of Frederick and Clarke. It has the potential to threaten agricultural crops, forests, and home landscapes throughout Virginia. Learn how to ID, report sightings, and slow the spread of this terrible new pest. Also learn to combat this pest by eliminating SLF's favorite host tree, the equally invasive Tree-of-Heaven (*Ailanthus altissima*).

MONTICELLO'S FALL PLANT AND NURSERY SALE
David M. Rubenstein Visitor Center
931 Thomas Jefferson Parkway, Charlottesville, VA 22902

Saturday, October 17, 10:00 AM – 2:00 PM
Sunday, October 18, 10:00 AM – 2:00 PM

Fall is the perfect time for planting and the Monticello nursery will have a wide range of plants available for sale. Join us at the David M. Rubenstein Visitor Center for three exclusive and physically-distanced plant sales. The Monticello nursery will have a variety of discounted perennials. Our knowledgeable nursery staff will be on hand to answer your gardening questions. **Registration is required** and space is limited. **Registered guests will be allotted one forty-five minute reserved time to shop and purchase plants. Credit card sales only! Go to this link to register for your time.**

MONTICELLO'S VIRTUAL HERITAGE HARVEST FESTIVAL

The Heritage Harvest Festival will offer 5 classes this year online, on a variety of topics. The first class is October 6, and the last class is December 5. See this link for a description of topics, dates, and times, and to register. Each class is $25, or you can register for all 5 for a package fee of $100. Ticket holders will receive class instructions and a **list** of any supplies, ingredients or materials required for the event. Please register early to allow adequate time to secure these items, as they are essential to the class experience.

HEARTFLAME GARDEN OPEN DAYS
Saturday, October 17
Sunday, October 18
1:00 – 6:00 PM

Heartflame Garden is a private garden located at **650 Sandy Bottom Road near Elkton, Virginia** and adjacent to Shenandoah National Park. It is a lovely three-season display garden with about two acres of cultivated gardens and another four acres of rolling hills and streams to explore. The garden is open by appointment, and also offers "open" days when an appointment is not required. These mid-October open days will hopefully show the garden in fall-color splendor! Check this link for more information, including contact information.

IVY CREEK NATURAL AREA SELF-GUIDED OR VIRTUAL WALK
Co-sponsored by Jefferson Chapter Virginia Native Plant Society
and Ivy Creek Natural Area
First available for download on or about October 17

Take a **virtual fall walk** focusing on trees with Phil Stokes. He will seek out many of the 50+ species that naturally occur at Ivy Creek and explain the distinguishing characteristics that help identify them. With nuts and fruits present, identification is made much easier. See this link for more information on how to enjoy **either** a self-guided walk on-site at Ivy Natural Creek, or through a guided virtual tour. A list of native plants to be highlighted on the walk will also be available around October 17.

VIRGINIA NATIVE PLANT SOCIETY POTOWMACK CHAPTER
"Native Plants and Birds" with Dr. Peter Marra via ZOOM
Thursday, October 8
7:30 pm – 9:00 pm

Dr. Marra will be discussing the importance of native plants for providing food and shelter for native birds. For more information and to register, see this link.

VIRGINIA NATIVE PLANT SOCIETY JEFFERSON CHAPTER
"Ecological Gardening" with Dr. Debbie Delaney via ZOOM
Wednesday, October 14
7:30 pm – 9:00 pm

Dr. Debbie Delaney will join us in October for her talk on ecological gardening via Zoom Video Conference. See this link for more information.
Please email jeffvnps@gmail.com for Zoom access information.

Debbie Delaney is an associate professor in the Department of Entomology and Wildlife Ecology at the University of Delaware, where studies various aspects of pollinator health and productivity. She has over 20 years of experience working with native pollinators and honey bees. Her research program has four main focal areas: 1) genetic identity and diversity of US honey bees 2) temporal stability of pollinator populations and 3) best management solutions for creating sustainable managed pollinator populations 4) pollinator nutrition and forage mapping. Dr. Delaney works closely with Doug Tallamy at the University of Delaware.

STATE ARBORETUM OF VIRGINIA
BLANDY EXPERIMENTAL FARM

“Nature Nurtures” VIRTUAL Event
Saturday, October 24

This event includes **three different sessions relating to native plants. Author Cole Burrell** will be speaking during the middle session that begins at **1:00 PM.** Addressing the topics of native plants and ecology, he will address the question **“Can a Garden have Everything?”** There will also be a session on *Herbs for Healthy Living,* and a Farm-to-Table Cooking Demonstration. These other two sessions are at 11:00 AM and 3:00 PM, but only the 1:00 session will count toward CE hours for Piedmont Master Gardeners.

Registration opens soon; the cost is $10 per session, or $25 for all three sessions. See this link for information and to register.

JAMES MADISON’S MONTPELIER PRESENTS
Virtual Youth Nature Series: “Colors of Nature”
Saturday, October 17
10:00 AM

Virtually join Montpelier’s Horticulture team and the Virginia Master Naturalists as we explore how and why leaves change colors. We will demonstrate how to make a collage of different leaf shapes in a rainbow of colors. **Register here** now and we’ll send you a link to participate. You’ll also get a link to the recorded tour afterward, so if you can’t watch at the scheduled time, you won’t miss out! Member, free; nonmember, $10.

THE NATURE FOUNDATION AT WINTERGREEN
Hike with a Foundation Naturalist

Join a Foundation Naturalist for an **interpretive hike** and explore Wintergreen’s natural environment! These hikes are rated moderate to strenuous. Meet at Trillium House parking lot. **Registration and payment due before event.** Due to COVID- 19, we are following the state’s restrictions. See this link for information about the different types of hikes available, and to register.

The Nature Foundation at Wintergreen Greenhouse

Native wildflowers and shrubs are available for sale by appointment at the greenhouse on Thursdays & Fridays from 9:30 AM to 4:30 PM. There are about 1,500 mature native shrubs in 3-5 gallon pots in our inventory. Shrubs are grown from 2” cuttings of local ecotypes. There is also a good selection of local ecotype wildflowers. If you are interested in something specific, please contact Doug Coleman, director@twnf.org in advance; orders will be accepted at this email as well. For more information and a list of available plants, see this link. Customers will be given a date and time to pick up their plants at the greenhouse.

MONARCH CONSERVATION WEBINAR – CONSERVATION OF MONARCHS IN MEXICO
Tuesday, October 27
2:00 PM Eastern
This series is a collaborative effort between the Monarch Joint Venture and the National Conservation Training Center.

Presenters:
Eligio García Serrano – Coordinator, Fondo Monarca
Eduardo Rendón Salinas – Subdirector of Terrestrial Ecosystems, WWF México

Colleagues in Mexico will share the work being done to protect and conserve monarchs and their overwintering sites within the Monarch Butterfly Biosphere Reserve (MBBR). Register here and you will receive additional details about participating in the webinar on the confirmation page after registering. Links and instructions for participating will be sent out the week prior to the webinar.

EXTENSION MASTER GARDENER WEBINAR SERIES VIA ZOOM
"URBAN AGRICULTURE"
Thursday, October 15
10:00 AM

Join Dr. Leonard Githinji from Virginia State University as he talks about urban agriculture, why it's important, and where it intersects with volunteerism. Registration is required. Register here for your Zoom link.

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An Educational Series Dedicated to the Art and Science of Natural Landscape Design

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Common Diseases in the Home Garden

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Red Maple Earns Its Popularity

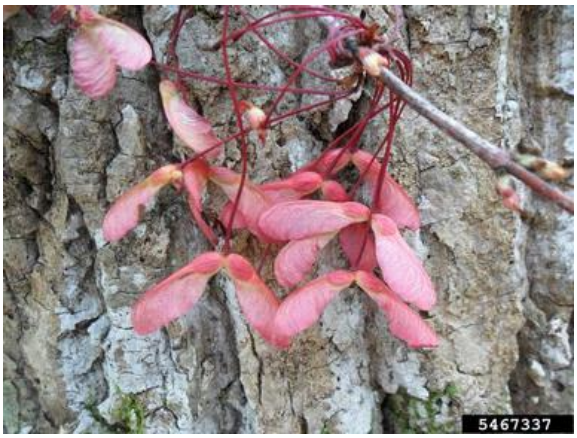
By Susan Martin | October 2020-Vol.6 No.10

The red maple, *Acer rubrum*, is one of the most popular and widely used trees in the home landscape, thriving in USDA Hardiness Zones 3 to 10. This medium-sized, deciduous tree is **native** to Eastern North America, ranging from Quebec to Minnesota, south to Florida, and west to eastern Texas. In the

southernmost parts of their range, red maples are a wetland species, which has earned them the nickname "swamp maple." **Not all red maples turn red in the fall,** which is why plant breeders have developed cultivars that offer more dependable, vibrant fall color. The term *rubrum,* of its Latin name, describes the **overall redness** of the tree, rather than fall foliage.

DESCRIPTION

Clusters of small, **red buds and red flowers** appear on the tree in early spring (March/April) before the leaves appear. Male and female flowers typically occur on separate trees, but can be on separate branches on the same tree. Occasionally flowers are *perfect* (have both male and female parts). Male flowers are pink to red, rarely yellow; female flowers have two bright red arching styles in the center. The flowers become reddish-green, **two-winged fruits (samaras)** that can be seen twirling to the ground by early May. Twigs are reddish. Leaves are medium to dark green, 2–6″ in length, with 3 or 5 lobes, and roughly-toothed edges. Young trunks are smooth and light gray; older trunks are darker gray and separated by vertical ridges into large, plate-like scales.



Red maple samaras (fruit) Photo: David Stephens, Bugwood.org Creative Commons Attribution-Noncommercial 3.0 License.

IN THE WILD

Red maples are perhaps the most abundant tree in the eastern deciduous forest. This status can be attributed to the tree's generalist tendencies. A generalist species is one that can **tolerate a wide range of habitat conditions** and uses many different types of resources. Red maples do well in sunny or shady spots, dry or wet soil, and high or low elevation. Adaptable roots help the red maple to cope with differing moisture levels. If the tree is placed in wet soil, it grows a short taproot and extensive lateral roots to soak up water at the surface. When red maples grow in dry sites, a long taproot and short lateral roots develop. Despite their remarkable adaptations, red maples grow better in some conditions than in others. **Deep, moist, acidic soil results in the healthiest red maples.**

Although their life span averages 80-100 years, not a long life in tree terms, they begin producing seeds at about 4 years. After fires or hurricanes, when many trees are decimated, red maples spring up quickly and can become the dominant species in the forest.

WILDLIFE

The fruits (samaras) provide food for squirrels and many other rodents. Young shoots are a favorite of white-tailed deer. Horse owners should note, however, that wilted or dried maple leaves can be toxic to horses. Doug Tallamy (2009) notes that in addition to the red maple acting as a larval host for the Cecropia Moth (*Hyalophora cecropia*), maples support many forest-loving Lepidoptera:

If you plant native maples in your yard, you are enabling the rosy maple moth (Dryocampa rubicunda), the oval-based prominent moth (Peridea basitriens), the retarded dagger moth (Acronicta rubicoma), the orange-

humped maple worm (Symmerista leucitys), the maple looper (Parallelia bistriaris), and the Baltimore bomolocha (Bomolocha baltimoralis or Hypena baltimoralis) to exist where they otherwise could not.

POTENTIAL PROBLEMS

The bark is thin on most maples, and easily damaged by mechanical impact. Wounds can make the tree more susceptible to disease and insects. To avoid damaging shallow feeding roots, trees should be planted where turf below the canopy is not desired. **Mulching** around trees will help protect the trunk and roots from mechanical damage, conserve moisture, and help keep soil temperatures cool. Spread mulch 2-4″ deep to the **drip line** of the tree canopy, making sure that **the mulch does not touch the trunk,** and that the root flare is visible. The mulch should form a **flat "donut"** with the tree's trunk in the center. (See mulching guidelines provided by the Charlottesville Area Tree Stewards.)

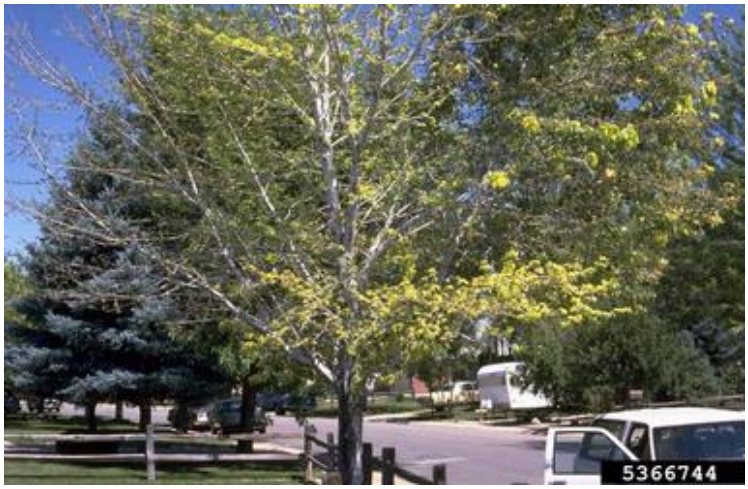
Watch for aphids, leafhoppers, borers, scale and caterpillars. Leafhoppers can cause substantial damage. Canker, fungal leaf spot, and root rots may occur. Red maples are also subject to anthracnose fungus, but this is usually not serious. *Verticillium* wilt is a much bigger problem and is discussed below. Wind and ice may break some branches. Alkaline soils (those with a pH above 7.5) usually cause leaf chlorosis (a yellowing of the leaf blades, often with pronounced green veins). Abnormal yellow color in maple trees is frequently associated with nutrient deficiencies, particularly manganese. Manganese nutrient deficiency leads to nitrogen deficiency, resulting in poor chlorophyll production and stunted growth. As soil pH increases (becomes more alkaline), the ability of the red maple to take up manganese decreases. If high pH is verified by a soil test, you can lower your soil's pH (make it more acidic), by applying elemental sulfur or acidifying fertilizers.

Red maple is somewhat sensitive to being transplanted in autumn, and care should be taken to amend the soil, fertilize, water thoroughly, mulch adequately, and avoid winter salt spray, to enhance survival chances during the first winter. Maples are considered 'bleeders' and are best pruned in early winter or during summer. They do not tolerate heavy pollution.

VERTICILLIUM WILT

Maples are susceptible to *Verticillium* wilt which attacks the vascular system and can be fatal. *Verticillium* wilt is caused by a soil fungus called *Verticillium dahliae*. This fungus lives in soil as small, darkened structures called microsclerotia. These microsclerotia may lie dormant in the soil for up to 10 years. When the roots of susceptible plants grow close to the microsclerotia, the fungus germinates and infects the roots of the plants through wounds or natural openings. The fungus spreads into the branches through the plant's vascular system and simultaneously causes the plant cells to "plug" themselves. Once the xylem is infected, it becomes so plugged that water can no longer reach the leaves. *Verticillium* can spread through wounds on branches or trunks.

Maple leaf verticillium wilt Photo: Joseph O'Brien, USDA Forest Service, Bugwood.org Creative Commons Attribution 3.0 License.



Verticillium wilt on silver maple Photo: William Jacobi, Colorado State University, Bugwood.org Creative Commons Attribution 3.0 License.

The disease can occur either acutely or chronically. **In acute infections**, a branch or a section of several branches of the tree may wilt and turn brown rather suddenly. Often, other branches soon follow, until most or all of the branches are wilted. Leaves may also turn yellow between the veins, or may drop prematurely. Branches may die back. **Acute infections occur when the fungus is living in the newest wood (the sapwood).**

In **chronic infections,** leaves may be smaller than usual or yellow, often with brown edges. The tree may grow poorly and may produce abnormally large seed crops. The tree does not wilt or die quickly, but **declines slowly over time. Chronic infections occur when the fungus is living in older wood.** The appearance of streaking helps to identify the disease but does not guarantee that the tree has *Verticillium* wilt. Sometimes other factors or diseases cause discoloration of sapwood. Only laboratory examination can positively diagnose the disease. **At this time, there is no known chemical control for this disease.**

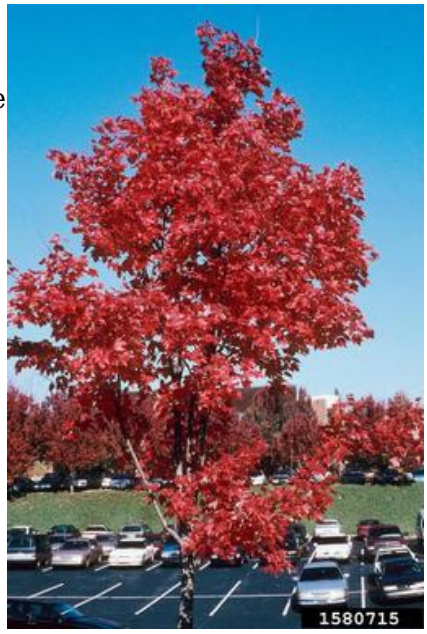
Because the fungus lives in the soil and does not spread through the wind, there is no need to quickly remove infected trees. Dead branches should be pruned out to prevent infection by other fungi; remember to sterilize tools. Plants showing early symptoms should be watered and fertilized. Use fertilizers lower in nitrogen and higher in potassium. **When replacing trees that have died from *Verticillium* wilt, choose resistant species** such as conifers, crabapple, beech, ginkgo, hackberry, hawthorn, hickory, white oak and poplar, among others. Visit this link for a listing of trees and shrubs that are **susceptible** to the disease. Allow several years (three or more) before growing a susceptible plant in an infected area. Do not plant back into the same hole.

ACER RUBRUM CULTIVARS

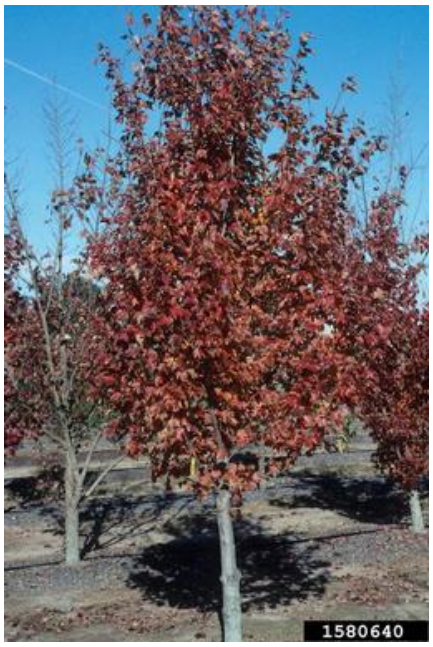
Acer rubrum is prized for its adaptability to different conditions, its fast growth rate, pleasing form, and fall color. **Consistently beautiful fall color, however, is available through cultivars.**

The following lists includes some of the more frequently used red maple cultivars, so that readers interested in planting a red maple can learn about the characteristics of different cultivars. These lists might also help clear up some of the confusion between cultivars that are crosses between red maples, and cultivars that are crosses between red maples and silver maples. This first list shows cultivars that are crosses between red maples.

***Acer rubrum* 'October Glory'**: This female cultivar (patented in 1961) grows 40-60' tall and 20-25' wide with an oval rounded form. Attractive red flowers appear in early spring before the foliage emerges. Flowers give way to red-tinged samaras. Glossy dark green leaves retain good green color well into fall (longer than many other *A. rubrum* cultivars), and in more northern areas are sometimes subjected to frost prior to acquiring fall color. It is best used north of USDA hardiness zone 9. Orange to red fall color for this cultivar is brilliant in most years. **It turns color late in October.**



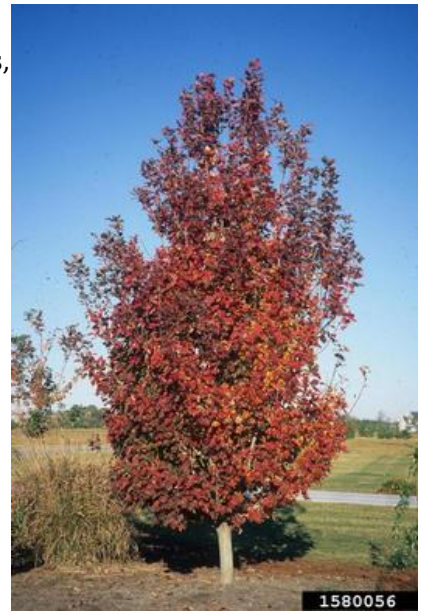
Acer rubrum 'October Glory' Photo: John Ruter, University of Georgia, Bugwood.org Creative Commons Attribution-Noncommercial 3.0 License.



Acer rubrum 'Autumn Flame' Photo: John Ruter. University of Georgia, Bugwood.org. Creative Commons Attribution-Noncommercial 3.0 License.

***Acer rubrum* 'Autumn Flame':** Patented in 1964, this male selection produces greenish-yellow flowers in spring, but no fruit. It is noted for abundant leaves that are smaller in size than those of the species. A brilliant scarlet fall color develops about **two weeks prior to fall color on the species.** Noted for its pleasing rounded habit as a young tree, it matures 40-60' tall, and 30-50' wide. **May lack the hardiness of other cultivars.**

***Acer rubrum* 'Brandywine'**: A cross between two popular red maple cultivars, 'October Glory' and 'Autumn Flame'. It grows 40' tall and 30' wide; oval form; male cultivar (seedless); deep red fall color; **resistant to leafhopper.**



Acer rubrum 'Brandywine' Photo: John Ruter, University of Georgia, Bugwood.org

Red Sunset® red maple *(Acer rubrum* 'Franksred'): Grows 40-50' tall and 30-35' wide; pyramidal to rounded form. In early spring before the leaves emerge, tiny red flowers cover the canopy of the tree. The samaras, or winged seeds, turn bright red in early summer and then fade to brown and fall to the ground. Foliage starts as a glossy, dark green turning to bright reds and oranges in the fall. **One of the best red maples for fall color.**

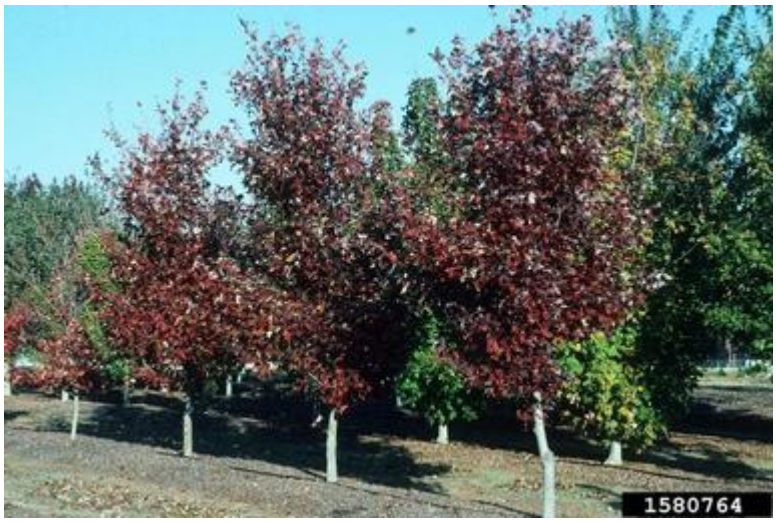
Redpointe® red maple (*Acer rubrum* 'Frank Jr.'): A pyramidal shape growing 40-50' tall and 25-30' wide. Foliage starts as a bright green in spring, darkening to a glossy, dark green in summer, and turning to a **brilliant red in the fall.** It has a high canopy with a typical clearance of 6 feet from the ground, and should not be planted underneath power lines. As it matures, the lower branches of this tree can be strategically removed to create a high enough canopy to support unobstructed human traffic

underneath.

***Acer rubrum* 'Bowhall'** – Growing to 45' tall and 15' wide, it is **narrower in width** than other red maple cultivars, such as 'Red Sunset' or 'October Glory', making it suitable to smaller planting areas. Leaves are borne on upright stems which give the tree its upright to oval crown at maturity. During the summer months, the leaves are dark green above and grayish beneath. In the fall, the leaves turn shades of yellow, orange and reddish-orange. It is considered to have better fall color than the Freeman maple cultivar 'Armstrong'.

Two newer cultivars have been introduced from the **U.S. National Arboretum red maple research project.** Both are male cultivars that don't produce seed, show good leafhopper resistance, and exhibit brilliant red fall color. As new introductions, they don't seem to be widely available at this point. Both prefer full sun and moist, acidic soils.

***Acer rubrum* 'Somerset':** A cross between *A. rubrum* 'October Glory' and *A. rubrum* 'Autumn Flame'. Grows 40' tall and 30' wide. Showy clusters of red flowers in early spring; foliage emerges red in the spring, turning to medium green. Strong, upright growth habitat with a moderately ovate crown. Bark is silvery gray and furrowed. Long-lasting brilliant red color starts in late October; has been shown to **color well as far south as Georgia (Hardiness zone 8).**



Acer rubrum 'Somerset' Photo: John Ruter, University of Georgia, Bugwood.org. Creative Commons Attribution-Noncommercial 3.0 License.

***Acer rubrum* 'Sun Valley':** A cross between *A. rubrum* 'Red Sunset' and *A. rubrum* 'Autumn Flame'. Grows to 40' tall and 35' wide; oval and densely branched. It has pink, ball-shaped flowers in spring. Bark is light gray and smooth when young, turning dark gray with age. USDA Hardiness zones 4-7.

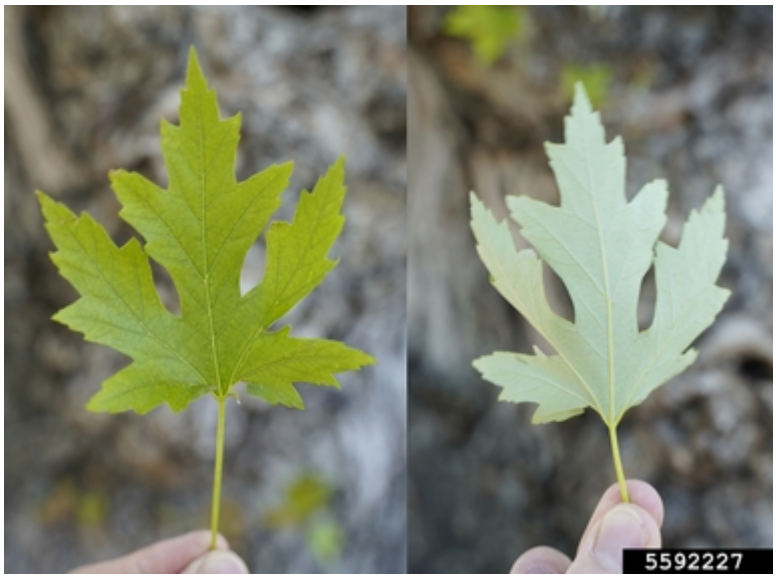
FREEMAN MAPLE (*ACER FREEMANII*)

Freeman maples are hybrids of red maples and silver maples. They combine the strong branch attachment of the red maple and the fast growth rate of the silver maple. One criticism cited is a tendency for these cultivars to develop multiple leaders that, in combination with narrow crotch angles, may predispose the tree to structural failure later in life. These cultivars have a brilliant, red-orange color in the fall, and are **less prone to chlorosis symptoms due to alkaline soils**. Oliver M. Freeman of the National Arboretum made the first controlled crosses between red maple and silver maple in 1933. **Crosses between red and silver maples occur not only by controlled propagation, but also naturally in the wild**. It is sometimes difficult to identify a Freeman hybrid because of the complexity of crosses and backcrosses that may occur. Cultivars are sometimes listed for sale by nurseries under *Acer rubrum* instead of *Acer* × *freemanii,* making it difficult for consumers to know what they're buying. To understand these cultivars, let's look at the characteristics of the silver maple.

SILVER MAPLE *(ACER SACCHARINUM)*

The silver maple is native to the eastern and central **United States** and to Canada. This is the fastest growing of all American maple species, with a growth rate of 10-12' in four to five years. It grows 50-70' tall

and 35-50’ wide. Although it tolerates a wide variety of soils, it prefers moist soils in deep woods and along stream banks. This tree has a very vigorous root system that can buckle sidewalks, clog drain tiles, and invade septic fields or well pipes. **Due to its rapid growth, the wood is weak and prone to storm damage. It is susceptible to many diseases and insect pests, particularly the woolly alder aphid.**



Acer saccharinum Photo: John Ruter, University of Georgia, Bugwood.org. Creative Commons Attribution-Noncommercial 3.0 License

In spite of these problems, silver maple is a very popular tree and planted often, mainly because of its rapid growth and ease of culture. The bright green leaves are silvery underneath, and are especially attractive when fluttering in the wind.

ACER *x FREEMANII* CULTIVARS

Armstrong Freeman maple (*Acer* x *freemanii* ‘Armstrong’): With an upright, **narrow** form, this tree can reach a height of 50-70’ with a 15-20’ spread. It can tolerate wet soils. Although it does not have strong fall coloration, it does turn orange-red. Other cultivars are considered to have better fall color.

Armstrong Gold red maple (*Acer rubrum* ‘KW78’): Selected from an evaluation of hundreds of seedlings of ‘Armstrong’, this cultivar improves greatly on the parent, with brighter foliage color, greater foliage density, and a compact, less leggy growth habit. Its **columnar form** recommends it for narrow street planting sites. Grows 40’ tall and 12’ wide.

‘Armstrong’ Freeman maple Photo: T. Davis Sydnor, The Ohio State University, Bugwood.org. Creative Commons Attribution-Noncommercial 3.0 License.

'Autumn Blaze' Freeman maple Photo: T. Davis Sydnor, The Ohio State University, Bugwood.org Creative Commons Attribution-Noncommercial 3.0 License.

Autumn Blaze® Freeman maple (*Acer* x *freemanii* 'Jeffsred'): A rounded to broad oval tree, growing 50-60' tall and 40-50' wide. It has a strong central leader and better branching habit than silver maple, making it better adapted to areas with either ice or snow. Fall color is a consistent orange-red to scarlet-red. Originally thought to be a male tree, it has produced fruit in some cases. **It tolerates clay soil, and will withstand both wet soil conditions and drought.**

Autumn Fantasy® Freeman maple (*Acer* x *freemanii* 'DTR 102): A broadly oval form growing about 50' tall and 40' wide. Produces bright red fall color. **This maple is drought tolerant.**

Celebration® Freeman maple (*Acer* x *freemanii* 'Celzam'): A broadly oval form growing about 50' tall and 35' wide. Leaves are similar to silver maple, but this cultivar has a more uniform growth habit, making it **more resistant to storm damage**. It is more tolerant of urban conditions. Fall color is yellow to orange.

Firefall™ Freeman maple (*Acer* x *freemanii* 'AF#1'): An upright, oval form growing 50' tall and 35' wide. The orange-red-to-red fall color develops a little earlier than other cultivars. **Better suited to northern climates.**

Marmo (*Acer* x *freemanii* 'Marmo'): This cultivar has a uniform, upright-to-columnar form. It grows 45-70' tall and 40' wide. It has a strong central leader and excellent branching habit. Fall color is an interesting mottled blend of red and green to burgundy and yellow. Produces no fruit. The parent tree was selected from the collections at The Morton Arboretum and is a Chicagoland Grows® introduction. (See this link for information on Chicagoland Grows®.)

Sienna Glen® Freeman maple (*Acer* x *freemanii* 'Sienna'): This cultivar has a strong central leader and a uniform, pyramidal shape, making it less prone to breaking in wind and storms. It grows 50'tall and 35' wide. Fall color is orange to red-burgundy. This is an excellent street or specimen tree and is tolerant of salt, drought, flooding, alkaline soils, and pollution.

SUMMARY

If you are looking for a native shade tree that can thrive in many different conditions, the red maple steps to the front. It is happiest in full sun and in acidic, moist-to-wet soils. Cultivars offer consistently beautiful fall colors that help ease the pain of saying goodbye to summer. Freeman maples are a cross between red maples and silver maples. These cultivars were developed to combine the very fast growth rate of the silver maple, and the stronger form of the red maple. There is still some concern about its predisposition to structural failure later in life, particularly if planted in high wind areas. Freeman cultivars are generally more tolerant of alkaline soils than are red maples. As native trees, red maples are important contributors to a diverse ecosystem of native plants, insects, and birds that support each other robustly and thrive in our

home landscapes.

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Featured photo: *Acer rubrum* (Swamp Maple) Photo: Chris Evans, University of Illinois, Bugwood.org

Creating New Plants From Cuttings

By Patsy Chadwick | October 2020-Vol.6 No.10

If you are a typical gardener, then you are probably experienced with growing new plants from seed. Seeds are an easy and inexpensive way to grow lots of new plants, particularly annuals. In some cases, seeds may be the only viable way to propagate certain plant species. Unfortunately, not all plants come true from seed, particularly if the plant in question is a hybrid or cultivar. As a result, some plants grown from seed may differ from the parent plant, which can be very disappointing.

Another way to create new plants is to divide the roots of a mature plant into several separate plants. This method works well for many perennials with fibrous root systems. However, you must wait until the "parent" plant is mature enough to make root division feasible. On average that's about three to five years for the typical perennial. Also, plant species with tap roots or woody root systems, such as shrubs, trees, and some perennials, cannot be readily divided into new plants without seriously damaging the parent plant.

VEGETATIVE PROPAGATION FUNDAMENTALS

Vegetative propagation (asexual propagation) offers an alternative to creating new plants from seeds or root divisions. It involves taking a part of a plant, such as a stem or a leaf, and manipulating it so that it regenerates into a new plant. One advantage of vegetative propagation is that the new plant will be a clone of the "parent" plant and therefore identical, regardless of whether the parent is a species or cultivar. Another advantage is that the new plants will mature faster and flower sooner than plants grown from seed. A third advantage is that vegetative propagation can be done sooner than root division.

Vegetative propagation has been around for literally thousands of years. It is a cheap, easy, satisfying way to create new plants. Moreover, it may be the only viable means of retaining and perpetuating the

characteristics of some species or cultivars.

Several broad types of vegetative propagation include:

- Cuttings – severing a part of a parent plant and rooting it to create a clone of the parent.
- Layering – rooting a part of the parent plant and then severing the new plant from the parent.
- Grafting – joining two plant parts from different varieties so that they function as one plant.
- Budding – joining two plant parts from different varieties so that they function as one plant.

Because vegetative propagation is a fairly complex subject, this article is limited to a discussion of cuttings only.

FACTORS THAT IMPACT THE PROPAGATION SUCCESS RATE

If you are new to vegetative propagation and want to give it a try, there are a number of factors that can influence the success rate of your propagation efforts. Before you start a propagation project, consider the following first:

The health and overall condition of the parent plant. Choose a healthy, disease- and insect-free plant with characteristics you want to replicate. Avoid taking cuttings that are in flower or in bud. The cutting needs to put its energy into establishing a strong root system rather than supporting flowers.

The day before you plan to take cuttings, water the parent plant so that it is fully hydrated. Take cuttings of soft-stemmed (green) plants in the morning when the plant is well hydrated. This is not necessary for dormant woody cuttings.

Moisture. The soil or potting medium that you use for rooting your cuttings needs to be thoroughly moistened but not soggy. Apply water slowly so that it is uniformly distributed throughout the medium and then check it to make sure it is not dry in the middle.

Light: Diffused sunlight is generally sufficient for rooting cuttings. Low light levels cause the roots to root slowly. If the light level is too intense, it can stress the cuttings and potentially burn them or cause leaf drop.

Humidity: High humidity is needed to offset the amount of moisture lost through transpiration. Until cuttings develop roots, they are unable to take up moisture from the potting medium. Covering the pot or propagation tray with clear plastic wrap or a plastic bag causes condensation to form on the underside of the plastic and cuts down on the amount of moisture lost to the atmosphere. In conjunction with humidity, air flow around the cuttings needs to be taken into consideration. The plastic covering should be placed far enough away from the cuttings to avoid impeding air flow. An easy way to do this is to place stakes of some sort (twigs are great for this purpose) around the cutting so that the plastic rests on the tips of the stakes and not on the cuttings themselves.

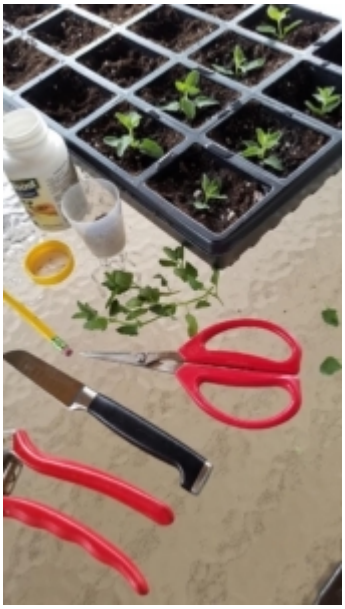
Temperature: While the ideal root zone temperature for rooting cuttings is about 70° to 75° F, it is important to avoid extremes in temperatures. Cuttings that are being rooted in the winter months can tolerate cooler temperatures but, if in doubt, provide bottom heat from a seedling heating mat.

Timing. The time of year plays an important role in the success of cuttings. For example, some plants should be propagated vegetatively only when they are actively growing in spring and summer. Other plants must be in a dormant stage. Yet other plants (mostly houseplants) may be propagated at any time of year.

PROPAGATION TOOLS AND SUPPLIES FOR ROOTING CUTTINGS

Fortunately, taking cuttings from plants does not require any special tools or techniques. However, cuttings need to be potted quickly to keep them from wilting or drying out. So plan what tools and supplies you need and have them ready in advance of taking cuttings. Here's a suggested list of items you may need:

- **Scissors, a sharp knife, or razor blades** for cutting soft stems and leaves. Sterilize tools before using them for cuttings.
- **Shears or pruners** for taking cuttings from fibrous or woody stems.
- **Pots or propagation trays** for rooting new plants. Sterilize and fill with potting soil to within about one-half inch of the top edge.
- **Trays** for holding pots. This is optional, but if you plan to fill a lot of pots with cuttings, it's easier to move pots around if they are on a tray.
- **Potting soil**. Choose a potting medium that provides optimum aeration, drainage, and moisture holding properties. Mixtures vary, but most include some combination of peat moss, perlite, vermiculite, or sand.
- **Plastic bags or plastic covers** to place over pots to create a humid environment while cuttings are developing roots.
- **Water** to moisten the propagation medium.
- **Rooting hormone**. This is not essential, but it tends to give better rooting results because it increases auxins (plant hormones located in the tip of a stem that encourage elongation), which can help the plant grow stronger roots.
- **Pencil, dowel, chop stick, or other pointed instrument** for making holes in potting soil in which to insert plant stems. The pencil (or pen) is also needed for writing on labels.
- **Labels**. These may not be needed unless you are rooting cuttings from several plant species and need to tell them apart.



Plant Propagation Tools and Supplies. Photo: Pat Chadwick

TECHNIQUES FOR TAKING CUTTINGS

Three major vegetative propagation techniques by cuttings include **stem cuttings, leaf cuttings, and root cuttings**.

STEM CUTTINGS

This is the most common propagation method for many herbaceous and woody plants. A few general rules apply to taking stem cuttings. To enhance your propagation success rate, take the cuttings:

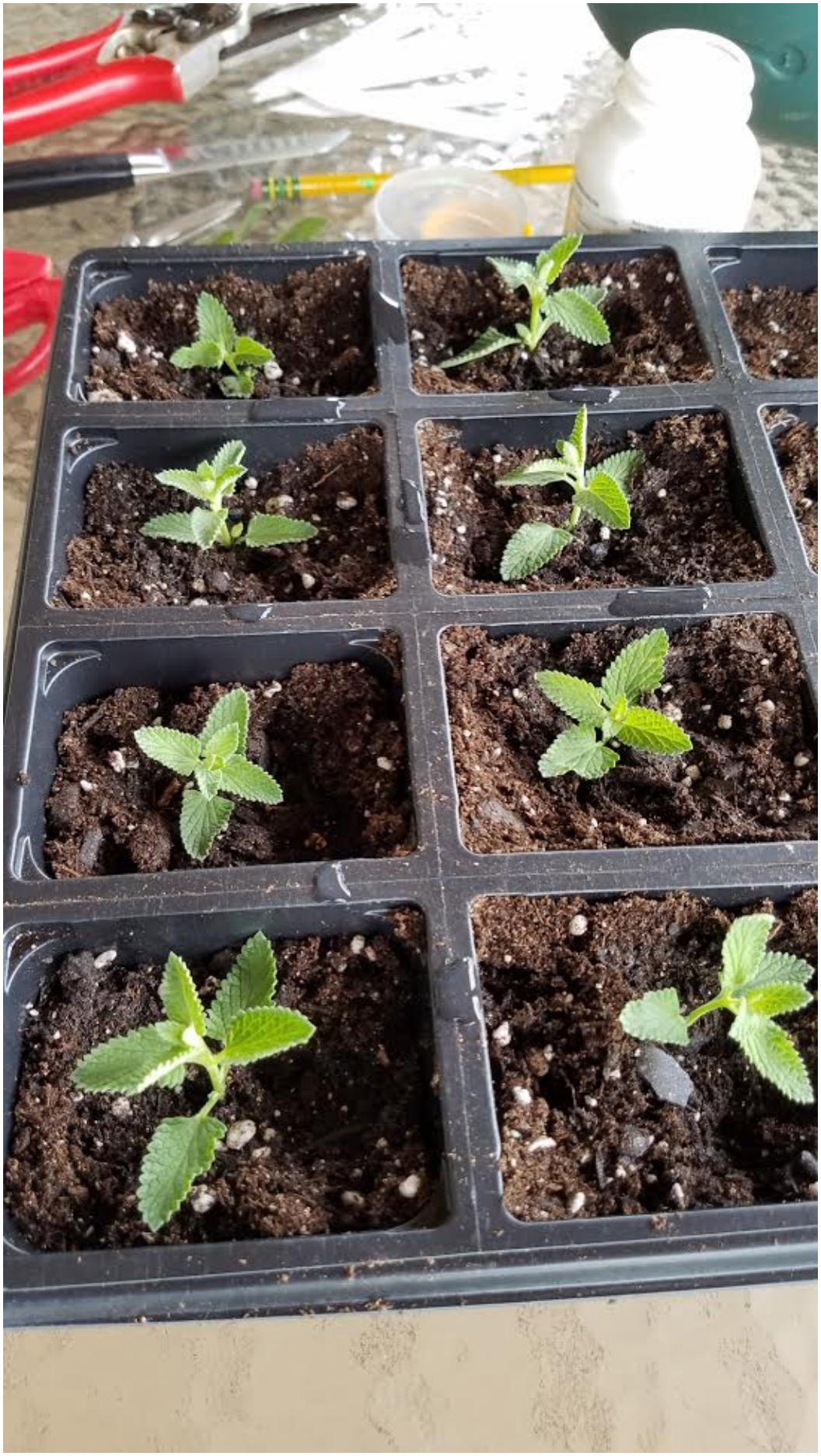
- From the correct part of the stem for the plant being propagated and for the time of year. Depending on the species, this refers to using a stem tip cutting, which is tender, versus a more mature (woodier) part of the stem.
- From younger plants rather than from older, more mature plants (if you have that option). Younger plants generally root better.
- From side (lateral) shoots, which root better, rather than cuttings from end (terminal) shoots.
- At the appropriate time of year. Some plants must be actively growing in order to respond well to cuttings, while others need to be in a dormant state.

Based on the growth stage of the parent plant, stem cuttings fall into the following broad categories: herbaceous, softwood, semi-hardwood, and hardwood.

Herbaceous cuttings. Many herbaceous (non-woody) plants such as annuals, perennials, herbs, and houseplants can be easily propagated from stem tip cuttings. One quick and easy way to propagate an herbaceous cutting is to root it in water, but that method doesn't work for all plants. A preferred method is to plant the fresh cutting in a potting soil medium.

Basil being rooted in water. Photo: Pat Chadwick

Coleus, dahlia, chrysanthemum, *Nepeta* (catmint), *Agastache* (hyssop), thyme, mint, lemon balm, sage, oregano, basil, ivy, and philodendron are just a few examples of plants that respond well to stem tip cuttings. These plants have tender, immature growth that tends to dry out quickly. Therefore, an artificially controlled environment is needed to moderate temperature and humidity long enough for the cutting to develop roots. Cuttings from these plants may be started any time of year, but spring or summer are best when the plants are actively growing.

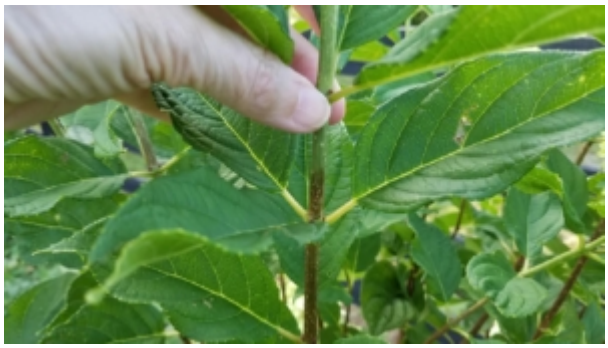


Nepeta tip cuttings being propagated.
Photo: Pat Chadwick

How to propagate a stem tip cutting:

- Cut off a 2- to 6-inch long portion of a stem that has no flowers or buds on it. If your only choice of plant material happens to be in flower, snip off all flowers and flower buds.
- Trim off any side stems and lower leaves, leaving no more than one or two sets of leaves.
- After removing the lower leaves, trim the stem to just below a leaf node. That's where the new roots and shoots will emerge from the stem.
- If using a rooting hormone, dip the end of the stem into the hormone and gently shake off any excess.
- Make a hole in the moist potting medium with a pencil or other pointed object.
- Insert the stem into the hole, making sure the stem wounds are covered by the potting medium.
- Insert the container in a tent that is loosely fashioned from a plastic bag or in a plastic container with a clear lid. If using a plastic bag, close it with a twist tie and make sure the leaves are not touching any part of the bag. If necessary, insert a couple of small stakes in the container to hold the plastic bag away from the foliage.
- Set the bag in a brightly lit area (but not in direct sun).
- Keep the potting medium moist but not soggy and open the plastic bag or enclosed container occasionally to allow some air circulation.
- Once the cutting starts to show new growth, gently tug on the stem to see if it has rooted. If it feels firmly anchored in the potting medium, gradually open the plastic bag to increase ventilation and decrease humidity. This will encourage the new growth to harden off for transplanting later.

Softwood cuttings: This is the soft, new growth that is produced at the tip of a woody stem on a shrub, vine, tree, or woody-stemmed perennial. The cuttings should be made just as the season's new growth begins to harden. This stage occurs for many woody plants in late spring through mid-summer. The stem should snap easily when bent and the leaves should be graduated in size with both larger, older leaves and smaller, newer leaves. To propagate softwood cuttings, follow the same steps as for herbaceous cuttings above.



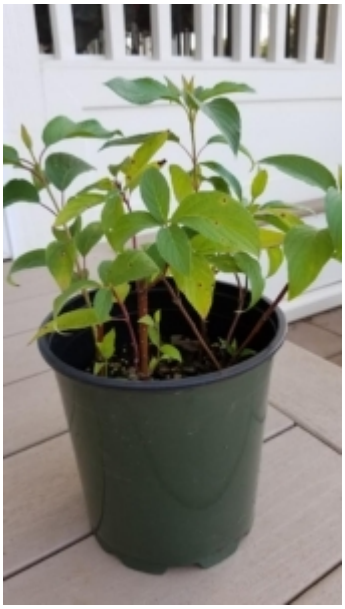
New Hydrangea growth suitable for propagation. Photo: Pat Chadwick

Semi-hardwood cuttings: Many deciduous woody shrubs, trees, or vines can be propagated from semi-hardwood cuttings in mid-summer to early fall. The cuttings should be taken from the current season's growth after it has matured. Many broadleaf evergreens, such as boxwood, holly, and Rhododendron, are examples of plants that respond well to semi-hardwood cuttings. These semi-ripe cuttings need the same temperature and humidity-controlled environment for rooting purposes as the herbaceous and softwood cuttings described above.

Hardwood cuttings: These are taken from dormant sections of mature woody shrub or tree stems in late fall, winter, or early spring from shoots that grew the previous summer. Hardwood cuttings are the easiest of the four categories to propagate. Although slower to root than other types of cuttings, they are robust and require few, if any, environmental controls to ensure their survival. The wood should be firm at this stage and not easily bent. Most deciduous shrubs and needled evergreens respond well to hardwood cuttings.

How to take a hardwood cutting:

- Cut a 4- to 8-inch long branch from a dormant woody plant using a **straight cut** at the bottom and just below a bud or pair of buds.
- Trim off any smaller branches from the cutting.
- Snip off the top of the branch using an **angled cut**. This helps water run off the cutting and helps prevent rot. It also indicates which is the top and which is the bottom end of the cutting.
- If using rooting hormone, dip the bottom including the bud or buds into the hormone compound.
- Make a hole (or holes if you are rooting multiple cuttings in the container) in moist potting medium with a pencil or other pointed object just slightly larger than the branch cutting. This prevents rooting hormone from rubbing off the cutting.
- Insert the cutting 2- to 4-inches deep into the holes. Ideally, just the top bud or buds should be exposed.
- Place the potted cuttings in a protected area outdoors. Water the dormant cuttings only as needed to keep the soil just barely moist.
- As weather warms up in early spring, start watering the cuttings.
- Move the pot into sunlight and keep the cuttings watered.
- Don't plant the rooted cuttings until fall to allow time for plenty of roots to develop over the summer.



Red Twig Dogwood propagated from dormant stem cuttings. Photo: Pat Chadwick

LEAF CUTTINGS

Leaf cuttings are often used to propagate house plants. While the cuttings can be taken any time of the year, spring to early summer is generally best when the plant is actively growing. With leaf cuttings, adventitious buds, shoots, and roots form at the base of the leaf and develop into new plants. The parent leaf typically disintegrates after the new plant is formed.

Depending on the species and leaf structure, plants may be propagated from leaves using several methods, including whole leaves with petiole, whole leaves without petiole, split vein cuttings, and leaf sections. As with herbaceous stem cuttings, leaf cuttings resulting from these methods need to be placed in a temperature and humidity-controlled environment while shoots and roots are forming.

- **Whole Leaf with Petiole.** A petiole is the slender stalk that attaches a leaf to a stem. Not all

leaves have petioles, but for those that do, the trick to rooting the leaves is to make sure some petiole tissue is attached. Otherwise, the leaf will not root. When rooting a leaf with a petiole, sever the leaf and as much as an inch of the petiole. Insert the cut end of the petiole into the potting medium. This type of propagation will result in one or more new plants that form at the base of the petiole. African Violets and Gloxinias are examples of plants rooted this way.

African violet leaf with petiole, ready for rooting. Photo: Nancy Bishop

Whole Leaf without Petiole. Some plants have leaves that lack a petiole and are attached directly to the plant stem. These plants are capable of forming new roots and buds directly from the leaf. Jade plant (*Crassula*), *Kalanchoe*, *Sanseveria*s, *Echeveria*, and *Sedum* are examples of such plants. Simply cut or snap off a leaf right at the base where it is attached to the stem. Place the leaf on a tray or other flat, dry surface to allow the cut to dry and callus over. This can take a few hours to several weeks, depending on the species and the thickness of the leaf. Once the callus is formed, place the leaf on top of a loose, well-draining potting medium and angle the leaf so that the cut end is just barely covered with soil. Roots usually begin to form within about 3 weeks.

Newly-propagated jade plants from leaf cuttings. Photo: Pat Chadwick

- **Split vein cuttings.** This method is often used to propagate begonias. Remove a leaf from the plant and cut off the petiole as close to the leaf as possible. Turn the leaf over and use a very sharp, sterile knife to slit the veins in several places. Try not to damage the adjacent leaf cells. The less damage you do, the greater your chances of successfully growing new plants. Place the bottom side of the leaf directly against moist potting medium. If the leaf wants to curl or lift up, place several pebbles or other small weights on the edges of the leaf to stabilize it and hold it in contact with the potting medium.

- **Leaf Sectioning**. This fourth method for propagating from leaves sounds a bit drastic because it requires you to mutilate the leaf. This is an easy way to get multiple copies of a plant from a single leaf. As described above, the objective of the split vein cutting method is to sever the veins of the begonia leaf while doing as little damage as possible to the surrounding leaf tissues. With leaf sectioning, the objective is to do the opposite. Instead of severing the begonia leaf veins, use scissors to cut the leaf into wedges. Each wedge should contain at least one vein. Position the wedge vertically so that the center point is in contact with potting soil. You may need to prop up the leaf against the side of the pot to help keep the severed edge in contact with the potting medium.

Leaf sectioning also works with more fibrous leaves such as those found on *Sansevieria* (snake plant) or *Eucomis* (pineapple lily). For these plants, use a sharp pair of scissors or a knife to cut off an entire leaf at the base. Cut the severed leaf horizontally into 2-inch pieces. Make sure you keep track of which is the top edge and the bottom edge of each cutting. Dip the lower edge in rooting hormone (optional) before inserting it about 3/4-inch into the potting medium. If you plant it upside down, it won't sprout.

ROOT CUTTINGS

While stem and leaf cuttings encourage the plant to develop new root systems, root cuttings may respond differently. For most plants, root cuttings encourage the development of 2 or 3 new stems first, after which the stems develop new root systems. The original root cutting eventually disintegrates. This method is an excellent way to produce a lot of new plants quickly and with very little effort.

For best results, **root cuttings should be taken in late fall, winter, or very early spring** from 2- to 3-year old plants when they are dormant. This minimizes stress on the parent plant. That's also when the roots have plenty of stored nutrients, but new growth hasn't begun yet. Oriental poppies (*Papaver orientale*) and bleeding hearts (*Dicentra* species) are two exceptions that may be propagated by root cuttings in midsummer, several weeks after flowering has finished, as opposed to winter.

Phlox paniculata root cuttings. Photo: Pat Chadwick

The technique for rooting a thin-rooted plant such as garden phlox differs from the technique used to root plants with thicker roots. To take a root cutting from a thin-rooted plant:

- Dig up the entire plant and rinse off the roots so that you can easily see the plant crown and root structures.
- Snip off a root (or roots) as close to where it joins the crown as possible.
- Snip the root into 1- to 2-inch long sections.
- Position the snipped sections horizontally about 1 inch apart on top of moist potting medium.
- Cover the roots with 1/2 inch of potting medium and moisten.
- Place the container with the cuttings in a plastic bag or under a humidity dome or under a pane of glass and place under grow lights.
- Keep the soil evenly moist but not soggy.
- Replant the original plant.
- After new growth is visible from the cuttings,

remove the covers. Give them sufficient light for their growing needs and keep soil moist but not soggy.
- The plant will be ready to transplant into the garden once several sets of leaves have developed.

To propagate thicker roots from a shrub, tree, or vine:

- Dig carefully around the base of the parent plant to expose some of the roots.
- Select roots that are about **the thickness of a pencil** and cut with pruning shears or a sharp knife. Make the cut as close as possible to where the root emerges from the crown of the plant. Take only a few roots from the parent plant. Otherwise, it may not recover from the loss of so many roots.
- After you take your cuttings, replace the soil over the root ball.
- Cut the harvested roots into 2- to 6-inch long sections. As you cut, make a straight cut on the end that was closest to the center of the plant. Make a slanting cut at the other end.
- Insert the entire cutting vertically in moist potting soil with the slanted end down and the straight end just below the surface of the soil.
- Keep the soil moist but not wet while the cutting is rooting.
- Once you see the roots emerging through the pot's drainage holes, you will know that it is ready for transplanting into the garden.

Examples of plants that respond well to root cuttings include: Barrenwort (*Epimedium*), bleeding heart (*Dicentra spectabilis*), Blue Star (*Amsonia*), Joe Pye weed (*Eupatorium fistulosum*), oriental poppy (*Papaver orientale*), raspberry (*Rubus biflorus*), and red twig and yellow twig dogwood (*Cornus stolonifera*).

AFTER CARE OF ROOTED CUTTINGS

The rooting time for cuttings varies greatly depending on the species, the time of year, and the growing conditions. Leaf cuttings may root in about 3 weeks, whereas woody cuttings may take up to 5 months to root. To test for roots, wait until you see new growth on the cutting. Give the cutting a gentle tug. If it doesn't give, then you know it has developed roots, but don't be in a rush to transplant. Give the cutting a chance to develop a more robust root system first. Before transplanting, make sure the plant has had a chance to harden off or acclimate to the growing conditions in the garden. Transplant when you see roots starting to grow from the drain holes of the container. A week or so later, start fertilizing with a liquid fertilizer. Because plants propagated from hardwood cuttings may be slow to develop roots, they may benefit from being left in the pot for a season or two before being transplanted to their permanent sites.

ONE LAST THING TO THINK ABOUT: TRADEMARK VIOLATIONS

As you contemplate propagating some of your plants, keep in mind that many commercially sold plants are patented. Depending on the plant, this means taking cuttings for propagation purposes may be a patent violation. When you purchase a plant, always check the label for patent information. A plant protected by a patent will bear a trademark (™) or patent number. Often you will see a label that reads PPAF (Plant Patent Applied For). Also, look for warnings, such as "propagation strictly prohibited" or "asexual propagation prohibited."

SUMMARY

Vegetative propagation methods have been practiced for thousands of years among many cultures

worldwide. The techniques are fairly simple and can be easily mastered with a little practice and experimentation. Once you see how easy it is to propagate plants vegetatively, you'll wonder why you haven't tried this sooner. Don't worry if some of your efforts fail. Successful propagation depends on a lot of variables. Even the experts don't always have a 100% success rate. Just root more cuttings than you need, and if you have a high success rate, share some of the surplus with friends. They'll be delighted to receive free plants from you.

RESOURCES

Encyclopedia of Gardening Techniques, The American Horticultural Society (Beazley, Mitchell, 2013)

Plant Parenting (Halleck, Leslie F., 2019)

Plant Propagation, The American Horticultural Society (Editor-in-chief Alan Toogood, 1999)

"Propagating Plants by Cuttings," Missouri Botanical Garden Visual-guides/propagating-plants-by-cuttings

"Propagation by Cuttings, Layering, and Division, VCE Publication 426-002

"New Plants from Cuttings," Purdue University Cooperative Extension Service, Publication HO-37-W.

North Carolina Extension Gardener Handbook (ncsu.edu/extension-gardener-handbook/13-propagation)