September 2023-Vol.9,No.9

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Seed Stratification: Why Does Temperature Make A Difference?

By Patsy Chadwick | September 2023-Vol.9,No.9

Earlier this summer, a generous neighbor gave me some columbine (*Aquilegia*) seeds from her beautiful garden. Naturally, I was thrilled to receive the seeds but wasn't sure when to plant them. Some gardening sources advised planting them in early spring. Other sources recommended planting them in fall. So, which was correct – spring or fall? While the sources differed on when to plant the seeds, they were consistent on one point: Columbine seeds need to be exposed to a period of cold temperatures before they can **break dormancy**. But why?

First — What does it mean to break dormancy?

Seeds may appear lifeless, but that is not the case at all. Fundamentally, a seed is a plant in embryonic form enclosed in a protective covering (**seed coat**). The thickness and hardness of the seed coat combined with chemical germination inhibitors (hormones) within the seed coat protect the embryonic plant until conditions are optimal for germination. To **break dormancy** simply means that the embryonic plant must literally break through or escape the seed coat so that germination can take place. For that to happen with some plant species, the seed coat needs to be softened or weakened through a process called **stratification**.

Stratification

Stratification uses temperature to break dormancy. It occurs when dormant seeds are exposed to a period of cold temperatures followed by warm temperatures and moisture. This combination of alternating temperatures softens or weakens the seed coat allowing the seeds to germinate **once growing conditions**

are suitable in spring. Think of stratification as a survival mechanism that prevents seeds from germinating either too early in spring, when the tender seedlings might perish during a late cold snap, or too late in summer when they won't live long enough to produce new seeds. This mechanism applies to plants that evolved in temperate climates such as those found in North America. Plants species that evolved in hot climates, such as the tropics, don't experience cold temperatures. Therefore, the seeds of those species don't need to be stratified.

For seeds that fall to the ground from plants or are sown in late summer or fall, stratification occurs naturally during winter's freeze/thaw cycles. This method has worked for Mother Nature for hundreds of thousands of years. But seeds may also be stratified indoors for planting outdoors later. The key to achieving successful stratification indoors is to simulate the conditions seeds experience when breaking dormancy in nature. In other words, the goal is to trick seeds into thinking they have experienced winter.

Methods for Stratifying Seeds

Before stratifying seeds, research the amount of chill time they need to break dormancy. It can range from just a couple of weeks to many months, depending on the plant species. Then, decide which stratification method will work best. While there are many methods, a few of the easier ones are described below. In addition, check out some of the commercial nursery websites for step-by-step stratification instructions and chill times.

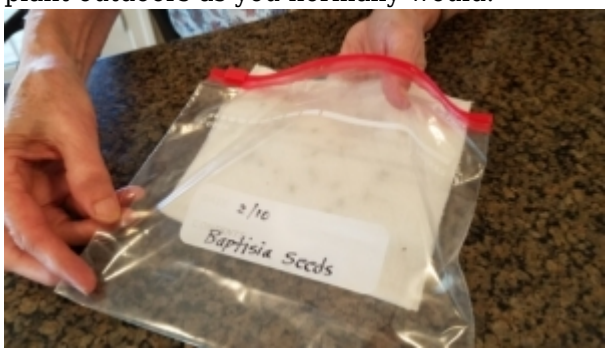
Dry Stratification– This is a pre-treatment that subjects seeds to a period of cold temperatures without any moisture. It works well for plants such as cleome, foxglove, some poppy species, and hardy perennial grasses that thrive in dry soils or dry winters. Simply seal dry seeds in a plastic baggie or glass jar, label and date the contents, and store the container in the refrigerator for one to four months depending on the plant species. After the chilling period, remove the seeds and plant in spring as you normally would once the danger of frost is past.

Moist Stratification– This method requires seeds to be in contact with a moisture-retaining medium during the chilling process. It works well for plants, such as wildflower species, that evolved under moist, cold winter conditions. Those conditions can be mimicked using any of the moist stratification methods below:

1. **Scatter seeds on raked soil in the fall** after the soil has cooled. Leave the seeds uncovered or very lightly cover them with soil to prevent birds and animals from consuming them. The normal freezing/thawing cycles plus moisture from rain and snow over the winter months will break down the seed coats. The benefit of this method is that it requires very little effort. The downside is that winter weather can be variable with some warm days interspersed with cold ones. As a result, natural moist stratification may take longer than refrigeration, which is controlled and consistent.
2. **Scatter seeds on soil in late winter or very early spring** before the soil starts to warm up. This is a good solution if you didn't remember to plant the seeds in fall. Keep in mind the number of weeks or months the seeds need to be exposed to cold temperatures so that you scatter them in plenty of time before warm weather arrives.
3. **Chill seeds in the refrigerator using a moist paper towel**. This method works well with small seeds. Place seeds on a dampened (but not soggy) paper towel or coffee filter. Make sure the seeds have good contact with the moist paper. Fold the paper over the seeds to form a packet. Place the packet in a plastic baggie or other sealable container and refrigerate for about one to three months depending on the plant species. Monitor the seeds periodically to make sure the paper towel is still damp but not too wet. Otherwise, the seeds may become moldy. At the end of the chilling period, remove the seeds and either sow them indoors under grow lights or sow them outside on raked soil after the last frost date (typically April 15 – 25 in

USDA Zone 7).

4. **Chill seeds in the refrigerator mixed in with a moist medium** such as sand, vermiculite, or soil-less seed starting mix. This method works well with larger seeds, such as beans. Mix the seeds into the moist (but not soggy) medium, making sure they have good contact with the medium. Place the mixture in a plastic baggie or other sealable container, label and date the contents, and refrigerate. During the chilling period, check periodically to make sure no mold has formed. Once the chilling period is complete, remove the seeds from the moist medium and plant outdoors as you normally would.



Baptisia seeds prepared for cold, moist stratification.
Photo: Pat Chadwick

5. **Chill seeds outdoors in pots or planting trays**. Make sure the containers have holes for good drainage. Fill with sterile soil or a soil-less seed starting mix. Sow the seeds and **lightly cover** with grit, vermiculite, or coarse sand to limit the amount of light and to prevent birds from eating the seeds. Store the containers outdoors over the winter months in a protected area away from the wind where they will receive precipitation, light, and cold conditions over the winter months. If squirrels or birds are a problem, lay a flat piece of chicken wire or other similar barrier over the pots and weigh it down to discourage digging. Monitor periodically to keep the soil moist and mold free until the seeds germinate in spring. Transplant into the garden once growing conditions are favorable and the seedlings have developed at least two or three sets of leaves.

Examples of seeds that benefit from stratification

Seeds of most tree and shrub species that evolved in the mid-Atlantic area of the U.S. benefit from stratification. The amount of chilling time needed depends on the species. Iowa State University Extension's publication on Germination of Tree Seed provides advice on when and how to collect tree seeds for germination of a variety of species including redbuds, maples, oaks, hickories and fruit trees.

The seeds of most ornamental annual species don't require stratification. However, a few that do require stratification include larkspur (*Consolida*), love-in-a-mist (*Nigella*), annual poppies (*Papaver* spp.), annual pincushion flower (*Scabiosa atropurpurea*), and bells of Ireland (*Moluccella laevis*).

A few examples of perennial species that benefit from stratification include:

Black-eyed Susan (*Rudbeckia* species)

Columbine (*Aquilegia*)

False Aster (*Boltonia*)

False Indigo (*Baptisia*)

False Sunflower (*Heliopsis*)

Ironweed (*Vernonia*)

Joe Pye Weed (*Eupatorium maculatum*)

Lavender (*Lavendula*)

Milkweed (*Asclepias syriaca*)

New England Aster (*Symphyotrichum novae-angliae*)

Perennial Sunflower (*Helianthus* species)

Rattlesnake Master (*Eryngium yuccifolium*)

Turtlehead (*Chelonia*)

In particular, wildflower species that produce their seeds in fall benefit from stratification. For more information on those species, check out the Missouri Botanical Garden's guidance on Native Seed Propagation Methods listed under Sources at the end of this article.

Scarification

Some seeds may not sprout if moisture cannot penetrate their hard, impermeable seed coats. Those seeds should be scarified before they are stratified. **Scarification** is the process of breaking, scratching, or softening the seed coat so that moisture can penetrate and start the germination process. While this process often can be accomplished through natural means, it can also be accomplished by mechanical, chemical, or thermal intervention such as:

- **Thinning** – Lightly rub seed coats with fine grit sandpaper or file them with a metal file to thin and weaken them.
- **Breaking** – Gently crack seed coats slightly with a hammer or nick seed coats with a knife or nail clippers. For large seeds such as beans (legumes), avoid cracking or nicking the seed at the small scar (called a hilum) where the seed was previously attached to the mother plant.
- **Acid bath** – Soak seeds in bleach or vinegar for 10 minutes to several hours to weaken seed coats.
- **Decay** – Place seeds in a nonsterile, warm, damp container for several months where microbes can cause the seed coats to decay and break down.
- **Breakdown by digestive tract** – As seeds that are swallowed by birds or other animals pass through their digestive tracts, acids weaken the seed coats.
- **Heat** – Some plant species require heat rather than cold to jump start the germination process. Pour warm water over the seeds and soak them for 12 to 24 hours. In nature, **smoke and fire** are two additional heat-related methods for weakening the seed coats of certain species.

The seeds of many tree species benefit from a combination of scarification and stratification because of their particularly thick, hard seed coats. Virginia Cooperative Extension's Publication 426-001 outlines basic seed stratification procedures for trees and shrubs.

In conclusion

Seeds of many plant species that evolved in temperate climates require a period of freeze/thaw temperatures

to break dormancy and germinate. By understanding how seeds work in terms of stratification and scarification, it's possible to improve their germination rates.

As for the columbine seeds mentioned at the beginning of this article, sources varied on the amount of time they should be stratified with the average time being 3 to 4 weeks. This means they may be planted outdoors either in early spring before the soil warms up or in fall so that they are exposed to the winter cold. As long as the seeds receive sufficient chill time, either approach will work.

FEATURE PHOTO: Examples of seeds that benefit from stratification. Starting at top of photo and moving clockwise: Baptisia, milkweed, coneflower, blanket flower, coreopsis, and columbine. Photo: Pat Chadwick

SOURCES:

Plant Propagation, The American Horticultural Society (Toogood, Alan, 1999)

Botany for Gardeners, Third Edition (Capon, Brian, 2010)

The Ever Curious Gardener – Using a Little Natural Science for a Much Better Garden (Reich, Lee, 2018)

Germination of Tree Seed, Iowa State University Extension

How to Prepare Seeds for Sowing, Lady Bird Johnson Wildflower Center

Native Plant Seed Propagation, Rutgers Cooperative Extension Fact Sheet FS1329

Native Seed Propagation Methods, Missouri Botanical Gardens

Plant Propagation From Seed, Virginia Cooperative Extension publication 426-001

Seed Stratification: What Seeds Require Cold Treatment?, University of Illinois Urbana-Champaign Extension

Upcoming Events

By Cathy Caldwell | September 2023-Vol.9,No.9

September 16 @ 2:00 pm – 4:00 pm

Garden Basics: Fall Lawn Care and Great Lawn Alternatives

Trinity Episcopal Church 1118 Preston Avenue, Charlottesville
FREE

Lawns can help prevent wind and water erosion, control flooding, break down organic chemicals, cool the air, reduce noise, and sequester carbon. But they can also increase water consumption and pollute our air and waterways. Learn a sustainable approach to lawn management that includes —
• Using environmentally friendly practices
• Managing weeds and pests while doing no harm to pollinators, birds, and other wildlife
• Reducing your lawn with groundcovers and low-maintenance native plant beds.

Garden Basics is a partnership with the Bread and Roses ministry at Trinity Episcopal Church.

RSVP HERE

Coming up in October . . .

October 21 @ 2:00 pm – 4:00 pm

Garden Basics: Native Plant Propagation—Seed Saving and Winter Sowing

Trinity Episcopal Church 1118 Preston Avenue, Charlottesville
FREE

Growing native plants is vital to sustaining pollinators, birds, and small mammals. Seed saving and winter sowing can extend your budget and widen the selections available. Participants will learn about —

• seed collection and resources for buying native seed,

• various techniques for preparing native seeds for sowing, and

• propagation techniques for winter and spring and for outside and inside.

The class will feature a hands-on winter-sowing activity.

Garden Basics is a partnership with the Bread and Roses ministry at Trinity Episcopal Church.

RSVP HERE

Tree Identification by Season – Fall

Tuesday, October 17 @ 7:00 pm – 8:30 pm on Zoom

Charlottesville Area Tree Stewards

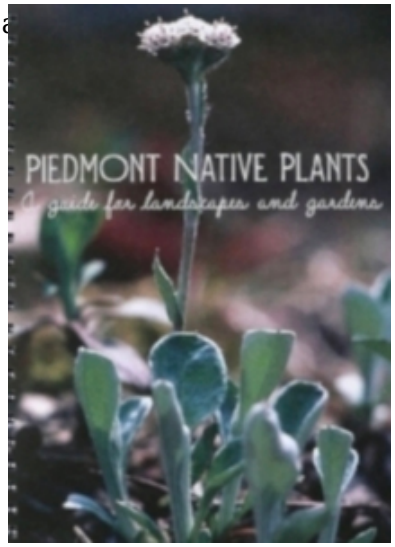
“Keystone” Native Plants 101

By Meg Norling | September 2023-Vol.9,No.9

One of the simplest things a home gardener can do to support a healthy, diverse ecosystem is to plant native plants. Adding any native plant to your garden is good; adding keystone native plants is even better! The goal of this article is to provide a brief “primer” about the importance of native plants — especially the keystones — and to share some of the excellent resources available on this topic.

What is a native plant and why is it important? Native plants are the species that are natural to a local area and ecosystem. Native plants are best suited to local soil, water, and climate conditions. They have co-evolved with other elements of the local ecosystem, and provide essential food and

shelter for a diversity of wildlife— including the bees, butterflies, and birds we a



- A good overview of native plant information and resources can be found on the Native Plants page of the Piedmont Master Gardeners (PMG) website. PMG also provides an excellent list of Native Plants and Habitat resources.
- Piedmont Native Plants- A Guide for Landscapes and Gardens is an excellent guide to selecting native plants for our Piedmont VA area. You can download a free PDF or find purchase information at the link provided.
- The National Wildlife Federation's Native Plant Finder uses your zip code to find plants native to

  your area.
- Detailed native plant fact sheets can be found at Tried and True Native Plant Selections for the Mid-Atlantic on the Master Gardeners of Northern Virginia website.
- The National Audubon Society's Native Plants Database provides plant and bird information based on your zip code.

Why do we need to *plant* natives? In many areas, native plant populations have been dramatically reduced by many factors, including human development and the spread of non-native invasive species. Gardeners are encouraged to plant natives to help repopulate these essential and beautiful plants. And, because native plants have evolved in local conditions, they generally require less water, fertilizer, or pesticides— another ecosystem benefit!

- Homegrown National Park, a cooperative conservation initiative, provides resources to encourage all of us to plant natives and remove invasive plants.

Gardeners who plant natives are invited to “get on the map” by recording their contribution on a national map. (Virginia is ranked #3!)

What is a keystone native plant? The term “keystone” plant, popularized by noted entomologist **Douglas W. Tallamy**, refers to the critical piece of a stone arch that holds it together. Without it, the arch collapses. In a similar way, our food web, without its foundational elements (many of which are insects), will be in danger of collapsing.

The keystone plants are native plant superstars. They provide the highest level of resources for the species that support the food web. Of special importance are caterpillars and specialist bees.

- Keystone Plants is a short 3 minute introduction to keystones, hosted by Dr. Tallamy, one of the leading researchers in the field.
- An excellent, more detailed video introduction to this topic is the National Wildlife Federation’s **Native Keystone Plants for Wildlife**. In it, Dr. Tallamy provides clear and compelling information about the food web, species loss, and why we should plant natives— especially keystones.

Which keystone plants are best for where I live? Keystone plants provide the greatest ecosystem benefit when planted in their native ranges. For lists of keystone plants suited to our region, these are excellent resources:

- **Every Garden Needs Keystone Plants**, published by PMG, is a concise one-page summary which lists some of the best keystone plants for our Piedmont, VA area.
- For more information about keystone plants specific to each North American ecoregion, the National Wildlife Federation’s **Keystone Plants by Ecoregion** is a comprehensive guide. Their recommendations for our Virginia Piedmont area can be found on the list for the **Eastern Temperate Forest Zone**.

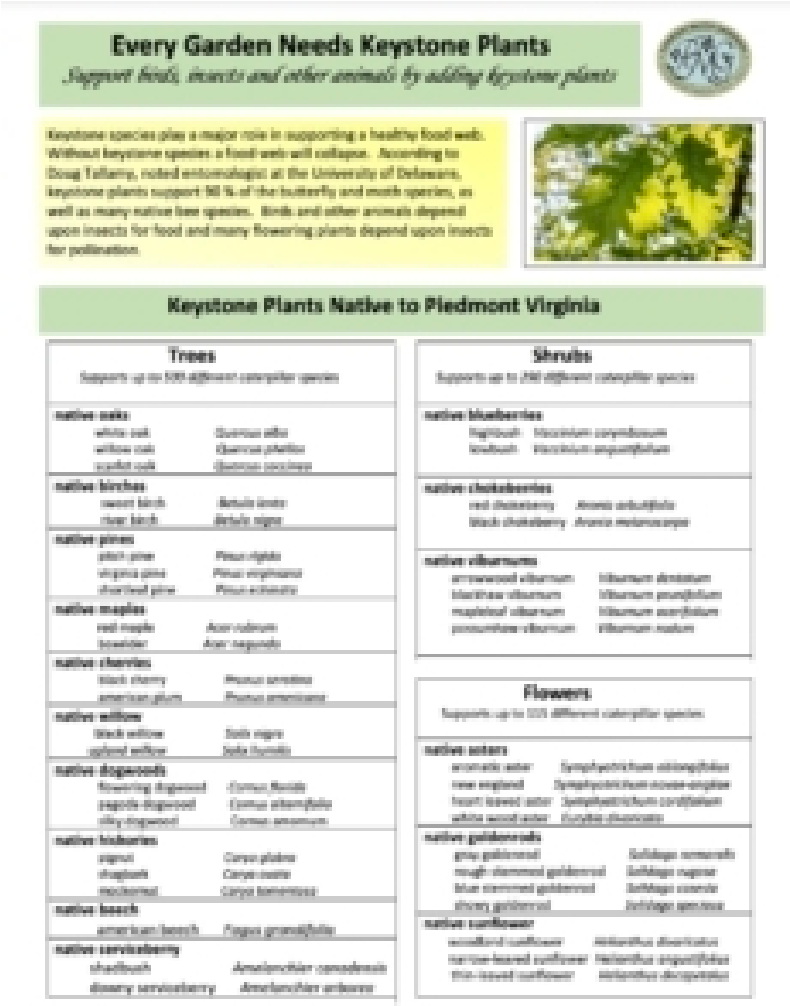
Which native or keystone plants should I put in my garden? In landscaping, a well-known motto is “right plant in the right place.” In general, it is recommended that you choose plants that bloom at different times, to provide shelter and food– nectar, pollen, berries or seeds– for as much of the year as possible. When planting, try to use groups of three or more of the same species. Grouping plants this way makes them more attractive and useful to the insects and other pollinators, who will have an easier time

spotting their favorite plants. Assess the conditions of your site; the resources below will help you pick and place plants correctly.

- In **Making Wise Plant Choices, Part 2: Keystone Plants**, the Master Gardeners of Northern Virginia (MGNV) provide a good summary of native keystone plants for the mid-Atlantic.
- The Ladybird Johnson Wildflower Center offers a **Native Plant Database** where gardeners can do a custom search selecting for plant characteristics (such as type, size, color and bloom time) as well as site conditions (such as sun and moisture).
- MGNV's **Best Bets: Plants for Particular Uses** provides recommendations for plants that help solve some common site-specific challenges (including erosion control, deer-resistance, shade).
- The Virginia Native Plant Society has posted an excellent overview of places to find **Native Plant Search Tools**.

Is there a simple list that summarizes keystone plant information? As noted above, there are two excellent lists for our Piedmont VA area.

- PMG's 1-page Every Garden Needs Keystone Plants lists keystones trees, shrubs and flowers that support the food web –especially the essential caterpillars.
- The National Wildlife Federation's 2-page list for our Eastern Temperate Forests also lists the trees, shrubs and flowers that benefit the food web, and also provides information about the plants that support the specialist bees.



Every Garden Needs Keystone Plants

Support birds, insects and other animals by adding keystone plants!

Keystone species play a major role in supporting a healthy food web. Without keystone species a food web will collapse. According to Doug Tallamy, noted entomologist at the University of Delaware, keystone plants support 90 % of the butterfly and moth species, as well as many native bee species. Birds and other animals depend upon insects for food and many flowering plants depend upon insects for pollination.

Keystone Plants Native to Piedmont Virginia

Trees

Supports up to 500 different caterpillar species

native oaks:
white oak — Quercus alba
willow oak — Quercus phellos
scarlet oak — Quercus coccinea

native birches:
sweet birch — Betula lenta
river birch — Betula nigra

native pines:
pitch pine — Pinus rigida
virginia pine — Pinus virginiana
shortleaf pine — Pinus echinata

native maples:
red maple — Acer rubrum
boxelder — Acer negundo

native cherries:
black cherry — Prunus serotina
american plum — Prunus americana

native willow:
black willow — Salix nigra
upland willow — Salix humilis

native dogwoods:
flowering dogwood — Cornus florida
pagoda dogwood — Cornus alternifolia
silky dogwood — Cornus amomum

native hickories:
pignut — Carya glabra
shagbark — Carya ovata
mockernut — Carya tomentosa

native beech:
american beech — Fagus grandifolia

native serviceberry:
shadbush — Amelanchier canadensis
downy serviceberry — Amelanchier arborea

Shrubs

Supports up to 200 different caterpillar species

native blueberries:
highbush — Vaccinium corymbosum
lowbush — Vaccinium angustifolium

native chokeberries:
red chokeberry — Aronia arbutifolia
black chokeberry — Aronia melanocarpa

native viburnums:
arrowwood viburnum — Viburnum dentatum
blackhaw viburnum — Viburnum prunifolium
maplelaf viburnum — Viburnum acerifolium
possumhaw viburnum — Viburnum nudum

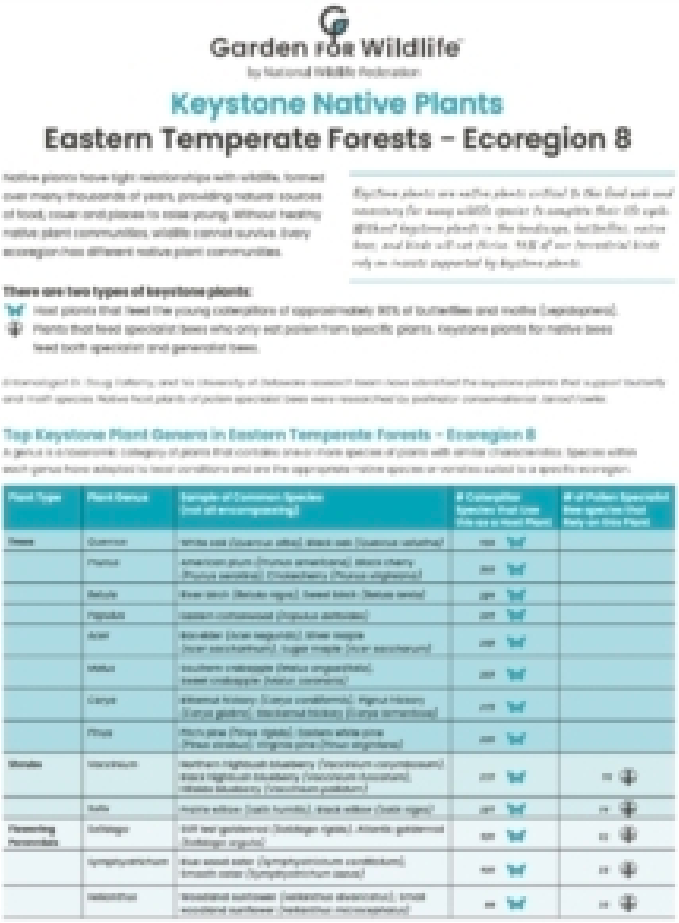
Flowers

Supports up to 115 different caterpillar species

native asters:
aromatic aster — Symphyotrichum oblongifolium
new england — Symphyotrichum novae-angliae
heart leaved aster — Symphyotrichum cordifolium
white wood aster — Eurybia divaricata

native goldenrods:
gray goldenrod — Solidago nemoralis
rough stemmed goldenrod — Solidago rugosa
blue stemmed goldenrod — Solidago caesia
showy goldenrod — Solidago speciosa

native sunflower:
woodland sunflower — Helianthus divaricatus
narrow leaved sunflower — Helianthus angustifolius
thin leaved sunflower — Helianthus decapetalus



Garden for Wildlife
by National Wildlife Federation

Keystone Native Plants

Eastern Temperate Forests – Ecoregion 8

Native plants have tight relationships with wildlife, formed over many thousands of years, providing nature's sources of food, cover and places to raise young. Without healthy native plant communities, wildlife cannot survive. Every ecoregion has different native plant communities.

Keystone plants are native plants critical to the food web and necessary for many wildlife species to complete their life cycle. Without keystone plants in the landscape, butterflies, native bees, and birds will not thrive. Will all our terrestrial birds rely on insects supported by keystone plants.

There are two types of keystone plants:

- Host plants that feed the young caterpillars of approximately 90% of butterflies and moths (Lepidoptera).
- Plants that feed specialist bees who only eat pollen from specific plants. Keystone plants for native bees feed both specialist and generalist bees.

Entomologist Dr. Doug Tallamy, and his University of Delaware research team, have identified the keystone plants that support the highest and most species Native host plants of pollen specialist bees were researched for pollinator conservation (since) (web).

Top Keystone Plant Genera in Eastern Temperate Forests – Ecoregion 8

A genus is a taxonomic category of plants that contains one or more species of plants with similar characteristics. Species within each genus have adapted to local conditions and are the appropriate native species or varieties suited to a specific ecoregion.

Plant Type	Plant Genus	Example of Common Species (not all encompassing)	# Caterpillar Species that Use this as a Host Plant	# of Pollen Specialist Bee species that Rely on this Plant
Trees	Quercus	white oak (Quercus alba), black oak (Quercus velutina)	534	
	Prunus	American plum (Prunus americana), black cherry (Prunus serotina), Chickasaw plum (Prunus angustifolia)	456	
	Betula	River birch (Betula nigra), sweet birch (Betula lenta)	289	
	Populus	eastern cottonwood (Populus deltoides)	285	
	Acer	Box elder (Acer negundo), silver maple (Acer saccharinum), sugar maple (Acer saccharum)	285	
	Salix	southern coastal plain willow (Salix caroliniana), sweet coastal plain willow (Salix caroliniana)	456	
	Carya	shagbark hickory (Carya ovata), pignut hickory (Carya glabra), black hickory (Carya texana)	456	
	Pinus	Pitch pine (Pinus rigida), eastern white pine (Pinus strobus), Virginia pine (Pinus virginiana)	456	
Shrubs	Vaccinium	northern highbush blueberry (Vaccinium corymbosum), black highbush blueberry (Vaccinium fuscatum), mohlon blueberry (Vaccinium pallidum)	456	10
	Salix	Prairie willow (Salix humilis), black willow (Salix nigra)	285	10
Flowering Perennials	Solidago	Gray rod goldenrod (Solidago nigra), Atlantic goldenrod (Solidago uliginosa)	456	10
	Symphyotrichum	blue wood aster (Symphyotrichum cordifolium), smooth aster (Symphyotrichum laeve)	456	10
	Helianthus	Woodland sunflower (Helianthus divaricatus), small woodland sunflower (Helianthus microcephalus)	456	10

Featured Photo: Keystone plant aromatic aster (*Symphyotrichum oblongifolius*). Photo: Fern Campbell.

Additional Resources:

Books by Dr. Douglas Tallamy:

Bringing Nature Home: How Native Plants Sustain Wildlife in Our Gardens (2009)

Nature's Best Hope: A New Approach to Conservation That Starts in Your Yard (2020)

The Nature of Oaks: The Rich Ecology of Our Most Essential Native Trees (2021)

The Living Landscape: Designing for Beauty and Biodiversity in the Home Garden (Rick Darke & Doug Tallamy, 2014)

Nature's Best Hope (Young Readers' Edition): *How You Can Save the World in Your Own Yard* (Douglas W. Tallamy & Sarah L. Thomson, 2023)

Plants and People on the Move: Reflections on Change

By Charles D'Aniello | September 2023-Vol.9,No.9

Plants surround us; but do you know where they originally came from? What follows is only a quick "sampling" of some memorable edible plant immigration to the Western Hemisphere, comment on invasive plants, and discussion of the involvement of immigrants with gardening. People move around and so do plants; often they travel together — both can be immigrants.

Thomas Jefferson: "The Greatest service . . . "

Gardens at Monticello (2011). Photo: Billy Hathorn, Wikimedia Commons, CC BY-SA 3.0

With time, barriers to plant dispersion become more permeable. Although oceans, deserts, and expansive landscapes have been barriers — even in ancient times people and plants traveled together. People disperse plants, sometimes coincidentally, other times purposefully. Plants such as chili peppers, potatoes and tomatoes came to Virginia only through European settlement. About his Monticello vegetable garden Thomas Jefferson wrote in his *Notes on the State of Virginia*: "The gardens yield musk melons, water melons, tomatoes, okra, pomegranates, figs, and the esculent [edible] plants of Europe." None are plants native to Virginia. In 1800 Jefferson wrote, "[T]he greatest service which can be rendered any country is to add an useful plant to its culture; especially a bread grain, next in value to bread is oil."

Early Encounters and Established Staples

Today the natural landscape – as well as our agriculture — is far different from that enjoyed by native peoples. In fact, the landscape they lived in was one they created. As Peter Coates (*American Perceptions of Immigrants and Invasive Species*, p. 11) notes, we do not know which seeds accompanied them as they "migrated across the Baring land bridge from Siberia some 14,000 years ago [some scholars have pushed the date back to at least 20,000 years ago]. . . whether carried deliberately or stuck to hair, clothes or feet. . . Plants also came up from the south. . . crops cultivated by native peoples first encountered by Europeans colonists were not indigenous to the eastern seaboard. They came from Central America. Corn may not have arrived in southern New England until the eleventh century." People have always been on the lookout for something good to eat and no amount of prejudice or fear of new things has held appetites in check for long. Seeds are clearly the ultimate software to the ultimate computer – nature. They're made for traveling!

Wheat field in Vampula, Finland. Photo: Kallerna, Wikimedia Commons, CC BY-SA 4.0

As children, we learned the foods (plants) the New World gave to the Old. But here we will focus on what was taken from other places and rapidly integrated into our pantries, farms, and gardens. From the start, with Spanish invasion and settlement, Europeans wanted to eat like Europeans. This was the initial reason for wheat, native to the ancient Middle East's Fertile Crescent, being introduced by the Spanish and preferred to maize (what we call corn). It can all get a little confusing: the Spanish word *maiz* is an altered version of the native Taino word *mahiz*. The term "corn" was used in England to refer to the predominant grain in a given location, so "corn" was used for wheat, and oats was "corn" in Scotland and Ireland. Today, most of the world refers to corn as either "maize" or "maiz."

In addition to wheat, Spanish settlers introduced grape vines, radishes, chickpeas, melons, cabbage, olive trees, and watercress. The Spanish attributed what they judged as savageness among the peoples they encountered as a consequence of what they ate. They sought to preserve their own natures and change those of native peoples through a

change of diet. It could go the other way as well, and in the 1680 Pueblo Revolt in New Mexico rebels were told by their leaders to destroy the seeds Spaniards brought and eat the seeds of their ancestors — maize and beans. But adoption of European foods could be swift, and by the 1580s, Andean villagers were consuming a host of European crops. Economy could win the day too, and from the 1580s forward, ships sailing to Spain might be provisioned with bread made from maize or cassava. New England colonists early on made puddings from maize, although they had the same cautions on eating native foods. For the above and more, see Rebecca Earles's excellent "The Columbian Exchange" in *The Oxford Handbook of Food History* (2017).

Sugar cane is a native of New Guinea, and coffee, of Yemen. The former was grown and processed on an industrial scale, with enslaved labor, in Brazil and the Caribbean. Also grown with enslaved labor, coffee was originally grown in the Caribbean, primarily on France's Saint-Domingue (in the area of today's Haiti), but the Haitian Revolution (1791-1804) compelled its migration to Brazil. Beginning breakfast with a glass of orange juice is a ritual in many American homes, but the orange, and other citrus fruits, came to our shores with Spanish settlement. And the label "as American as apple pie" may lean to an earlier time, but earlier still because the apple is not native to the Americas. It originated in Kazakhstan. Peaches and bananas have other origins as well. Rice is today a standard American food. It was introduced by the British to their colonies in 1685 when a slave ship unloaded a cargo of rice in Charleston, South Carolina. It was already in the Spanish and Portuguese colonies. It reached commercial success in the Carolinas, thanks to the skill and labor of enslaved people who came from rice-growing societies in Africa. Rice was first cultivated in parts of China and then Africa and Eurasia. Also introduced from Africa were yams, watermelons, plantains, okra, and black-eyed peas. Barley is an ancient Fertile Crescent grain originating in parts of Asia. It was brought to Mexico and came to New England in 1602, but prospered only after moving into New York in the 17th century. Rye was cultivated for hundreds of years in Northern Europe before landing in the New World in Nova Scotia in 1606. It appears to have been first cultivated in southwestern Asia. Both owed much to a thirst for alcoholic beverages – beer and whiskey respectively. And while we are not focused on animals, Rebecca Earle observes that there were no goats, sheep, pigs, horses, or mules in the Americas until European settlement ("The Columbian Exchange," p. 346).

Cut sugar cane. Photo: Rufino Uribe — cana de azucar, Wikimedia Commons, CC BY-SA 2.0

Rebecca Earle also points outs that Old World peoples, shortly after contact, needed help in placing New World foods within their gastronomic system ("The Columbia Exchange," p. 348). The Spanish compared the new foods to foods they knew, as did the Aztecs. The former likened the avocado to a pear, guava to the apple, and the pineapple to the quince. The Aztecs called black pepper *caxtillan chilli* or "Castile chile" and wheat, *castillan tloalli* or *caxtillan centli*, or "Castile maize." Almond trees were described as trees from which peanuts grow.

Fears, Suspicions, and Unfortunate Realities

Just as immigrants have not always been warmly accepted, even when their labor is or was needed, there is an element of suspicion of foreign or alien plants. As we know, some plants, not to mention insects, do not "play well" with current residents – even if those resident plants were once themselves immigrants. Non-native plants, though, are not necessarily invasive. To be invasive they must be harmful and uncontrollable. The PlantVirginiaNatives.org (see Plant Virginia Natives) website explains that only 3,000 of the more than 30,000 plant species introduced since European discovery and settlement are naturalized in the U.S. outside of cultivation. About 1,000 of these species have become invasive. Since Jamestown's settlement more than 600 species have been introduced in Virginia and less than 100 are identified as invasive. For a detailed definition of invasive plants, see the page prepared by the U.S. Forest Service. Weeds are a nuisance; but invasive plants are a threat. To be classified as an invasive, a plant must be non-native to the ecosystem and likely "to cause economic or environmental harm or harm to human health."

Kudzu infestation — Pueraria montana var. lobata. Photo: James R. Allison, Georgia Department of Natural Resources. Bugwood.org, CC BY 3.0 US

Emily Grebenstein, for the Smithsonian Institution, lists her top six invasives: purple loosestrife, Japanese honeysuckle, Japanese barberry, Norway maple, English ivy, and kudzu. As observed by Peter Coates (*American Perceptions of Immigrant and Invasive Species,* p. 15), plant paranoia is evident in such films as *Day of the Triffids* (1963) and *Invasion of the Body Snatchers* (1956). Nonetheless, new plants and crops have been searched for and welcomed. Durum wheat, dates, figs, Japanese rice, mango and other crops are celebrated in government botanist David Fairchild's 1906 *Our Plant Immigrants*. Fairchild (1869-1954), for many years manager of the Department of Agriculture's Office of Seed and Plant Introduction, experienced a personal kudzu nightmare. Kudzu is a native of Japan and southeast China. It debuted in the United States at the 1876 Philadelphia Centennial Exposition and in 1884 at the New Orleans Exposition. In 1902 Fairchild planted seedlings around his D.C. home. They failed; but then he planted seeds and they thrived. They did so well they smothered plants in their path. By 1938 Fairchild had enough. Nonetheless, kudzu had its day as an officially encouraged control for soil erosion, a cover crop, and inexpensive forage. It was designated as a common weed in the 1970s and in 1998 Congress officially identified kudzu in the Federal Noxious Weed Act. It is no longer on this list, but remains classified as a noxious weed in 13 states and is a plant of concern in Virginia. For further insight into what defines a plant as invasive, visit the Virginia Department of Conservation and Recreation's *Invasive Plant Species of Virginia*. There is a fact sheet for kudzu. Also visit the Blue Ridge Partnership for Regional Invasive Species Management's (PRISM) kudzu fact sheet. For another perspective, see Bill Finch's 2015 *Smithsonian Magazine* piece.

An entry in EDDMaps notes that "Of our agricultural crops, 98% are not native to the regions where they are

grown." Nevertheless, our major food crops neither displace nor cause harm to the ecosystem or humans. In fact, Invasive.org notes that "only a small percent of introduced species ever become invasive." Food plants are bred, among other things, for ease of cultivation, taste, and to bear unnaturally large and plentiful fruit or seed. This breeding has occurred across millennia and continues today. However, they prosper because of a diversity of human interventions. They lack the toughness, opportunism, rate of growth and spread, and resiliency of weeds. In addition, crops such as maize (corn), rice, and wheat have lost the ability to drop seeds naturally. Interestingly, undesirable plants can evolve from domestic ancestors. "Crops can go wild" as explained in the 2010 *Evolutionary Applications* article "Crops Gone Wild: Evolution of Weeds and Invasives from Domesticated Ancestors." The authors identify 13 incidences of this; among common pests are: artichoke thistle (invasive), semi-wild wheat (weed), California wild radish (invasive/weed), and weedy rice (weed). The names may be unfamiliar, but that this can happen prompts the authors to raise questions at the article's conclusion. Apparently, domesticated plants are occasionally capable of turning to the dark side. (Beyond the scope of this piece are questions regarding Genetically Modified Organisms (GMOs) as invasive.)

Setting Down Roots in a New Land

Fruit of a fig tree. Pixabay

Plants from around the world thrive in our gardens and the gardens of others across the globe. It is said, "Tell me what you eat, and I'll tell you who you are." American immigrant gardens have always shown this. Adoption of new foods can be surprisingly quick, but core diets and recipes, especially among newer immigrants, reflect traditional food preferences. Language proficiency is lost more quickly. Food preferences persist for generations. Vegetables common in an Italian garden reflect the diversity the Mediterranean encouraged since ancient times, but there are also newer arrivals from the Americas, notably eggplants, squash, and zucchini. Their presence in Italian American gardens is a homecoming.

In her The Italian American Garden Project, Mary Menniti observes that in their usually small or even tiny backyard gardens, Italian immigrants were quick to plant fig trees. They planted many things and on this site, through text and video, you will learn their gardening stories. The fig, of course, is not native to the New World. In fact, one way of preserving it through northeast winters was to bury it. Often cuttings were brought over hidden in clothing – and this at a time when there was no legal impediment to such introduction. You just couldn't take chances with something so important! Today she suggests you can visit some neighborhoods, even if Italians have moved on, and see this giveaway of their prior residence.

Immigrant gardens, whether they are in backyards or elsewhere, offer immigrants the opportunity to enjoy food preferences, grow old friends, and try new things. Sometimes the familiar plants they grow are New World plants – a fact that may not be known to them. They offer a level of food security for the gardeners and their families. In fact, through their gardening, they can support and encourage a healthier diet than is prevalent among the wider population. Responsibility for a garden, nurturing and harvesting, can provide a

sense of fulfillment and empowerment. These gardens also offer the possibility for nascent entrepreneurship, because an abundance that exceeds needs can be sold. For insight into what these efforts can mean to participants and their descendants, see the Smithsonian Institution's Community of Gardens project. Browse its entries or use the search option or clickable map provided. Garden photos accompany each "story." To begin, you might enjoy "My Father's Garden" and "Four Generations of Gardeners." For a description of the project's intent, see "About Community of Gardens."

The International Rescue Committee's New Roots Program in Charlottesville

Through its New Roots program, the Charlottesville office of the International Rescue Committee (IRC) promotes agriculture and food security among those it serves. The organization — Charlottesville is one of the twenty-eight U.S. cities where the IRC has an office — was founded in 1933 in response to a plea from Albert Einstein. It is a nonprofit nongovernmental organization. It "provides opportunities for refugees, asylees, victims of human trafficking, survivors of torture, and other immigrants to thrive in America." Its programs, services and enormous reach are described on its website. The organization-wide New Roots program is explained in a November 2022 flyer. For an excellent introduction to the Charlottesville New Roots program, watch this video. At Albemarle County New Roots locations, new farmers – some with agricultural or gardening experience and some with none – have garden plots whose produce they can grow solely for their own use or sell at Charlottesville's iX Market. The IRC offers assistance in business aspects of the latter. Workshops and programs are also offered to help participants become better farmers. Volunteers across the area and from Piedmont Master Gardeners offer labor and guidance. "In 2021 the IRC held cooking workshops for refugee and Greek women living on the [Greek] Island of Lesvos [Lesbos]." The cookbook *Recipes from Home* (click on the image on the right) was developed from this effort. Along with legions of commercially-published cookbooks, it demonstrates that plants transcend continents and borders. Across our area, and in the wider world, ethnic restaurants, markets, and widely available and diverse grocery store choices do the same. They serve new immigrants and associated nationalities and ethnicities; but they also make the world smaller and more interconnected for all of us. New Roots' efforts will be explored fully in a future *Garden Shed* article.

Gardens on local New Roots site worked by people from Afghanistan. A description of the IRC's Afghanistan refugee initiative is reached through the preceding link. Photo: Charles D'Aniello

Featured Image: Wheat field in Vampula, Finland. Photo: Kallerna, Wikimedia Commons, CC BY-SA 4.0. The Spanish brought wheat to Mexico in the early 1500s. From there its cultivation spread.

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September in the Ornamental Garden

By Cathy Caldwell | September 2023-Vol.9,No.9

September is an “in-between” month when daytime temperatures still feel summery but cooler nights signal the beginning of autumn. As long as the weather continues to be mild, weeds will continue to grow, plants will need to be watered, and the garden will need to be kept tidy.

Weeding – Summer weeds are coming to the end of their normal growing season now, but cool-season weeds such as henbit deadnettle (*Lamium amplexicaule*) and common chickweed (*Stellaria media*) are starting to appear. If not removed this fall, they will overwinter in your landscape and resume growing next spring. A few minutes spent weeding now will significantly reduce the number of weeds facing you next spring.

Common chickweed Photo: Jay Sturner, Wikimedia Commons (CC BY 2.0)

Watering – If there’s no rain in the near-term forecast, continue providing supplemental water to your perennials, shrubs, and trees, particularly those newly planted this year.

Tidying – In addition to weeding, a general sprucing up can make a big difference in your garden’s appearance this month.

- Cut back diseased and unsightly flower stalks of perennial species once they have finished blooming. But don’t get too aggressive with your tidying. If the flower stalks are healthy, they may be left in place to provide habitat for overwintering insect species.
- Re-edge flower beds to provide a nice sharp line of demarcation between lawn and garden. This simple task can make your garden look well maintained even if the plantings don’t look their best.
- Remove damaged or diseased leaves of hostas, day lilies, and other perennials. Not only will this make the garden look neater but, more importantly, it will remove foliage that might otherwise harbor fungal diseases and other pathogens over the winter.
- Cut back and fertilize leggy annuals early in the month to improve their appearance and to encourage one more round of blossoms. Or, if the plants appear to be beyond hope, replace them with cool season bedding plants, such as mums or ornamental cabbage and kale.
- Unless you have already stopped deadheading perennials, consider leaving the seed heads in place for the birds to enjoy. The seeds from coneflower, black-eyed Susan, aster, and other late season blooming plants are a vital source of food for many bird species in the winter.
- If mounding perennials, such as hardy geraniums, catmint, and spiderwort look messy, overgrown, and out of control at this point, make a note (for future reference) to shear them back after they finish blooming in the summer. This will help improve the overall appearance of the plant and encourage it to sprout fresh new growth which will look attractive through fall. Depending on the species, some perennials may even reward you with another round of blossoms before frost.

AUTUMN-SPECIFIC GARDENING TASKS

With cooler temperatures on the horizon, the timing is perfect for dividing perennials and planting trees and shrubs, among other autumn-specific tasks.

Divide Perennials. September and early October are ideal times to divide plants due to the combination of warm soil, cooler temperatures, and a greater chance of rain. Technically, a plant may be divided any time during the growing season, but you’re likely to have best success if you divide spring- and early summer-

blooming plants in the fall and fall-blooming plants in the spring. Pick a cool day for this task. Water the divisions well when you plant them and continue to keep them watered so that they become well established before the ground freezes.

While most perennials benefit from being divided every 3 to 5 years on average, some plants, such as asters, may need to be divided more often. Others, such as peonies, may not need to be divided at all. Look to the plant for clues that it needs to be divided such as:

- Fewer or smaller-sized flowers than in past years.
- A dead area in the center of the plant's crown.
- Less vigor than in past years.
- Weak inner flower stalks that flop over and can't hold up flowers.
- Sparse foliage at the bottom of the stems.
- Too large for its allotted space in the landscape.

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

For more information on this topic, see Guidelines for Dividing Perennials in the March 2021 issue of *The Garden Shed*.

Make Stem Tip Cuttings. While you can certainly dig up and overwinter wax begonias, geraniums, coleus, and other bedding plants, they don't always respond well to the transition indoors. It's usually more effective to root new plants from stem cuttings. The cuttings don't take up as much room indoors and they're generally easier to keep alive over winter than a full-size plant. Here's how to propagate a plant from a stem cutting:

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

Propagating Hyssop stem tip cuttings. Photo: Pat Chadwick

Save seeds. One of the great pleasures of gardening is growing plants from seeds collected in your own garden. If you are new to saving seeds, **annuals and biennials are grown from seed. Some perennial species may be grown from seed** (such as coneflower, rudbeckia, and cardinal flowers) but most are grown from cuttings or divisions. Be sure to save seeds from **open-pollinated or "heirloom" species rather than hybrids**. This ensures the offspring will resemble the parent plant from which the seeds were collected. Plants grown from hybrid varieties often revert to characteristics of earlier generations and are not likely to resemble the parent plant.

- Gather seeds when they are fully ripe but leave some for the birds to eat over winter.
- If seeds aren't already fully dry, spread them out on newspapers or leave them in an open paper bag to dry.
- Place the dried seeds in envelopes or glass jars labeled with the seed's name and the date.
- Store the packaged seeds in a cool place. Some gardeners like to store their seeds in the refrigerator.

To learn more about saving seeds, see the article on Growing Plants From Seeds You Collect in the September 2017 issue of *The Garden Shed*.

Cut and preserve flowers, such as globe amaranth, statice, strawflower, and other plants that dry well, for use in dried flower arrangements. A simple method for drying them is to bundle them loosely and hang them upside down in a dry, well-ventilated space away from direct sunlight. Purdue University Cooperative Extension service has good information on how to preserve plant materials.

Direct sow seeds this fall of cool-season annuals, such as calendula, California poppy, larkspur, love-in-a-mist, snapdragon, and sweet alyssum. These species require a period of cold, moist weather (a process called stratification) to break down the seed coating so that the seed can germinate. While technically these seeds may be planted very early in spring, greater germination success may be achieved by planting them in

the fall.

Got deer? Install plastic fencing, chicken wire, or other barriers around shrubs and trees, particularly young or newly planted ones, to prevent damage this fall from deer browsing and antler rubbing. Another approach is to install 4 or 5 sturdy metal fencing stakes around vulnerable plants.

Buy bulbs for fall planting while supplies are still plentiful. As you plan ahead for next year's spring garden, expand your horizons and experiment with bulbs other than daffodils and tulips. Invest in some of the early-blooming minor bulbs such as snowdrops (*Galanthus nivalis*), starflower (*Iphieon*), scilla (*Siberian squill*), crested iris (*Iris cristata*), glory-of-the-snow (*Chionodoxa*), and other easy-to-naturalize hardy bulbs for planting this fall. As extra incentive to you, the deer, rabbits, voles, and other wildlife generally do not bother these early bloomers.

TREES AND SHRUBS

Fall is traditionally the best time of year to **plant woody ornamental species in the landscape.** Newly planted trees and shrubs are happiest when soil temperatures range between 55°F and 75°F. Without the stress of hot summer weather, they can focus on developing good root systems before the onset of winter. Root development stops once soil temperatures drop below 40°F. To give those plantings the best possible chance for success, keep them well watered. Don't rely on rainfall alone to maintain adequate moisture levels. Also, be sure to maintain a three-inch layer of mulch over the root ball area, but not up against the trunk of the plant, to help hold in moisture and to moderate the soil temperature. For suggestions of shrubs and trees to plant, check out the Virginia Cooperative Extension's publication 450-236, Problem-Free Shrubs for Virginia Landscapes, and The Virginia Department of Forestry's publication on Common Native Trees of Virginia.

Don't become alarmed if the **needles on white pines** (*Pinus strobus*) start to show some yellowing around mid to late September. It's perfectly normal for the older, interior needles to shed.

HOUSEPLANT CARE

Remember – you gradually acclimated your plants for their transition to the sunny outdoors this spring. Now that it's time to bring the plants indoors for the winter, you need to reverse the process.

- If your houseplants are currently in a sunny location, move them into a shadier spot about 2 weeks in advance of bringing them indoors so that they can adjust to lower light levels.
- Before moving the plants indoors, wipe down the containers to remove dirt and debris.
- Thoroughly inspect each plant for insects, such as scale, white fly, mealy bugs, and fungus gnats, or insect eggs and larvae. Don't forget to check under pot rims for spiders. Inspect the bottoms of containers as well as the bottoms of saucers for insects or their egg cases.
- While daytime temperatures may be hot, night-time temperatures become noticeably cooler in September, particularly toward the end of the month. Plan to move houseplants indoors before night-time temperatures drop below the mid-50s.

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

SEPTEMBER CREEPY CRAWLIES

Banded Woolly Bear Caterpillar – According to a common urban myth, the color bands on the harmless woolly bear caterpillar are a predictor of just how mild or severe the winter will be. If the black bands on either end of this bristly-looking caterpillar are longer than the center reddish band, the winter will be harsh. Conversely, a wider center band supposedly indicates that the winter will be mild. Neither is true. In fact, the wideness of the center band has more to do with the age of the caterpillar than its ability to predict the weather. Woolly bears, also called "woolly worms," become very active in autumn as they search for protected places to spend the winter. They may be handled but the bristles covering their bodies are prickly to the touch and may cause a rash on sensitive skin. This amazing little creature produces a cryoprotectant in its tissues, which allows it to survive harsh winter weather even when frozen solid. In spring, it becomes active again and briefly resumes feeding before pupating. After about 2 weeks, it finishes its metamorphosis and emerges as an adult Isabella Tiger moth (*Pyrrharctia isabella*), which is indigenous to the United States and parts of southern Canada.

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

INVASIVE ALERT

Porcelain-Berry (*Ampelopsis brevipedunculata*) is **easy to spot in September and October** when clusters of different colored berries ripen to **bright turquoise blue**. This invasive vine is a rapidly growing woody perennial vine with a vast hard-to-kill root system. **Herbicidal foliar treatment is most effective for eradicating the vine when applied between midsummer and early fall.** It is the only feasible option for treating large infestations. Cutting back the vines and spraying the regrowth is a good way to reduce the amount of herbicide needed. Another method is to **cut the largest stems down near the ground (cut stump method)** and apply a concentrated, recommended herbicide immediately to the cut. A third method is to **use a basal bark application if you can reach the largest stems in the tangle**. This requires applying a concentrated, recommended herbicide mixed with horticultural oil to the lowest 12" of the stems; no cutting is needed. For additional information on Porcelain-Berry, see the Blue Ridge Partnership for Regional Invasive Species Management (PRISM) Factsheet.

Invasive Porcelain-Berry Vine. Photo: Courtesy of Missouri Botanical Garden Plant Finder

Controlling Autumn Olive Video, Blue Ridge Prism.

Autumn olive can be controlled in autumn, or at any time of year (except during spring growth), by cut-stumping or hack & squirting. For detailed guidance, including a very helpful video, take a look at Autumn Olive/Sept. 2023/The Garden Shed.

Many invasive plant species are easier to identify in fall because of their brightly colored berries, fall foliage, or both, and Porcelain-Berry is just one example. To learn more about other invasive species in this area of Virginia and methods for controlling them at this time of year, see the Blue Ridge PRISM website. See also the Invasive Plant Control Calendar in the May 2022 issue of *The Garden Shed*.

PESTICIDE WARNING

> *Pesticides (which include herbicides, insecticides, rotenticides, etc.) are poisonous. Always read and carefully follow all precautions and safety recommendations given on the container label. Store all chemicals in the original labeled containers in a locked cabinet or shed, away from food or feeds, and out of the reach of children, unauthorized persons, pets, and livestock. Consult the pesticide label to determine active ingredients, signal words, and proper protective equipment.Pesticides applied in your home and landscape can move and contaminate creeks, lakes, and rivers. Confine chemicals to the property being treated and never allow them to get into drains or creeks. Avoid drift onto neighboring properties and untargeted areas.*

FEATURED PHOTO: New England aster 'Violetta' with rough-stemmed goldenrod 'Fireworks'. Photo: Pat Chadwick

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September in the Edible Garden

By Ralph Morini | September 2023-Vol.9,No.9

September is a busy month for committed edibles gardeners. Harvesting, cleaning up, final planting for fall, early winter harvest, and cover cropping or mulching for beds that are finished for the season. We'll touch on each area to help you plan your actions.

Harvesting

Many summer vegetable plantings will be reaching the end of their productive lives. It is a judgement call on when to stop the harvest and remove plants. It depends on plant condition, pest impact, and intentions for that garden space's next phase. Harvesting when fruits and vegetables are young can help keep plants going a bit longer. Tomatoes can be picked as soon as color starts to change to minimize pest damage, while maintaining most "summer tomato" qualities. If you're picking tomatoes early, place them on and cover with newspaper. Keep them at room temperature and check them daily. Some folks include bananas or apples with the tomatoes since their ethylene content can speed the ripening process.

This is also the time to optimize late season herb harvest. Pinching flowers will help prolong leaf production. Plants can be dug up and potted or cut and rooted to be moved inside. Alternatively, they can be cut for immediate use or preserved by freezing or drying.

Planting

In our local hardiness zone 7a, some produce and vegetables can be planted through mid-September. These include beets, kale, collards, kohlrabi, leeks, and turnips. Spinach, lettuces, mustard and radishes can be planted until the end of the month or even into early October, depending on weather. The earlier they are planted the better, since growth will slow as days shorten and temperatures drop.

Row cover in kale bed. Photo: R Morini

Many pests will continue attacking plants until frost. After that, the low temperatures will harm the plants. Picking insects off plants and spraying them can help control pests. Row covers can protect new plantings from fall predators. Row covers can also extend the growing and harvest times for the cooler weather crops. For more mature plants that are already susceptible to pest damage, row covers are not a good idea until after frost kills the pests. A row cover can provide a 4 to 5 degree temperature benefit and extend the growing season for a variety of greens, spinach, lettuces and other crops. Check out this *Garden Shed* article for simple row cover construction ideas.

If you have been struggling with pests this year, a great all-purpose source for pest identification and treatment options is the Home Grounds and Animals: 2023 Pest Management Guide from the VA Cooperative Extension.

Preparing Beds for Winter

If you are finished for the year, this is the time to clean up, amend soil, and protect soil for the winter.

Fall is a great time to do a soil test. Identifying needed amendments and adding them now, provides a head start for strengthening the soil by spring.

Next, thoroughly clean up the garden area. Removing spent plant material is essential to minimize wintering-over pests and disease-carrying vegetation. It is best to bag and dispose of any diseased plant materials.

Clean material can be chopped up and composted or spread on the soil and allowed to decompose over winter.

Once beds are cleaned, best practices are to either cover crop or mulch the growing beds. Prior to that, smooth the beds and add amendments recommended on the soil test.

Next, choose whether to cover crop or mulch. While cover cropping is best, adding 4+ inches of organic mulches like compost, chopped leaves, leaf mold (partially decomposed leaves), and/or aged wood chips, will protect the soil during winter and add organic matter over time.

Fall cover crop growing through straw mulch. Photo: R Morini

Cover crops bring additional benefits, including building soil structure, reducing erosion and compaction, weed suppression, adding organic matter, and in the case of legumes, fixing atmospheric nitrogen for plant use. There are a couple of basic cover crop choices: *winter-killed* and *winter-hardy*.

- **Winter-killed cover crops** die out after a few hard frosts, but their root and surface biomass help hold the soil and they can be used as mulches or tilled under in spring. Oats, field peas, forage radishes, and rapeseeds are common types.
- **Winter-hardy cover crops** will either grow through or go dormant in winter but resume growth in spring. They should be cut in spring prior to going to seed, with the greens composted, used as mulch, or, if you insist on tilling, tilled into soil as a green fertilizer. If greens are tilled in, allow 2 or 3 weeks after tilling to let decomposition start prior to planting. Winter-hardy choices include winter rye, winter wheat, hairy vetch, Austrian winter peas, and crimson clover.
- **Mixed Covers: Regenerative farmers** report benefits from mixed cover crops that diversify the soil. A mix used successfully on Piedmont Master Gardener projects includes crimson clover, forage radishes, and annual ryegrass. If planted by mid-September, the radishes will penetrate deeply into the soil before being killed by frost, opening the soil and depositing valuable organic matter. The clover and ryegrass will go dormant in winter and revive in spring,

adding nitrogen and root mass to the soil. They can be cut during the flowering stage, prior to seed formation, and allowed to rest for a couple of weeks before planting. The cut vegetation can be used as a mulch or removed and composted.
- These techniques blend well with converting your beds to “No-Till” gardening. For more info on this proven effective and burgeoning soil management practice, check-out the Garden Shed article No-Till in the Home Garden: Why and How.

Preparing New Beds

Preparing newly-tilled bed for cover crop seeding. Photo: W Sublette

If you are planning a new garden or garden expansion for next year, fall is a good time to begin preparing soil. Tilling to remove or bury surface vegetation, adding organic matter, and mulching or cover cropping prior to winter are good preparation for next year. The picture above shows a new garden area operated by New Roots Charlottesville, our local arm of the International Rescue Committee, a PMG community garden partner. The surface grass in the bed has been tilled under and volunteers are preparing the surface for a winter hardy cover crop planting. Additionally, based on a soil test, lime was spread over the area to raise the low pH.

More information on cover crops can be found in Cover Crops and Cover Crops and Green Manures in Home Gardens from the Maryland and Minnesota Extensions respectively.

Another option, which doesn’t require digging or tilling, is sheet mulching. It involves moistening the base soil, covering it with an organic barrier like newspaper or flat corrugated boxes, then adding six or more inches of a mix of organic materials including leaves, soil, compost or aged wood chips, topped off with a few inches of straw to manage moisture and reduce weeds. If done in the fall it should be ready for direct planting in the spring, although the decomposition rate is a function of the materials used. Chunky, woody materials take longer to get ready than mulched and decomposed matter. Find detailed guidance in the video Sheet Mulching: Lawn to Garden Bed in 3 Steps from the Penn State Extension.

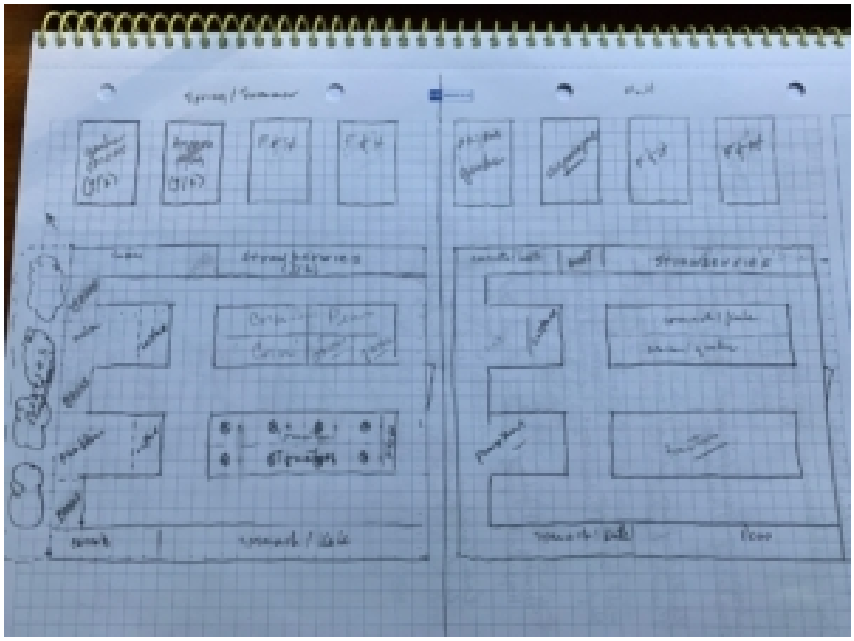
General Tips

Garlic is best planted during October. Now is a good time to purchase seed bulbs before local retailers sell out. Internet suppliers offer more variety for experimenters or connoisseurs. The article Growing Garlic – Fall Planting from the Penn State Extension provides a concise summary of garlic selection, planting, and care.

Eary September tomato plant. Photo: R Morini

Give your tomato plants one last feeding. Compost tea or fish emulsion should give them the extra energy they need to make that final push at the end of the season. **Pinching off small green tomatoes and any new flowers** will channel the plant's energy into ripening the remaining full-size fruit.

Don't cut asparagus ferns (stalks) until they turn brown and dormant. This is typically later in the fall. Best to give the plants time to store photosynthesized nutrients in the roots to fuel spring re-growth.



Planting journal helping with crop rotation. Photo: R Morini

If you've been lax in your **garden documentation** this year, tour your garden and make notes on varieties grown, successes, challenges, and chores, so that you can learn for next year. Make a sketch showing the location of this year's plants to guide rotation next spring, an important pest and disease management practice.

Continue to weed the garden to prevent the weeds from going to seed and germinating next spring. **Keep** the **strawberry patch** weed free. Every weed you pull will reduce labor next spring.

Pick pears when green and hard ripe. Store in a cool, dark place to ripen.

Check peach tree trunks and just below the soil at their base for borer holes. Probe the holes with a wire to kill the borers.

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

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

Plant lavender seeds in the fall for spring germination.

In any case, enjoy the fall gardening season. Cooler weather, reflecting on the past season and making preparation for a better next year can be very satisfying. As usual this year, our gardens have been a wonderful diversion. See you next month at *The Garden Shed*.

Sources:

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Virginia’s Home Garden Vegetable Planting Guide: https://www.pubs.ext.vt.edu/content/dam/pubs_ext_vt_edu/426/426-331/SPES-170.pdf

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Season Extenders and Growing Fall Vegetables (psu.edu): Advice on growing fall vegetables and how to protect plants from the cold and pests.