What is fertilizer, what forms does it come in, and why do we use it?
Fertilizer is a chemical or natural substance that is added to soil to increase its fertility for healthy plant growth. The fertilizer is meant to add what is not adequately supplied by the soil. A soil test will determine what is already available in the soil and give recommendations on the amounts to add.

There are 16 nutrient elements essential for plant growth and reproduction. Carbon, hydrogen, and oxygen are obtained from water and air. The other 13 are divided into primary, secondary and micronutrients. Nitrogen (N), phosphorus (P), and potassium (K) are the primary nutrients needed in large quantities compared to other nutrients. Calcium, magnesium, and sulfur are secondary nutrients which are required by the plant in lesser quantities but are no less essential for good plant growth. Zinc, manganese, iron, boron, copper, molybdenum, and chlorine are micro nutrients that are required by plants in very small amounts.

If you purchase a bag of commercial fertilizer, there are three numbers on the bag such as 12-12-12 or 7-0-0 or 15-30-15. The three numbers stand for the percentage of nitrogen (N), phosphate (P₂O₅), and potash (K₂O) in the bag. These are the forms of N-P-K that are available for the plant to uptake. So if it is a 50 pound bag (for easy math!) of 12-12-12, it will have roughly 6 pounds of each N-P-K in the bag. This is also known as a complete fertilizer because it has all three major plant nutrients, N, P, and K. It is considered a balance fertilizer because all three elements are in equal amounts. The second example I used was 7-0-0. This fertilizer contains just nitrogen, so it is considered incomplete. These types of fertilizers come in handy when a soil test is calling for just one or two elements. The third example is known as a bloom booster, 15-30-15. This is a complete fertilizer with
Back To Basics - Fertilizer
by Katie Kammler, MU Horticulture Specialist

all three components but it has a different fertilizer ratio, in this case 1 part nitrogen to 2 parts phosphorus to 1 part potassium.

Fertilizers can be divided into two broad groups: organic and inorganic (chemical). Organic fertilizer is derived from a living plant or animal source. Chemical fertilizers are usually manufactured and have a lower cost. The plant does not care which type of fertilizer it uses, so long as it is getting the nutrients it needs. Commonly used synthetic fertilizers are formulated so the primary nutrients are in a form readily available to the plant. Organic fertilizers generally have more significant amounts of micronutrients and the macros are likely to be in forms that are not readily absorbed. Nitrogen in an organic fertilizer is slow to become available to plants because it has to be reduced to a usable form by micro-organisms. Because of this, organic fertilizers are considered more “time-release” and synthetic fertilizers are fast acting. A potential drawback to organic fertilizers is that they may not release enough of the primary elements in a timely manner so the plants can make use of them. A benefit is that they increase soil organic matter content and improve the physical structure of the soil. Inorganic fertilizers can be a source of water pollution. Nitrogen moves easily and can leach from the application point. Slow release formulations can help with this problem.

For more information on what fertilizer would work best for you, contact your local extension office or this guide sheet http://www.clemson.edu/extension/hgic/plants/other/soils/hgic1654.html

Horticulture Term: Heirloom Vegetables
by Katie Kammler, MU Horticulture Specialist

My family grows what we call Aunt Ruth tomatoes. They are a pinkish plum tomato that makes great juice, pulp, and are good for eating. They are the tomatoes that my great Aunt Ruth kept year after year. This tomato has been passed down from generation to generation. We never have to save seed, just have to wait until volunteers come up in the garden and transplant them to the new tomato spot. This is an example of an heirloom vegetable.

Generally speaking, heirloom vegetables are considered to be a variety that has been around 50 years or longer. Heirlooms are always open pollinated whereas hybrids are cross pollinated. Cross pollinated seed cannot be maintained by ordinary means. Because heirlooms are open pollinated, seeds can be saved every year and handed down from generation to generation for many years. Many heirloom selections have a better taste, texture, and smell than hybrids however, they lack shelf life and durability because they are fragile. In comparison, many hybrids are bred for their ability to withstand mechanical harvest and shipping but they lack the taste, texture and smell - the classic, “old-fashioned” tomato qualities.
March Gardening Calendar
By Donna Aufdenberg, MU Horticulture Specialist

Outdoor Plants and Ornamentals
- Clean up beds by removing all weeds and dead foliage at this time.
- Tree, shrubs and perennials may be planted as soon as they become available at local nurseries.
- Fertilize woody plants before new growth begins, but wait until soil temperatures have reached 40 degrees.
- Apply superior oil spray to control scale insects & mites on landscape plants.
- Divide and transplant perennials, such as ajuga, shasta daisy, daylily and liriope. Rework beds before planting, adding organic matter and fertilizer.

Vegetable Gardening
- Cultivate weeds and remove the old, dead stalks of last years growth from the asparagus bed before the new spears emerge.
- Delay planting if garden soil is wet. When a ball of soil crumbles easily after being squeezed together in hand, it is dry enough to be safely worked.
- Plant peas, lettuce, radishes, kohlrabi, mustard greens, collards, turnips, Irish potatoes, spinach and onions outdoors.
- By the end of the month, plant beets, carrots, parsley and parsnip seeds outdoors. Set out broccoli, cabbage, brussel sprouts, chinese cabbage and califlower transplants into the garden.
- Start tomatoes indoors now for transplanting around May 1st.

Fruits and Nuts
- Gradually remove mulch from Strawberries as the weather begins to warm.
- Continue pruning grapes. Bleeding causes no injury to vines. Tie vines to the trellis before the buds swell to prevent bud injury and crop loss.
- Continue pruning apple trees. Burn or destroy all pruning to minimize insect or disease occurrence.
- Apply dormant oils by the end of the month. Choose a dry day when freezing temperatures are not expected.

Turfgrass
- Mow lawns low to remove old growth before new growth begins.
- Apply controls for wild garlic. It will take several years of annual applications for complete control.
- Apply crabgrass preventer now before it starts to warm and before seeds germinate.
- Thin spots and bare patches in the lawn can be overseeded now.

Edible Flowers To Try This Year!
- Borage
- Bachelor Buttons
- Hollyhocks
- Calendula
- Chamomile
- Chive Flowers
- Dandelion
- Daylily
- Elderberry
- English Daisy
- Honeysuckle
- Lavender
- Nasturtium
- Pansy
- Passion Flowers
- Pineapple Sage
- Red Clover
- Roses
- Squash Blossoms
- Violet
One disease that is often more of a nuisance than a real issue on plants is powdery mildew. This disease appears as a light grey or white powder on the upper surface of ornamental and vegetable plant leaves. If you try to wipe it off with your fingers, the white will come off.

Warm, humid days and cool, moist nights increase the spread of the disease. If powdery mildew is present it will weaken a plant’s ability to handle other attacks by insect or disease and contribute to poor health.

While powdery mildew is often helpful in identifying a lilac it rarely causes a health issue with this plant; they almost always have it. On oaks the overall root system on the tree usually prevents severe damage. On vegetables and annuals it can mean death within a short amount of time.

Control can be as simple as spacing plants to improve air circulation. Prevent water from splashing on leaves or any overhead watering.

This disease is one of the reasons you do not water in the evenings. Make sure plants are not wet when the sun goes down.

When purchasing plants, especially vegetables, select those that are resistant to powdery mildew.

There are fungicides available to help control powdery mildew but they vary depending on the plant and the need. For example, a lilac does fine without control when infected but vegetables may need some help.

If a fungicide is going to be used to control powdery mildew, then use it to “prevent” the disease and not “cure” it. Applying fungicides as a cure rarely takes care of the problem. In most cases, the fungal disease is far too progressed for the fungicide to have any impact. If you have had powdery mildew on a certain plant in a previous garden season, it is important to consider applying a fungicide before the disease ever appears.

Remember the old time saying from Benjamin Franklin “An ounce of prevention is worth a pound of cure.” With any plant disease, this saying is very true.
What is grafting and why would we do such a thing? Most of our fruit and nut trees do not reproduce true from seeds, so producers graft to known varieties. If you buy a Golden Delicious apple in the store, plant the seeds from it and let it grow into a fruit producing tree, no telling what that apple would look or taste like. This is generally because of cross pollination.

Grafting is a form of asexual propagation and will give the grower better quality fruit trees that will produce in a shorter amount of time. Grafting is basically the act of joining two plants together. The upper part of the graft (scion) becomes the top of the plant, the lower portion (rootstock) becomes the root system or part of the trunk. The scion is the desired variety and rootstock provides advantages such as dwarf plant characteristics, better adaptation to soil conditions, and climate.

Grafting can have some limitations. Generally only plants closely related botanically form a good graft union. New varieties cannot be developed by grafting. The rootstock and scion must be compatible. Incompatible grafts may not form a union at all or form a weak union, prone to breaking or poor growth. Other reasons for graft failure include cambiums (growing points) not meeting properly, scion upside down, grafting at the wrong time, rootstock or scion not healthy, scions dried out or injured by cold, scions not dormant, graft not properly sealed, graft union displaced by storms or birds, graft too shaded, insects, disease, or the union was girdled by improper care.

Grafting is a fairly simple procedure when taken step by step. It takes time and practice but is worth the effort because of the useful crop that is the end result. I grew up on tree farm where we grafted pecans and black walnuts for better nut quality and thinner shells. My first sunburn of the year would be when we were out grafting in the late winter to early spring. Before new growth begins. The scion is collected during the winter and stored in a cold, moist place at temperatures close to 34 degrees. A refrigerator works well in a plastic bag with moist paper towels.

Materials needed depend on the type of graft you are wanting to do. The three most important tools are a knife, grafting tape, and hand pruners. A good quality knife that holds a sharp edge is key. There are special grafting and budding knives available but a good pocket knife will work fine. Grafting tapes are specialized so they keep a tight seal but also expand as the union grows. They will need to be removed after the union heals. Other materials that might be needed include grafting wax, budding strips, nails, a grafting tool, aluminum foil, plastic sandwich bags, white paint, Elmer’s glue, staple gun, and a sharpening stone.

There are many different grafting techniques. The techniques can be divided into two basic types, usually determined by the size of the rootstock. Grafts can be made to join a scion and rootstock of nearly equal size. The other type attaches a small scion to a much larger rootstock. Sometimes in this case several scions may be attached to the rootstock.
Grafting
by Katie Kammler, MU Horticulture Specialist

early spring. I have many fond memories of this time and we learned a lot from trial and error. One of the simplest things was to protect the graft from birds using it as a perch by attaching a stake to the tree so it sticks up above the graft. Birds will perch on the highest portion of the tree and you don’t want that portion to be your new scion on the graft.

If you would like more information on grafting trees, this guide sheet shows specific kinds of grafts and has some audio clips explaining the processes. http://extension.missouri.edu/p/G6971

Help For Pollinators
by Megan Franke, Master Gardener, Cape Girardeau, MO

Pollinators, such as honeybees, are important for producing our crops; however, they are in trouble: diseases, loss of habitats, pesticides, parasitic mites, and Colony Collapse Disorder have created a honeybee crisis. The number of managed honeybee colonies in the US has dropped by 50% since 1945. We can no longer assume that these bees will be able to provide the pollination services that farmers and gardeners need. Fortunately, there are things we can do to improve the situation. Let's consider three of them:

Provide nectar and pollen rich plants, including natives and herbs. Native wildflowers, like purple coneflower, foxglove, and trumpet honeysuckle, draw native pollinators to our yards. Diversify your plantings to make sure you have plants that bloom all season long. It is a good idea to have at least three plant species that bloom at any given time. Herbs, such as mint, also attract native pollinators and provide nourishment for them.

Provide nest sites for a variety of pollinators. We don’t need to rely on the honeybee; there are many types of pollinators such as wasps, flies, and butterflies and bats. Many native pollinators nest in woodpecker drillings, insect holes, and even underground which necessitates having some open spaces available for their use. Also consider introducing Mason Bees to your garden this spring. Unlike honeybees, Mason Bees do not make honey, but they are effective pollinators. There is a lot of information on the internet, but here is a link for ordering Mason Bees: http://www.crownbees.com/product-category/spring-mason-bees/. Catalogs, such as those available from Gardener’s Supply Company also have nests or you can make your own with materials like bamboo or hollow reeds.

Stop using chemicals and pesticides. Pesticides are toxic to pollinators; natural products, such as salt and cider vinegar mixed with a little dishwashing soap, work well and are safer to use especially around children and pets. You can also make “tea” from hot peppers, garlic, etc., or plant natural repellants like marigolds, nasturtiums, and garlic, to ward off pests. Many garden stores sell nontoxic products if you don’t want to concoct your own. If you must apply pesticides, do so either near dark or very early in the morning when insects are less active.

By taking a few simple steps to help reverse the decline in pollinators, your garden, community, and environment will profit.

Gardeners in southeast Missouri can grow some of
our state’s most outstanding native plants. Their
beauty is more than ‘blossom deep.’ They provide a
feast for the birds, butterflies, honey bees, and
many beneficial native insects that grace our
gardens with life, beauty and health.

Below are 11 perennial wildflowers that have
thrived for me in our soils, heat and high humidity.
At the end I list sources in the state for seeds,
nursery plants, and more information on growing
conditions and size.

Spring Blooming
1. Copper iris (*Iris fulva*) likes
moisture in spring so I grow it in
a rain garden and at the edge of
a large pond. To my amazement,
both patches survived two years
of hard drought and some
neglect. Blooms in sun mid
March to mid May.

2. Wild sweet William (*Phlox divaricata*) are blue
charmers that return year after year if given moist
part shade with no afternoon sun and a dressing of
good leaf mulch. Their sweet fragrance makes the
hard work of weeding and planting a pleasure, and
they last well in arrangements. Who was Sweet
William, anyway? We need to meet!

3. Celandine poppy
(*Stylophorum diphyllum*) has
successions of luscious yellow
blooms that open for only one
day and blue-green leaves. It
likes the same conditions as
wild sweet William and they
look marvelous together. Ferns would play nicely
with both.

Late Spring and Summer

4. Purple poppy mallow
(*Callirhoe involucrata*)
sports no-holds-barred
magenta blooms. It grows
well in medium to dry
areas of sand or clay soils.
The long tap root can
make them risky to
transplant without rooting powder. Use the foot
tall plants as a ground cover or as a “skirt” at the
edge of beds in front of taller plants. Often they will
flush a second round of blooms after dead-heading,
cutting the leaves
back and watering.

5. Our monarch
butterflies are in
trouble! The
population has
dropped 90% in 20
years. Much of our
native milkweeds -- the only plants their larva can
eat -- have been destroyed by herbicides. Timber
cutting in Mexico is destroying its winter habitat.
Have a heart and share the planet: grow a big patch
of butterfly weed (*Asclepias tuberosa*) to feed our
only migrating butterfly. Read more: [www.nwf.org/
Pollinators/Monarch.aspx](http://www.nwf.org/Pollinators/Monarch.aspx)

6. Purple coneflower (*Echinacea purpurea*) and
yellow coneflower (*E. paradoxa*)
are two of the native
coneflowers that grow here.
These butterfly and bee
magnets are reliable bloomers
for the garden and the vase.
The purple species will bloom
all summer and into fall with
deadheading and rests during
Go Wild with Natives!
by Carolyn Johnson, Master Gardener, Dexter, MO

The Garden Spade

the hottest weeks. Leave the last blooms to make seeds for winter interest to the garden and to feed the goldfinches.

Mid Summer to Fall

7. At least five species of blazing star call Missouri home. They all do well in this area and show off long purple spikes that make great cut flowers, if you can bear to cut them. My favorite is the tallest and gaudiest of them all, the prairie blazing star (*Liatris pycnostachya*), which can top out at five feet or more with good soil, sun and some moisture. Birds and pollinators of all kinds love them, and they look good with black-eyed-Susans and tall native grasses such as big blue stem or switch grass.

8. The pure red spikes of cardinal flower (*Lobelia cardinalis*) are a long-lasting July and August show stopper in the garden that will spark hundreds of hummingbird battles each day. They need moist, rich soil, and I placed mine in a spot that receives sun until mid afternoon. Two things to keep in mind: cardinal flowers won’t take competition from other plants or mulch over the top of the plant in the winter.

9. Slender mountain mint (*Pycnanthemum tenuifolium*) smells wonderful, behaves itself (unlike most mints), and provides a wonderful late summer buffet for honey bees and other pollinators. The small white blooms cover the stems much like baby’s breath and make a good filler in arrangements.

10. Bringing the bloom season to a close is the aromatic aster (*Symphyotrichum oblongifolium*) with its two-foot high mounds covered small lavender blue blooms and at least a thousand pollinators who have come to feast at the last banquet of the season. It’s a no-problem plant that, despite its subdued color, adds a lot of punch to the garden.

Plant and Seed Sources

I have bought plants and seeds from the three companies listed here and had a very good experience with each of them. Their websites are treasures of photos and detailed information.

Easyliving Wildflowers - 417-469-2611
www.easywildflowers.com; PO Box 522, Willow Springs, MO 65793; john@easywildflowers.com

MO Wildflowers Nursery - (573) 496-3492
www.mowildflowers.net; 9814 Pleasant Hill Rd, Jefferson City, MO 65109

Hamilton Native Outpost - 417-967-2190
www.hamiltonnativeoutpost.com; 16786 Brown Rd., Elk Creek, MO 65646; natives@hamiltonnativeoutpost.com
Upcoming Events

The following Master Gardener Meetings are held each month. All are welcome to attend. Please contact the local extension office to confirm location if you did not attend the previous meeting.

Parkland MGs - 1st Monday at 6:30pm, Memorial United Methodist, Farmington, MO
Poplar Bluff MGs - 1st Tuesday at 6:00pm at First Episcopal Church in Poplar Bluff, MO (Do not meet in January)
Ste. Genevieve MGs - 2nd Thursday, at 6:30pm, Ste. Gen. County Extension Center
Cape Girardeau MGs - 3rd Thursday at 7:00pm, Cape County Extension. Center
Perry MGs - 4th Monday at 6:30pm, Perry County Extension. Center
Jackson Beekeepers - 4th Tuesday @ 7:00pm, First Presbyterian Church, 206 E Washington, Jackson, MO
SEMO Honey Producers - 2nd Thursday @ 6:30pm, Church of Christ, Poplar Bluff, MO (Do not meet in December or January)
Parkland Beekeepers - 3rd Tuesday @7:00pm, North College Center, Mineral Area College, Park Hills, MO
South Central MO Beekeepers - 1st Friday, Howell Electric Coop, West Plains, MO

March
5 - Seed Starting Workshop at the Madison County Extension Center in Fredericktown at 6:30 p.m.
7 - A Garden Symposium by the Parkland Master Gardeners at Mineral Area College, Technology Building from 8 a.m. to 3:30 p.m. For more information, contact 573-438-5103. Registration only - no walk ins.
12 - Beginning Gardening Seminar at the Madison County Extension Center in Fredericktown at 6:30 p.m.
17 - Garden Symposium, 8:00 am to 3:00 pm at the Bootheel Planning Building (Old Armory) in Dexter, Missouri. To register call 573-568-3344.
25 - Farmers Market Workshop, 8:00am, North College Center, Mineral Area College, Park Hills, MO—Rescheduled due to winter weather!

April
15 - Garden Workshop, Howell County Health Department, 180 Kentucky Street in West Plains, MO. To register call 417-256-7078.
16 to 19 - Dogwood Azalea Festival in Charleston, MO

If you have a horticultural related event for the calendar call 573-686-8064 or email it to Denklers@missouri.edu.

“Green Thumb”

Garden Workshop Series
At the Shawnee Park Center in Cape Girardeau, MO from 6 to 8 p.m.

March 10 Seed Starting
April 7 Organic Gardening
April 21 Design Your Garden - Raised Beds, Container and Lasagna Gardening
May 5 Growing and Using Herbs
May 19 Fruit Production
June 9 Compost and Improving Your Soil
July 7 Save Your Harvest - Canning and Freezing Techniques

For more information or to register for these free workshops, call 573-339-6340. Sponsored by the University of Missouri Extension Service, The Cape Girardeau County Public Health Department and the Cape Girardeau Parks & Recreation Department.

For Trade:
Interested in Blueberry plants?
Contact Laurieizzo@yahoo.com who has plants available for trade.

Interested in beekeeping. Follow the Missouri State Beekeepers Association on Facebook or go to scientificbeekeeping.com to connect with knowledgeable groups.
**Editor’s Corner**

The Garden Spade is published monthly by University of Missouri Extension staff for individuals and families living in Southeast and East Central Missouri. This newsletter is provided by your local extension council.

**Editors:**

*Katie Kammler, Plant Science Specialist*
255 Market St., Ste. Genevieve, MO 63670
573-883-3548

*Sarah Denkler, Horticulture Specialist*
222 North Broadway Street, Poplar Bluff, MO 63901
573-686-8064

*Donna Aufdenberg, Horticulture Specialist*
304 High Street, PO Box 19, Marble Hill, MO 63764
573-238-2420

---

We welcome and encourage Master Gardener groups and individuals to submit items to the newsletter. We encourage the submission of any news such as upcoming volunteer opportunities, community events related to gardening, warm wishes or congratulations to fellow gardeners. We also encourage Master Gardeners sharing experiences and writing articles on timely topics.

All entries into the group news sections must be received by 4:30 on the 15th of each month for the following months news.

Email News to: kammlerk@missouri.edu, denklers@missouri.edu, or aufdenbergd@missouri.edu

Disclaimer: No special endorsement of mentioned products is intended, nor is criticism implied of similar products not mentioned.

---

March 2015 Garden Spade

Ste. Genevieve County Extension
255 Market St.
Ste. Genevieve, MO 63670