

Missouri Environment & Garden

July 2011

Volume 17, Number 7

Rose Rosette Disease

Rose rosette is a fatal disease of plants in the genus *Rosa* which is caused by a virus-like pathogen, spread (vectored) by a tiny, eriophyid mite (*Phyllocoptes fructiphylus*). This mite is so small that it requires 30X magnification to see and is easily dispersed on wind currents.



The most common host plant is the noxious weed, *Rosa multiflora*. However, over the past 10 years, there have been increasing reports of rose rosette infecting domesticated roses. Although there may be differences among rose species and cultivars in susceptibility to this disease, most experts believe that no cultivated roses are highly resistant. Unfortunately, this seems to be true of Knockout® and some of the other low maintenance shrub roses popular in the landscape trade. While they show excellent resistance to black spot, death from rose rosette disease is all too common.

Symptoms of rose rosette disease (RRD) are diverse and bizarre. Initially, the infected plant may have a reddish pigmentation on the leaf veins. Affected shoots may show an abnormally rapid elongation and reddening of the stem and leaves. Gradually, leaves become distorted and there is an abnormal proliferation of shoots and thorns, ultimately leading to a “witches broom” appearance. Shoots often fail to develop winter hardiness and may, consequently, be killed by freezing injury. Flowers that develop on affected shoots are small and distorted. In some cases, damage from glyphosate exposure can create symptoms that look similar to those of RRD.



Unfortunately, there is no cure for RRD. Although infection may start on individual shoots after mite infestation, it becomes systemic, usually causing death of small plants within one or two years. It may be possible to reduce

the probability of mite infestation by making weekly applications of pesticides such as carbaryl, horticultural oil or insecticidal soap in May, June and July. Repeated application of carbaryl often leads to outbreaks of spider mites due to elimination of mite predators. Avid is labeled for control of both eriophyid and spider mites on roses. How-

ever, the first step in management of RRD should be to remove all multiflora or other wild roses within 100 yards (especially upwind) of uninfected domestic roses. Symptoms of new infections generally start to appear in mid July. Pruning out symptomatic shoots may slow the progression of the disease. However, if there are many uninfected roses in the vicinity, the safest approach is to remove and destroy plants (including roots) that show any symptoms.

RRD symptoms: Reddish foliage and stems and excessive elongation, branching and thorns.



In This Issue

Rose Rosette Disease
Page 51

Plant Analysis: A Diagnostic Tool for Monitoring Nutrient Status of Perennial Fruit Crops
Page 52

Losing a Tree Can Be like Losing an Old Friend
Page 53

Horseradish: America's Favorite Root?
Page 54

Brown Patch Management in Tall Fescue Lawns
Page 55

Septoria leaf spot of tomato
Page 56

August Gardening Calendar
Page 57

Chris Starbuck,
Associate Professor
Division of Plant Sciences
StarbuckC@missouri.edu

Plant Analysis: A Diagnostic Tool for Monitoring Nutrient Status of Perennial Fruit Crops

Plant analysis has proven to be a very effective means of predicting fertilizer needs for perennial fruit crops, and has been used as a diagnostic tool for many years. To determine nutrient deficiencies, most growers rely primarily on visual symptoms, plant tissue analysis and soil analysis. Plant analysis and soil testing go hand in hand. A soil test provides an index of the nutrient that is potentially available for the crop. Plant analysis tells how much of that potentially available nutrient is actually taken up by the plant.

For perennial fruit crops (blueberries, strawberries, apples, grapes, peach, etc.), plant analysis is the best way to monitor the plant's nutrient needs. Plant analysis can be used to fine tune the efficiency of a fertilizer program before nutrient deficiency symptoms occur and is very useful in improving the fruit quality and yield. Fertilization practices can be monitored by sampling leaves or petioles mid-season, and making adjustments for the following year.

Foliar samples for perennial fruit crops are typically taken once the plants start bearing regular fruit. Plant tissue samples are taken from plants when the nutrient levels in the leaves are relatively stable. The analysis and interpretations are of little value without the use of standard and consistent sampling procedures. In general, plant samples for perennial fruit crops are taken mid-season. Usually the leaf plus petioles or just the petiole alone is sampled for plant nutrient analysis. If the level of the nutrients falls outside the optimum range, the corrective measures should be taken. Optimum nutrient ranges are based on samples collected at a particular growth stage. Since the results of the plant analysis will be compared to known standards, it is important that parts of plants are sampled at a certain stage of development.

The leaf nutrient concentrations vary throughout the growing season. The general nutrient status of grape vines and orchards should be evaluated annually. This will help in evaluating the response for applied fertilizer. For plant nutrient analysis for orchards, the leaf sample should be collected between July 15th and August 15th. Table 1 lists the proper time and plant parts to sample for perennial fruit crops.

Submitting Plant Samples for Analysis

When submitting plant samples, do not include plants affected by insects, disease or pesticide damage. Where a deficiency is suspected, take samples from normal plants in an adjacent area as well as from the affected area. It is important to take a soil sample from each area. Comparing soil and plant analysis results can greatly assist in the interpretations. Collected plant tissue is very perishable

Table 1.
How and When to Sample Perennial Fruit Crops?

Crop	Stage of Growth	Plant Part/ Location on Plant	Number of samples or Plant Part
Apples	July 15-Aug. 20	Fully-expanded leaf from middle of current terminal shoot.	40 leaves and petioles
Blueberries	First week of harvest	Young mature leaf from current season's growth.	40 leaves detach petioles
Brambles	Aug 1 –Aug 21	Select the most recent fully expanded leaf blade of each primocane.	40 leaves detach petioles
Fruit Trees (Peach, nectarine, plums, etc.)	July 15- Sept 1	Select shots at eye level from around the outside of the tree. Select shoots that make a vertical angle of 45-60 degrees to the ground. Remove 1 or 2 leaves from the mid portion of current season's growth.	30 leaves and petioles
Grapes	Veraison	Petiole from most recently matured leaf on shoot (1 petiole per shoot).	60 petioles
Raspberries	First week in Aug.	Leaf 18 inches from tip	30 leaves
Strawberries	Mid Aug.	Mature leaves from new growth at flowering	20 leaves

and requires special handling to avoid decomposition. Therefore, fresh plant tissue should be placed in clean paper bags left open; partially air dried if possible or kept in a cool environment during shipment. Wash dusty plants before air-drying. Fresh plant samples should not be placed in closed plastic bags unless the tissue is air-dried or the bag and contents are kept cool. Air-drying of fresh plant tissue can be done by placing the plant tissue in an open, dry environment for 12 to 24 hours. Air-dried samples can be placed in a clean brown bag or envelope and mailed to the lab. Request a regular plus micronutrients analysis package which includes nitrogen (N), phosphorus (P), potassium (K), calcium (Ca), magnesium (Mg), copper (Cu), iron(Fe), zinc(Zn), manganese (Mn) or the complete nutrient analysis package which includes all the above tests plus boron (B), molybdenum (MO) and sulfur (S). The University of Missouri soil and plant testing lab offers regular plus micro nutrient analysis for \$23 per sample and the complete nutrient analysis package for \$30 per sample. All the samples submitted should be accompanied by duly filled sample information

Continued on page 53

Plant Analysis: A Diagnostic Tool for Monitoring Nutrient Status of Perennial Fruit Crops

...continued from page 53

form and check written out to “MU Soil Testing” for the amount due. Counties and firms that have accounts with the lab can provide county code and firm number in the sample submission form so that they can be billed. Sample information forms can be downloaded from: <http://soilplantlab.missouri.edu/soil/forms/index.aspx>. Additional information on submitting samples to the lab and sample

information forms can be obtained from the lab’s website at: <http://soilplantlab.missouri.edu/soil/>

*Manjula V. Nathan,
Director, MU Soil and Plant Diagnostic Service Laboratories
Division of Plant Sciences
NathanM@missouri.edu*

Losing a Tree Can Be Like Losing an old Friend

The old elm tree in the front yard may be more like an old friend than a landscaping asset. You may remember when your children played under its branches. Or maybe your grandfather planted it when he first settled here. But time and disease have taken its toll and now the tree is dying. Your first consideration should be if the tree is a hazard to people or property. Have the tree evaluated by a professional to see if it might recover or should be removed.

Removing a tree can be costly but consider the danger and possible damage if it were to blow over during a storm. You might be tempted to only have the large dying branches removed instead of removing the tree. But often the tree will have to be removed entirely in a few more years, leaving you with two costly services instead of just one if you had removed it in the first place.

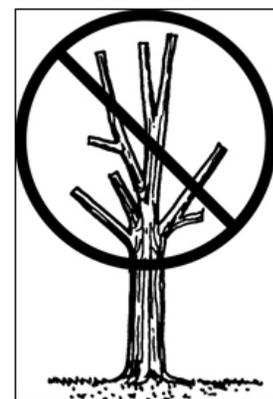
Removing a large tree should be left to professionals. Check the phone listings, usually it will be under Tree Service. If possible, check to see if they are part of an established business in the community or nearby area. Ask for current certificates of insurance showing that they are fully insured for property damage, personal liability, and worker compensation. Call the insurer for verification.

Ideally, the company should have someone on staff who is a member of a professional association such as the International Society of Arboriculture (ISA), the National Arborist Association (NAA), or the American Society of Consulting Arborists (ASCA). Certified arborists are trained and have access to current technical information on tree care, repair, and removal.

Don’t top your trees

Untrained individuals may urge you to cut back all of the branches in the mistaken belief that reducing the length of branches will help avoid breakage in future storms. Professional arborists say that “topping” -- cutting main branches back to stubs -- is one of the worst things you can do for your trees. Stubs will tend to grow back many weakly attached branches that are even more likely to break when a storm strikes.

Some trees simply can’t be saved or are not worth saving. If the tree has already been weakened by disease, if the trunk is split, or more than 50 percent of the crown is gone, the tree has lost its survival edge. Even if a storm has damaged the tree, do not top the tree. The broken branch should be pruned back to the trunk. Also, the tree will need all its resources to recover from the stress of storm damage.



Topping the tree will reduce the amount of foliage, on which the tree depends for the food and nourishment needed for re-growth. A topped tree that has already sustained major storm damage is more likely to die than repair itself. At best, its recovery will be retarded and it will almost never regain its original shape or beauty.

A look to the future

Finally after the tree is removed, plant a tree for future generations. Pick a tree that will fit the location. A common mistake is to not take into account the final size of the planted tree. It can be hard to imagine that this small sapling might someday crowd into the house or interfere with utility lines.

For more information, check your local University of Missouri Extension Center for the following guides: *G6867 First Aid for Storm Damaged Trees*, *G6866 Pruning and Care of Shade Trees* and *G6850 How to Plant a Tree*. Or look for them at Extension’s website: www.extension.missouri.edu.

*Pat Miller,
Agronomy Specialist and
County Program Director Vernon County
Division of Plant Sciences
MillerPD@missouri.edu*

Horseradish: America's Favorite Root?

There is a (somewhat) unconventional line of reasoning that suggests eating something hot and spicy makes a warm summer day seem cooler. If there is truth in that philosophy then reaching for the horseradish sauce might be a novel way to stay cool this summer. At any rate, horseradish is an interesting plant that serves as the source of a condiment enjoying new-found popularity nationwide. Is it any wonder, then, that the Horseradish Information Council has dubbed it "America's favorite root"?

Horseradish (*Armoracia rusticana*) is a perennial member of the Brassicaceae (Mustard) family. Although its leaves are edible it primarily is grown for its fleshy, pungent roots. Native to southeast Europe and west Asia, its common name is puzzling since it has nothing to do with horses and is not a radish. The German word for horseradish is "*meerrettich*" (sea radish) since it grows by the sea and, similar to radish, it bears a large storage root. The English began calling it "*mareradish*". Over centuries of time words often gradually become corrupted and "mare" became "horse" and its current common name was born. The first record of horseradish as a designation for the plant appeared in an herbal on medicinal plants published in 1597.

The first use of horseradish by humans was for its medicinal properties and dates back at least 3000 years. Some ancients used horseradish syrup as a cough medicine while others were convinced it cured ailments such as rheumatism and tuberculosis. Early Greeks (who considered horseradish to be worth its weight in gold) used it as an ointment for back pain and an aphrodisiac.

The appreciation of horseradish as food is believed to have originated in Europe, and during the Renaissance horseradish consumption spread from Central Europe north to Scandinavia and west to England. By the late 17th century horseradish was a standard condiment for English commoners and labourers and was especially favoured to accompany beef and oysters. From England, it was taken to North America during colonial times. Commercial production of horseradish is very labor intensive. It began in the mid 19th century in the United States on small horseradish farms in the Midwest. Today, that tradition continues and Illinois produces more horseradish than any other state.

A little horseradish goes a long way and the needs of most families are met by only a few plants. For those who want to grow their own, horseradish is propagated vegetatively in the early spring from root cuttings eight to nine inches long that contain a growing point. The latter usually is saved from the previous fall's harvest. Form a trench three to five inches in depth and place the root cuttings 12- 15 inches apart at a 45 degree angle, all facing in the same direction. Cover the bottom portion of the cuttings

with soil to hold them in place.

Horseradish needs a deep, rich soil along with adequate fertility and moisture to thrive. Manure incorporated into the soil in the fall before planting a crop the following spring is very beneficial. Synthetic fertilizers may be added in the spring but avoid those that are high in nitrogen. Once roots are established, irrigation usually is not necessary until later in the growing season when the storage roots begin to enlarge.

The greatest amount of root growth of horseradish occurs during late summer or early fall when temperatures are relatively cool. Harvest is accomplished by digging the roots and should not be done until late October or early November after frost has occurred. Roots may be dug anytime during the winter as long as the soil is not frozen.

Horseradish is relatively pest free. Flea beetles and beet leaf hoppers are its primary insect pests; white rust, turnip mosaic and brittle root are diseases known to be problematic on horseradish.

Freshly dug, intact horseradish roots have almost no aroma. However, when cut or grated, enzymes convert a compound called sinigrin to isothiocyanate, or mustard oil. The latter irritates the eyes and sinuses and causes the "fire" in horseradish sauce. To prepare horseradish sauce use a well-ventilated area since the fumes are very strong. Roots can be ground in a home food grinder, blender or processor after they have been peeled and diced. Keep the mixture as cool as possible by adding a small amount of water or crushed ice. Oddly, horseradish needs to be kept cold to stay hot.

After the horseradish sauce is the proper consistency for consumption, about two to three teaspoons of white wine vinegar should be added per cup of ground horseradish. The vinegar stops the enzymatic reaction described above and stabilizes the hotness of the finished product. Adding the vinegar promptly produces a milder product; waiting several minutes results in greater pungency. It should be noted that waiting too long will cause the sauce to discolor and assume a bitter taste. After preparation is completed place the mixture in tightly sealed jars and store in a refrigerator or freezer.

Horseradish Trivia:

- Sales of bottled horseradish sauce began in 1860 making it one of the first "convenience" foods.
- The U.S. produces 24 million pounds of horseradish annually which, when processed, equates to six million gallons of horseradish sauce.

Continued on page 55

Horseradish: America's Favorite Root?

...continued from page 54

- In an age of mechanization horseradish is still planted, cultivated, harvested and processed primarily by hand.
- Horseradish has only two calories per teaspoon, is low in sodium and provides potassium, calcium, magnesium, and phosphorous as well as dietary fiber.
- The National Heart, Lung, and Blood Institute recommends horseradish as part of a healthy, low-fat diet because of its fat-free, high-flavor qualities.

*Dave Trinklein,
Associate Professor
Division of Plant Sciences
TrinkleinD@missouri.edu*

Brown Patch Management in Tall Fescue Lawns

Missouri is located squarely in the climatic transition zone of the United States, meaning we are subject to extreme high temperatures during the summer and several months of freezing temperatures in the winter. Evidence of our wild temperature swings could be seen in the up and down temperatures of this past May, which was immediately followed by the Columbia's warmest first 10 days of June since 1934 (source: Pat Guinan, state climatologist). As the saying goes, "if you don't like the weather in Missouri just wait a minute". Unfortunately for a perennial crop like turfgrass, it goes hand in hand with another saying - "we can grow any grass we want, we just can't grow any of them very well".

Most lawns in Missouri are planted with tall fescue, a species of cool-season grasses that is the hardiest of the bunch. It requires relatively low maintenance, and has exceptional pest, drought, and heat tolerance as opposed to other cool-season turf species. The species does have a few pitfalls, though. It is a bunch-type grass, which means that an individual plant can only fill damaged areas by tillering from a single growing point. For this reason, tall fescue is often planted in a mixture with Kentucky bluegrass. This less stress and drought tolerant species has the advantage of spreading into damaged areas via a daughter plant arising from below ground stems (rhizomes). Tall fescue is also susceptible to brown patch; its major nemesis during the hot summer months.

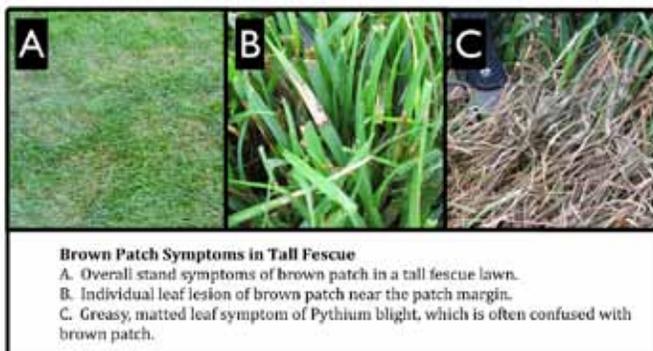
Brown patch is caused by a fungal pathogen, *Rhizoctonia solani*. The disease is foliar, which means it only attacks the leaves and not the crowns or roots of the plant. Brown patch is favored by warm (highs in the mid 80°Fs), humid conditions that start in late spring and occur throughout the summer. As the name implies, the disease occurs in straw-colored, bleached patches that can get to 2-4 feet in diameter. On the outer margins of patches, individual leaves will show characteristic lesions that have straw-colored interiors and dark brown outer margins (see photos). This is in contrast to *Pythium* blight: another summer-time foliar disease of tall fescue. It requires higher humidity and higher temperatures (think this past July 4th weekend). *Pythium* lesions will appear water-soaked, and oftentimes infected leaves will mat together.

So if you have brown patch in your lawn, what do you do? In mild cases, probably no action is necessary as the turf will recover when conditions improve. In more severe cases, fungicides in your local garden store or applied by your lawn care company will help suppress and knock back the pathogen. A full, integrated management approach, however, is less costly and can help prevent these severe brown patch (and *Pythium*) outbreaks in the future. Here are a few points to consider in tall fescue management that can improve turfgrass health and limit disease outbreaks.

Water

The most critical ingredient that a foliar turfgrass disease needs for infection is a wet leaf. This can be extremely difficult to limit, particularly in the mornings during a heavy dew set. During periods when irrigation of tall fescue is necessary, it is particularly important to water infrequently and to water early in the morning. Watering in the evening starts the time when the leaf is wet, which will continue all night since no sunlight is available for it to dry. Watering in the morning effectively rinses the

Continued on page 56



View IPM Publications on the web <http://ppp.missouri.edu/ipm/pubs.htm>

Brown Patch Management in Tall Fescue Lawns

...continued from page 55

nutrient-rich dew off the leaf blades and stops the period of leaf wetness. Sunlight and higher daytime winds will dry the irrigation off the leaf blade quickly.

Shade

Like all plants, turfgrasses need light to produce their energy. Trees and other plantings that are taller than 4 inches reduce the available food source, but more importantly produce a shaded condition that extends the amount of time that a leaf can stay wet. Selectively and carefully pruning tree limbs can aid in the amount of light and drying that a turf leaf receives, but also new plantings can be made with the turf in mind. As alluded to earlier, drying the leaf blade early in the morning is important, and therefore morning sunlight is the most valuable of the day for turfgrass. Since the sun rises in the east, try planting some of your ornamentals and trees on the west side of the lawn if possible.

Mowing

Turfgrasses are the most harvested plant on Earth. Mowing occurs every week or two, cutting off tissue that was previously providing the plant with energy. During the stressful summer season, raising the mowing heights to the tolerance level of tall fescue (4 inches) will greatly improve the overall stand health, and limit turf diseases and

weed encroachment.

Fertilizing

I discussed this aspect and its impact on brown patch severity at length in May's MEG newsletter. Brown patch (and Pythium) are 'high nitrogen' or 'nitrogen loving' diseases. This means a nice, juicy fat green leaf will increase the rate of pathogen growth and increase the rate a brown patch epidemic will increase. Therefore it is important to limit spring, and particularly late spring and summer, nitrogen applications and save them for the fall. Suggested nitrogen fertilizer rates are from 2-4 lbs N/1000 sq ft per year for cool-season lawns. Higher fall N rates can aid turf recovery from summer's stresses and prepare the turf for winter slumber.

Hopefully some of these management techniques can limit the amount of brown patch encountered in your lawn and save a buck or two in necessary fungicide expenditures.

*Lee Miller
Associate Professor
Division of Plant Sciences
turfp@missouri.edu*

Septoria leaf spot of tomato

Tomatoes are a favorite summer vegetable for many gardeners. In Missouri, many disease problems can ruin the chance of a crop, shorten the harvest season and reduce yield, or reduce the quality of the fruit. In fact, the health of the plant can even have an impact on the flavor of the tomato. One of the most frequent diseases seen during the summer is Septoria leaf spot. This disease infects the lower leaves first and gradually works its way up the plant. The first symptom usually appears after the first fruit sets with small (1/8 to 1/4 inch) circular dark-brown borders and gray centers. By looking at the lesion with a hand lens, you can see little, pepper-like fruiting bodies, which produce spores. The disease is spread when rainfall or overhead irrigation splashes the spores onto healthy tissue. As more spots develop, entire leaves will turn brown and dry up. Septoria leaf spot can rapidly progress over the entire plant during warm and rainy periods.

One of the most important things you can do is begin with strong, healthy seedlings that show no signs of disease. Vigorous, modern tomato varieties often develop fewer symptoms than older heirloom varieties, although very little resistance exists in common tomato varieties. Wet foliage is required for this disease to infect tomato

leaves. Spacing and staking plants upright will promote good air circulation and rapid drying of foliage. Overhead watering should be avoided; instead water at ground level with a soaker hose or direct the nozzle below the foliage. If this disease occurs this season, you cannot cure plants once they have become infected, but Septoria-infected plants will often produce well anyhow, especially when disease develops later in the season. The Septoria spot fungus can survive between crops on infected tomato debris, so remove and destroy debris soon after the plants stop producing. If Septoria leaf spot are severe year after year and limit production, fungicide applications that contain chlorothalonil, maneb, mancozeb or copper applied every 7 to 10 days can help in management. Fungicides should be used in addition to the other management tactics, and according to the label.

*Adam J. Leonberger
Plant Diagnostic Clinic Director
Division of Plant Sciences
LeonbergerA@missouri.edu*

August Gardening Calendar

Ornamentals

- **Weeks 1-4:** Continue spraying roses that are susceptible to black spot and other fungus diseases.
- **Weeks 1-4:** Annuals may appear leggy and worn now. These can be cut back hard and fertilized to produce a new flush of bloom.
- **Weeks 1-4:** Deadhead annuals & perennials as needed.
- **Weeks 1-2:** Divide oriental poppies now.
- **Weeks 1-2:** Feed mums, asters and other fall-blooming perennials for the last time.
- **Weeks 1-2:** Roses should receive no further nitrogen fertilizer after August 15th.
- **Weeks 1-2:** Powdery mildew on lilacs is unsightly, but causes no harm and rarely warrants control, though common rose fungicides will prove effective.
- **Weeks 1-2:** Madonna lilies, bleedingheart (*Dicentra*) and bloodroot (*Sanguinaria*) can be divided and replanted.
- **Weeks 1-2:** Divide bearded Iris now. Discard old center sections, and borer damaged parts. Replant so tops of rhizomes are just above ground level.
- **Weeks 1-2:** Prune to shape hedges for the last time this season.
- **Weeks 2-4:** Order bulbs now for fall planting.
- **Weeks 2-4:** Evergreens can be planted or transplanted now to ensure good rooting before winter arrives. Water both the plant and the planting site several days before moving.
- **Weeks 2-4:** If you want to grow big dahlia flowers, keep side shoots pinched off and plants watered and fertilized regularly.

Lawns

- **Weeks 1-2:** Zoysia lawns can receive their final fertilizer application now.
- **Weeks 1-2:** Apply insecticides now for grub control on lawns being damaged by their activity.
- **Weeks 3-4:** Lawns scheduled for renovation this fall should be killed with Roundup now. Have soil tested to determine fertility needs.
- **Week 4:** Dormant lawns should be soaked now to encourage strong fall growth.
- **Week 4:** Verify control of lawn white grubs from earlier insecticide applications.

Vegetables

- **Weeks 1-4:** Compost or till under residues from harvested crops.
- **Weeks 1-3:** Sow seeds of beans, beets, spinach & turnips now for the fall garden. Spinach may germinate better if seeds are refrigerated for one week before planting.
- **Weeks 1-3:** Cure onions in a warm, dry place for 2 weeks before storing.
- **Week 1:** Broccoli, cabbage & cauliflower transplants should be set out now for the fall garden.
- **Weeks 2-4:** Begin planting lettuce and radishes for fall now.
- **Weeks 3-4:** Pinch the growing tips of gourds once adequate fruit set is achieved. This directs energy into ripening fruits, rather than vine production.

Fruits

- **Weeks 1-4:** Prop up branches of fruit trees that are threatening to break under the weight of a heavy crop.
- **Weeks 1-3:** Protect ripening fruits from birds by covering plants with a netting.
- **Weeks 1-3:** Continue to spray ripening fruits to prevent brown rot fungus.
- **Week 1:** Thornless blackberries are ripening now.
- **Weeks 2-4:** Watch for fall webworm activity now.
- **Weeks 2-4:** Cultivate strawberries. Weed preventers can be applied immediately after fertilizing.
- **Weeks 2-3:** Spray peach and other stone fruits now to protect against peach tree borers.
- **Weeks 2-3:** Fall-bearing red raspberries are ripening now.
- **Weeks 2-3:** Sprays will be necessary to protect late peaches from oriental fruit moth damage.

Miscellaneous

- **Weeks 1-4:** Soak shrubs periodically during dry spells with enough water to moisten the soil to a depth of 8-10 inches.
- **Weeks 1-4:** Once bagworms reach full size, insecticides are ineffective. Pruning off and burning large bags provides better control.
- **Weeks 1-2:** Spray black locust trees now to protect against damage by the locust borer.
- **Weeks 2-4:** Hummingbirds are migrating through gardens now.
- **Weeks 2-3:** Watch Scotch & Austrian pines now for Zimmerman pine moth damage. Yellowing or browning of branch tips and presence of pitch tubes near leaf whorls are indicative. Prune and destroy infected parts.
- **Weeks 3-4:** Clean out cold frames to prepare for fall use.
- **Weeks 3-4:** Monitor plants for spider mite activity. Hose these pests off with a forceful spray of water.
- **Weeks 3-4:** 2nd generation pine needle scale crawlers may be present on Mugo pine now.

Gardening Calendar supplied by the staff of the William T. Kemper Center for Home Gardening located at the Missouri Botanical Garden in St. Louis, Missouri. (www.GardeningHelp.org)

