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Harvesting Apples at the "Right" Time

Many apple cultivars that are popular in Missouri are harvested in September and October. Harvesting apples at the "right time" will enhance and preserve the flavor and quality of the fruit. For example, fruit harvested too early is small in size with hard flesh and will taste starchy. In contrast, over mature fruit will have a dark, dull color with greasy peel and will taste starchy or have off flavors.

Several factors affect the harvest date. The fewer the number of apples on a tree, the more rapid fruit matures, resulting in an earlier harvest date. A heavy crop load will delay the harvest date. Also, high levels of nitrogen generally delays red color development, and induces flesh softening and early fruit drop. However, the most important factor influencing the harvest is temperature throughout the growing season. Apple harvest is slightly delayed this year with the usually cool temperatures. Apple cultivars vary in their response to temperature. For example, cultivars such as 'Jonagold' and 'Honeycrisp' favor cool northern climates. Thus, fruit of these cultivars grown in New York tends to be firmer with enhanced red blush on the peel as compared to that grown in warmer, southern climates. Also, 'Red Delicious' fruit is a brighter red color and is more elongated in shape, with the typical five points on the bottom of each apple when night temperatures are cool. In many years, 'Red Delicious' apples produced in Missouri tend to have a brownish-red, dull peel color and the fruits have a round shape due to high night temperatures often exceeding 80°F during August and September.

The "right time" to harvest depends on the intended use. For homeowners, apples can be left on the tree longer than those harvested for a retail or wholesale market. When apples are left on the tree longer, they are sweeter and softer than fruit picked earlier. Also, the storage life of later-harvested fruit is shorter than that picked earlier. Fruit that is to be shipped long distance must be harvested earlier, when fruits are firmer and less susceptible to bruising during transport.

There are several ways to determine the proper time of harvest. First, nursery catalogues will often list the days to maturity, which is the number of days from peak bloom to harvest. Alternatively, catalogues often have charts that present a range of harvest dates based on location. Another indicator of apple maturity and harvest is peel color. Peel color changes from green to yellow as the fruit matures and is ready for harvest. For apples that are primarily red in color, often the shift in color can be evaluated by looking for the color change on the side of the apple that has not been exposed to sunlight. However, because of the influence of nitrogen on color, other indicators, such as flesh firmness, and sugar and starch content should be used in conjunction with change in peel color to determine the proper time of harvest. Most commercial growers use instruments, such as a penetrometer to measure the firmness of the flesh and a refractometer to assess sugar content. Hard 'Red Delicious' fruit will measure 16.5 pounds, while ripe fruit will measure 8 pounds, and over-ripe will be less than or equal to 7 pounds. The

refractometer measures soluble solids (i.e., sugars) and values are listed as degrees Brix. Apple cultivars vary in soluble solid content at harvest. 'Fuji' apples are normally very sweet and will have high Brix values (>18), while Red Delicious will be lower. In fact, industry standards in some states require 'Red Delicious' and 'Golden Delicious' apples to have minimum Brix values of

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Daffodils: Harbingers of Spring

Few things exemplify the annual reawakening of nature each spring as do daffodils. They represent one of the most vigorous, colorful spring flowers and few garden plants provide as much pleasure with minimal effort as do daffodils. With adequate drainage they will thrive in most Missouri soils for years and are relatively pest-free. Early fall is an ideal time to establish daffodils for a glorious show of color next spring. Since daffodils remain a popular item among gardeners their bulbs should be appearing soon on the shelves of nurseries and garden centers everywhere.

There has been considerable confusion over the years concerning the proper name for this popular flower. Should it be called daffodil or narcissus? Actually, both are considered correct. Narcissus is the genus in the *Amaryllidaceae* family to which daffodil belongs and thus represents its Latin name. The genus was named after a young man in Greek mythology who was quite taken with his own attractiveness.

Daffodil is the English common name given to the plant and is thought to be a corruption of "affodell". The latter, in turn, was derived from *Asphodellus*, a genus of garden plants native to Europe. The term daffodil was carried to other countries by English-speaking people as they migrated from their native land. "Daffa down dilly," an old poetic term used for this plant, was popularized briefly in the 1960's by the release of a song with this title. Additionally, certain people today (mainly in the southern U.S.) erroneously call daffodil a jonquil. True jonquils, in fact, represent one of the 13 divisions or classes of *Narcissus*.

Some authorities reserve the term daffodil for the trumpet division of *Narcissus*. Members of this division have a trumpet-like corona (or cup) that is longer than their outer petals. Other popular divisions of narcissi include the large-cupped narcissi whose

cup is more than one-third but less than the full length of the petals; the small-cupped narcissi whose cup is less than one-third the length of the petals; and the double narcissi which are characterized by large flowers with many petals.

Good soil drainage is perhaps the most demanding need of daffodils. Bulbs planted in poorly drained locations weaken quickly, fail to flower after the first year and often develop bulb rots. Incorporation of organic matter into a soil usually helps improve drainage when it is a problem. Daffodils should have sunlight in order to develop the bulb and flower year after year; ideally this would be at least five hours of sunlight every day. However, since much of their growth and photosynthetic activity occurs early, before trees foliate, they may be planted under or near trees. Avoid planting them on north sides of buildings or near tall, dense evergreens. Daffodils do not require heavy fertilization. When preparing the soil for daffodils, incorporate a complete garden fertilizer with a 1:2:2 or 1:3:3 N-P-K ratio (e.g. 5-10-10); fertilizer with high amounts of nitrogen should be avoided. Be sure to mix this fertilizer thoroughly with the soil; never place it directly in the bottom of a hole in which a daffodil bulb will be planted.

Daffodils must have time to develop a good root system before cold temperatures set in for the winter. Therefore, early through mid-October is an ideal time to plant daffodils in Missouri. Later planting can be successful in years with warm, mild falls. Select large, firm, double-nosed bulbs free from any obvious defect or disease. "Double-nosed" is the term given to bulbs containing two growing points that should result in multiple flowers the first year after planting. When planting, space daffodils six to 12 inches apart depending on the cultivar selected and flowering effect desired. Fuller displays of flowers require closer

spacing and more frequent division of the bulbs. Daffodils should be planted so the **base** of the bulb is about six inches below the soil surface. In lighter soils, the depth can be increased to eight inches. Daffodils must have good moisture to flower well. If rainfall is sparse, the bulbs should be watered well after planting and throughout the fall. Application of an organic form of mulch (e.g. pine needles) can help to retain moisture as well as keep soil temperature uniform and warm. The latter is important to allow the bulb to develop an extensive root system before soil temperatures cool.

As mentioned previously, daffodils are relatively carefree and "naturalize" quite easily in Missouri. Established bulbs should be fertilized lightly each spring just as their leaves emerge from the soil. A handful or garden or bulb fertilizer around the base of each clump is sufficient; take care not to get any fertilizer on the leaves themselves. Both during and after flowering, daffodils require adequate water to make new growth. Fortunately, in Missouri they flower at a time of the year when spring rains tend to provide goodly amounts of moisture. In years with dry spring weather, supplemental irrigation is recommended. Daffodil bulbs should remain dry during the summer when the bulb is dormant. Daffodils manufacture food that is stored in the bulb and helps produce flowers the following year. For this reason, foliage should be allowed to remain on the plant for about eight weeks following blooming. Flower heads should be removed promptly following flowering to prevent seed heads from forming.

Properly spaced bulbs will need dividing only every five to 10 years. The need for division becomes obvious when flower size becomes smaller. To divide, dig the clump of bulbs after flowering has occurred and the foliage is dying back but can still be seen. After digging, remove excess soil and allow the bulbs to dry in a well-ventilated

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location out of direct sunlight. After the bulbs are dry, offsets may be removed from the parent bulb and stored in a dry, cool location with good air movement until October, when they should be replanted.

Daffodils may be forced in containers indoors for those who want a bit of late winter/early spring color. Begin by selecting healthy bulbs of cultivars that are known to force well. 'Barrett Browning', 'Carlton', 'Dutch Master', 'February Gold', 'Mount Hood' and 'Tête-a-Tête' represent a few examples of the latter. Select a clean container and fill the bottom with a soilless growing medium (e.g. peat, vermiculite and perlite) so that the tips of the bulbs

will be slightly below the rim of the container when planted. Gently place the bulbs on the growing medium in the container; three to four bulbs for a pot six inches in diameter should suffice. Fill and lightly firm the container with additional growing medium; the medium should cover the tips of the bulbs but end about one-half inch below the rim of the container. Label and water well.

Daffodils bulbs need to be exposed to temperatures in the range of 40 to 45° F for 13 weeks before they will bloom. This can be accomplished by placing them in an old refrigerator no longer used for food storage, an unheated shed or a trench made in

the ground and covered with mulch. Pots should be kept uniformly moist but not wet during the chilling period. After the chilling requirement has been met the pots may be moved indoors for forcing. Place pots in a cool room (preferably 63 to 65° F) in as bright a setting as possible and keep adequately watered. The plants should bloom within three to four weeks, depending upon temperature.

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Saving Garden Seed

As the growing season progresses many gardeners consider whether or not they should save seed from this year's garden to plant next year. There is no doubt that seeds of flowers and vegetables are becoming more expensive. For example, if offered an ounce of gold or an ounce of fibrous-rooted begonia seeds choose the latter (given you have a way of marketing them). A recent check of a popular seed company's internet site put the value of begonia seed at \$43,000 per ounce at the listed price per packet of 150 seeds. Of course the caveat here is that there are two million begonia seeds per ounce making the cost of an individual seed more palatable.

While thriftiness is considered a virtue by most, saving seed might not be the money-saving venture it would appear to be. A majority of the ornamental and vegetable plants we grow in our gardens today are F₁ hybrids. They tend to be more vigorous, uniform and productive than their non-hybrid counterparts. F₁ hybrids exploit a phenomenon known as "heterosis" or hybrid vigor which occurs when two carefully selected parental lines are crossed to form a hybrid offspring.

Heterosis, however, does not carry over from one generation to the next but must be fixed each generation by remaking the original cross. Therefore seed saved

from a hybrid variety will not produce a plant with the same characteristics as the plant that bore it. Progeny of F₁ hybrids tend to revert back in form to one of their parents. Genetically, this phenomenon is known as "segregation" and is a manifestation of one of the Laws of Heredity established by Mendel over 150 years ago.

The wisdom of saving seed from open-pollinated (non-hybrid) ornamentals and vegetables depends on a number of factors. Species that naturally are cross-pollinated (e.g. watermelon) derive their pollen from a male parent of the same species of unknown identity. Seed saved from an open-pollinated variety of watermelon such as 'Sugar Baby' will be "true to type" only if there were no other varieties of watermelon in the immediate area that might have served as a source of pollen. The safe isolation distance for seed collection for species pollinated by honey bees is consider to be one-half mile. For species cross pollinated by wind the safe distance depends on species and local conditions (e.g. topography and vegetation density).

Self-pollinated, non-hybrid species represent the best candidates for saving seed from the garden. Perhaps no better example exists than heirloom tomatoes but certain precautions still must be followed.

Since tomatoes are self-pollinated, saving seed from heirloom varieties will result in seeds of the same variety as long as accidental cross-pollination has not occurred. Insects such as the bumble bee and (occasionally) wind can cause cross pollination. Therefore to assure genetic purity producers of heirloom tomato seeds isolate varieties to prevent accidental cross pollination. The same must be done by the home gardener to assure genetic purity.

If the decision has been made to save garden seed then it should be collected from healthy plants. There are several virus diseases that are known to be transmitted through seeds. Clean the seed and try to sort out any that appear to be non-viable. The latter are usually smaller in size and lighter in weight. Cleaned seed should be stored in a cool, dry location. A jar with a tight-fitting lid containing a small amount of silica gel makes a good storage container. Label the jar and place it in a refrigerator or other cool location.

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Selecting Good Top Soil for Lawns and Gardens

Now that the fall season is approaching you may be getting ready for renovating your lawns. There may be small patches that you are trying to fill in with quality top soil at eroded spots and re-seed. Or you may have just finished construction of your new home and getting ready for landscaping. Since the top soil is generally removed during leveling and home construction, you may need to buy topsoil, which is the fertile top layer of soil in your yard that will support the lawn and garden. You may have a garden at your existing home or lawn that has a poor soil. Then you may consider buying a good topsoil to improve the soil or by adding organic matter and other amendments required like nutrients, lime and gypsum to improve the poor soil. One of the dilemmas the homeowners face is how to choose the good topsoil and what characteristics they should be looking for?

Topsoil is commonly available either bagged or in bulk. Bagged topsoil is usually sold in 40- to 50-lb quantities and has been amended with lime, fertilizer and organic matter and is available in the local garden centers. Bulk topsoil is generally a native soil taken from the surface and sold in truckloads. You can look in the yellow pages or newspaper adds to find bulk topsoil suppliers.

Topsoil is the uppermost part of soil ranging from 3 to 10 inches. Although most surface soils have higher organic matter content than subsoil, not all surface soil is ideal for your garden or lawns. While the plants will grow in a fairly wide range of materials, you should ensure that the topsoil you are buying has

suitable physical and chemical properties for your purpose.

Topsoil Quality Guidelines: The American Society of Landscape Architects has specifications for topsoil commonly used in contracts for landscape projects. These specifications commonly require topsoil to have acceptable ranges of organic matter, clay, and pH (a measure of soil acidity). Topsoil is often preferred to be free of weeds, plant disease pathogens, and is required to contain stones below a certain diameter as determined by sieving.

Three main chemical and physical properties influence topsoil quality in Missouri soils:

pH, texture and organic matter. It is important that the topsoil meet specific standards for these properties. If soil falls outside of acceptable ranges for any one of the properties, reject the material or realize the need for spending a considerable amount of money and time for improving the soil conditions for plants to do well.

pH: Soil pH is an indication of the acidity or alkalinity of soil. Soil pH must be measured with an electrode to obtain accurate value. Paper test strips will not accurately measure soil pH. A pH of 7 is neutral, while values below 7.0 are acidic and values above 7 are alkaline or basic. **Ideal pH is between 5.5 to 7.5.** A wide variety of plants will grow well in this pH range. However, some acid loving plants like azaleas, rhododendrons, blueberries and raspberries prefer pH below 5.5.

Texture: Soil texture refers to proportion of (percent.) sand, silt and clay sized particles in soil. The percentage by

weight of sand, silt and clay are used with a textural triangle in assigning soils to a specific textural class. Texture influences the water holding capacity, aeration, drainage, tilth, compaction and nutrient holding capacity of the soil (Cation Exchange Capacity- CEC). Ideal soil texture is loam and silt loam. Soil texture is measured in the lab by Hydrometer method or Pipette method.

Organic Matter: Soil organic matter is essential in the formation of soil structure, reducing compaction, and for retaining plant nutrients. It helps in improving the water holding capacity of the soil, aeration, and tilth. Ideal is to have an organic matter content of 3 % or greater. Soil organic matter can be measured in the by Loss on Ignition, or by Walkley Black method.

Evaluating Topsoil Quality: A soil test is the most reliable way to determine the quality of topsoil. If you are buying a lot of topsoil have it tested to check the soil pH, organic matter, nutrient levels and the soil texture. The University of Missouri Soil and Plant Testing laboratory located at 23 Mumford Hall of the UMC campus offers soil testing for determining the soil fertility status (pH, buffer pH, organic matter, P, K, Ca, Mg, and CEC) and textural analysis (particle size analysis). For more information call the laboratory at 573-882-0623, or email soiltestingservices@missouri.edu or visit the lab's website at <http://soilplantlab.missouri.edu/soil>.

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10 and 11, respectively, at harvest. Iodine tests are also used by commercial growers in some states to determine the time of harvest. For example, if half the area of the flesh is stained by an iodine solution, then it is ready for cold storage. With less flesh area staining, the fruit is more mature. Because of the toxicity of iodine to humans and animals, this test is not recommended for homeowners. While these instruments and iodine testing

are useful, homeowners can evaluate firmness and sugar and starch content by tasting the fruit. When the peel color starts to change from green to yellow, pick two fruit on opposite sides of the tree at about shoulder height. As you bite into the fruit, assess the flesh firmness and note the sweetness and absence of starchy flavors. If starchy flavors are detected, sample the fruit 5 to 7 days later and taste them again. When the taste of the fruit

is acceptable to your palate, harvest the apples, refrigerate them immediately, and savor your fruit in the following days.

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Clinic Update: August Samples at the Diagnostic Clinic

We have had a number of interesting submissions to the plant diagnostic clinic during August. What follows is a summary of some of the samples we have worked with over the past month.

We have had some tree samples with a large variety of issues. While many of the oak wilt samples we have received have come in to the lab later than they have in the past, several samples have been confirmed during August and early September. Positive samples have come from the St. Louis area, central Missouri and Adair county. Other oak samples have included Tubakia leaf spot (fewer positives so far compared to last year), jumping oak gall injury (samples have come in all summer), and Botryosphaeria twig canker (Pin oak with dead branch tips). White pine samples had bagworms, a bark beetle infestation and pine wood nematode infection (white pine is normally considered resistant to pine wilt). We had a scotch pine sample that was also positive for pine wilt nematode. Several Colorado blue spruce samples had bagworms as well as Rhizosphaera and Stigmina needlecasts. Multiple magnolia samples have had magnolia scale. In addition to the scale, extensive sooty mold development was present on the magnolia samples. The clients often complained that the scale were attracting bees or other insects to the area. Several other trees have been submitted with foliar diseases. A short list includes willow with Cercospora leaf spot, horse chestnut with Guignardia blotch, elm with black spot, dogwood with powdery mildew and Phyllosticta leaf spot, and ash with Phyllosticta leaf spot. Ornamental plum twigs had block knot infection, juniper had sapsucker injury, and pecan had a spittlebug infestation.



Figure 1. *Guignardia* leaf blotch on *Aesculus* foliage.

We have also had a limited number of other ornamental samples. Winterberry had a *Cercospora* leaf spot, peony had an *Alternaria* leaf spot, and coneflower had powdery mildew. Houseplants from a couple different locations have been submitted with severe sunburn after being moved outside temporarily during the middle of overcast days.

Finally we have had a number of fruit, herb and vegetable submissions. Several pepper submissions have been received. Pepper samples have had bacterial leaf spot, blossom end rot, and Southern blight. Tomato samples have also included bacterial leaf spot, anthracnose, bacterial canker, early blight, *Septoria* leaf spot, *Fusarium* wilt and spider mites. Pumpkin and squash samples have included *Fusarium* crown and root rot, bacterial spot (on leaves and

fruit), as well as bacterial soft rot and *Fusarium* rot of fruit. A recent cucumber sample was the first cucurbit downy mildew sample confirmed this year. Finally, we confirmed *Fusarium* wilt on basil and anthracnose on raspberry.

Sample submission can provide you with an accurate diagnosis to allow you to manage your plant problems, as well as allow us to provide comprehensive updates in the newsletter. Please refer to the sample submission section of our website <http://soilplantlab.missouri.edu/plant/index.htm> or contact us for more information on sample submission.

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Slowing the Spread of Exotic Insect Pests into Missouri

Due to extensive press coverage, most Missourians are aware of the destructive potential of emerald ash borer (EAB), which has killed tens of millions of ash trees in Michigan and Ohio. Most also know that an EAB infestation was discovered in Wayne County MO in 2008. Fortunately,

this pest has not yet been found anywhere else in Missouri. However, its presence in the state reinforces the need for concerned Missourians to do what we can to slow the spread of this and other exotic pests. The two most important things we can do are to learn to identify potential invaders and

help to educate less plant savvy citizens about the potential for spreading pests with firewood, infested plant material and recreational vehicles. There is excellent information about EAB on the web at <http://www.emeraldashborer.info/>. The

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Pest of the Month: Corn Earworm, a Pest of Many Names

The *Helicoverpa zea* moth and caterpillar is known by a number of names depending on what it's eating for dinner. It is most commonly known as the 'Corn Earworm,' however it is also known as the 'Tomato Fruitworm,' the 'Soybean Podworm,' the 'Cotton Bollworm,' and the 'Vetchworm.' It is a generalist feeder that dines on at least 16 cultivated plants and over a 100 wild host species. This pest can be found throughout the continental United States and has a global distribution.

The caterpillars (Figure 1) vary in color, ranging from a pale yellowish-green to red, to brown with lengthwise light and dark stripes. They are relatively long at around 2 inches each. The adult moths (Figure 2) are a whitish-buff color with irregular dark spots on the wings, and a span of 1½ inches.



Figure 1. Brown patch on turf (left) and grass leaves

The *Helicoverpa zea* pupa overwinters within an earthen cell 2 to 4 inches below the soil surface. They first emerge in April, and are later joined by migratory moths in June. The first-generation moths mate and the females lay their eggs on both cultivated and wild host plants. After the egg hatches, the larva feed for a short period of time on the foliage before attacking the fruit. Females on average lay around 1,000 eggs, but can lay anywhere from 500 to 3,000. The dome-shaped eggs are white when first laid and develop a reddish brown band before hatching.

The larvae feed for two to four weeks and molt four to five times. Once a larva is full-grown, it crawls down the host plant and pupates in the soil. The next generation of moths emerges within 10 to 25 days. There are two to three generations

per year in Missouri. The first generation runs from April through June, the second through July, and the third from August through September.

The larva of the *Helicoverpa zea* moth feeds primarily on the fruit of its cultivated hosts: corn ears, tomatoes, cotton squares and bolls, grain sorghum seed heads, and soybean pods and seeds. *Helicoverpa zea* larva is probably the most destructive insect pest of both sweet corn and tomatoes. The moths prefer tomatoes over corn for laying their eggs after the corn silks have turned brown and dried. The larva can attack vegetable crops throughout most of the production season, but early planted spring crops avoid heavy pest pressure. Late spring crops and fall crops of favored hosts (such as sweet corn) can experience 100 percent fruit damage.

Corn

On corn, first-generation larvae may feed within the tightly rolled leaves of the whorl-stage. This damage causes numerous ragged holes to appear after the leaves unfurl, similar to early season fall armyworm damage. The larvae also deposit wet, tan to brown waste droppings (or frass) between the whorl and the base of the leaves. Damage from second-generation larvae is more economically important because they feed on corn kernels around the tip of the ear. Since *Helicoverpa zea* larva are cannibalistic, usually only one or two larvae develop in the ear. Both the ear damage and larval frass also permit secondary disease pathogens to infect corn kernels and further reduce grain quality and yield. One of these pathogens, *Aspergillus flavus*, produces aflatoxin that is poisonous to both humans and livestock. Third generation larva can attack late-planted corn, but are usually found on other host plants. There is no recommended threshold for field corn in Missouri. Insecticide applications can be economically justified for sweet corn or late-maturing seed corn if an average of five corn earworm moths are found in pheromone traps per night when green silks are present in the field. This

only applies to pheromone traps placed adjacent to production fields and not to the moth captures reported on the MU IPM Pest Monitoring Network website. Stop insecticide applications when 90 percent of the silks turn brown.

Tomatoes

On tomatoes, moths lay their eggs at night on leaves near green fruit at the outer edges of the plant. The larvae prefer to feed on the green fruit and usually do not enter ripe fruit. Damage consists of deep watery cavities near the stem end of the fruit. During its development, one larva may injure several fruit. Economic thresholds only apply to tomatoes plants that have green fruit. Look for an average of 1 infested plant (larvae or fresh feeding damage) per 40 plants or when any eggs are present on foliage.

Cotton

On cotton, the female moth typically deposits her eggs on young terminals, square bracts and flowers (inside or outside). Boll damage is generally accompanied by semisolid, moist frass deposited by the larvae around the irregular-shaped entrance hole. A single larva may consume as many as six to seven cotton squares and two to three bolls before completing its growth. The University of Missouri's threshold treatment recommendation on cotton applies only when 10 or more cotton bollworm eggs or larvae are found per 100 plants, or when square or boll damage reaches 5-10 percent.

Grain Sorghum

On grain sorghum, larvae can be found feeding on the seeds and flower stems late in the growing season. Plants are most vulnerable to injury during the bloom to milk stages, and larvae can heavily damage seed heads. An average of one larva per seed head can reduce yields by as much as 5 percent and two larvae per seed head can cause a 9-10 percent yield loss. Insecticide applications are recommended for grain sorghum when thresholds levels of *Helicoverpa zea* larva exceed 75 percent

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of the plants in the field, or when one or more larvae are found per seed head.

Soybean

On soybean, late-planted or double-cropped soybeans are most vulnerable to attack, especially in southern Missouri. Third generation larvae can damage leaves, stems and flowers but pods and seeds are especially vulnerable. When larval infestations coincide with pre-bloom, damage is limited to the foliage and is generally of little economic importance. However, infestations during peak flowering to early pod fill stages can delay seed production and lower yields. Once soybean plants begin to flower, rescue insecticide applications are recommended when *Helicoverpa zea* larva populations are more than one per row



Figure 2. *Helicoverpa zea* moth.

foot and 5 percent or more of the pods are damaged.

Corn earworm (CEW) is one of eleven insect pests currently monitored by the

IPM Pest Monitoring Network. Nearly 20 pheromone traps located throughout Missouri's 8 geographical regions are checked frequently to provide up-to-date pest population data as an important tool to help pest managers make sound pest management decisions. Since the CEW monitoring season began in mid-April, there have been 39 CEW Pest Alerts sent to our subscribers from June 3 through August 27 due to potentially significant moth captures in pheromone traps. In the 2009 pest monitoring season, significant captures have occurred in 4 Missouri counties in 2 regions. There have been 16 alerts at the Delta Center near Hayward in Pemiscot County (SE region), 15 alerts from Benton in Scott, County (SE), 6 from Bloomfield in Stoddard County (SE), and 3 at the Bradford Research and Extension Center in Boone County (Central region).

Individuals interested in pest management can sign up and receive Pest Monitoring alerts by e-mail when potentially significant insect captures have been reported. To subscribe to this service, visit our web site at:

<http://ppp.missouri.edu/pestmonitoring/subscribe.htm>.

At the site, fill in the required fields and then mark the boxes next to the insects you'd like to track and click submit. When pest captures reach significant numbers you will automatically be notified via email. Although Pest alerts from moth

and beetle captures in pheromone traps do not indicate that treatment is necessary, they do provide a valuable tool to our subscribers indicating that scouting for potential pests in nearby locations may be in order.

Monitoring for pest outbreaks is a cornerstone of MU's Integrated Pest Management (IPM) Program. IPM stresses scouting practices rather than calendar-based treatments to detect pests and determine if action is necessary. MU's IPM Pest Monitoring Network provides farmers, landowners and pest managers with an up-to-date tally on several economically important insect species captured in pheromone traps throughout Missouri.

For additional information on Corn earworm and possible damage symptoms on corn and other crops as well as treatment recommendations follow this link:

<http://extension.missouri.edu/xplor/agguides/pests/g07110.htm>

Image citations:

Figure 1: *Helicoverpa zea* larva: R.L. Croissant, Bugwood.org

Figure 2: *Helicoverpa zea* moth: G7110, Corn Earworm in Missouri

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Missouri Department of Conservation also provides good information about the potential for spreading pests via firewood at <http://mdc.mo.gov/forest/features/firewood.htm>.

Two potentially destructive exotic insect pests that have faded from public awareness in Missouri are Gypsy Moth and Asian Longhorned Beetle. Unfortunately, these pests have not gone away. Gypsy Moth (GM) has been slowly working its way west and is currently infesting parts of Ohio, Indiana and Illinois. An excellent GM website maintained by the US Forest Service can be found at <http://www.fs.fed.us/ne/morgantown/4557/gmoth/>. A

GM trapping program has been in place in Missouri for a number of years. A recent memorandum from the Missouri Department of Agriculture reported that more moths (22) were found in pheromone traps around the state in 2009 than in any year since 1995. While we do not yet have a verified infestation, it is important to remind those camping in GM-infested areas to check their vehicles for egg masses before they return to Missouri. Firewood should never be transported from an infested area.

Although the Asian Longhorned Beetle was thought to have been eradicated in the Chicago area, there is new evidence that it

may be back. Also, a large new infestation has been found in western Massachusetts. Again, it is critical that Missourians know the dangers of moving firewood and other lumber that may be infested with this very destructive pest. An excellent guide on identification of Asian Longhorned beetle can be found at http://www.na.fs.fed.us/pubs/palerts/alb/alb_pa.pdf.

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October Gardening Calendar

Ornamentals

- **Weeks 1-4:** Continue watering, especially evergreens if soils are dry.
- **Weeks 1-4:** Nuts or seeds of woody plants usually require exposure to 3 months cold before sprouting. This may be provided by outdoor planting in fall or "stratifying" in an unsealed bag of damp peat moss placed in the refrigerator.
- **Weeks 1-4:** Container grown and B & B trees and shrubs can be planted. Loosen the soil in an area 5 times the diameter of the root ball before planting. Mulch well after watering.
- **Weeks 1-4:** Plant spring bulbs among hostas, ferns, daylilies or ground covers. As these plants grow in the spring they will hide the dying bulb foliage.
- **Weeks 1-2:** For best bloom later this winter, Christmas cactus, potted azaleas and kalanchoe may be left outdoors until night temperatures drop to about 40 degrees Fahrenheit.
- **Weeks 2-4:** Spring bulbs for forcing can be potted up now and stored in a cool, frost-free place until it is time to bring indoors, usually 12 to 15 weeks.
- **Weeks 2-3:** Cannas and dahlias can be dug when frost nips their foliage. Allow the plants to dry under cover in an airy, frost-free place before storage.
- **Weeks 3-4:** Transplant deciduous trees once they have dropped their leaves.
- **Week 4:** Plant tulips now.
- **Week 4:** Trees may be fertilized now. This is best done following soil test guidelines.

Lawns

- **Weeks 1-2:** Seeding should be finished by October 15.
- **Weeks 2-3:** Broadleaf herbicides can be applied now to control cool season weeds such as chickweed and dandelion.
- **Weeks 3-4:** Continue mowing lawns until growth stops.
- **Weeks 3-4:** Keep leaves raked off lawns to prevent smothering grass.
- **Weeks 3-4:** Now is a good time to apply lime if soil tests indicate the need.
- **Week 4:** Winterize lawn mowers before storage.

Vegetables

- **Weeks 1-4:** Sow cover crops such as winter rye after crops are harvested.
- **Weeks 1-2:** Harvest winter squash and pumpkins before frost. For best storage quality, leave an inch or two of stem on each fruit.
- **Weeks 1-2:** Dig sweet potatoes before a bad freeze.
- **Weeks 1-2:** Gourds should be harvested when their shells become hard or when their color changes from green to brown.
- **Week 2:** The average first frost usually arrives about October 15-20.
- **Weeks 2-4:** Tie leaves around cauliflower heads when they are about the size of a golf ball.

Fruits

- **Weeks 1-4:** Store apples in a cool basement in old plastic sacks that have been perforated for good air circulation.
- **Weeks 2-3:** Persimmons start to ripen, especially after frost.
- **Week 4:** Place wire guards around trunks of young fruit trees for protection against mice and rabbits.

Miscellaneous

- **Week 1:** Fall color season begins.
- **Week 3:** Begin peak fall color in maples, hickories and oaks.
- **Week 4:** End of peak fall color.