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## Fruit Trees to Plant in 2011

The best time to plan for the 2011 growing season is during the cold, dreary, short days of winter when the new nursery catalogs magically appear with glossy pictures of luscious fruits. Although those perfect fruit photos of exotic new cultivars are tempting, the best plan is to choose cultivars appropriate for Missouri's erratic climate. Also, whenever possible, choose the most disease-resistant cultivars available to minimize control problems. Unfortunately, insect resistant fruit cultivars have yet to be developed.

In Missouri, the predominant disease that kills apple trees or causes significant limb loss is fire blight. Other major diseases include apple scab, cedar apple rust, and powdery mildew. The top three recommended apple cultivars for which there is immunity or resistance are Williams' Pride, Liberty, and Enterprise. Williams' Pride is a dark-red fruit with a sweet flavor balanced with acidity. This cultivar is harvested in late July to early August. Liberty is a very tart-flavored red apple that matures near Labor Day in central Missouri. Because of the high temperatures during ripening, both Williams' Pride and Liberty fruits soften rapidly at maturity. The harvest period for high quality Liberty fruit is short and apples will drop from the tree if not harvested quickly. Both cultivars have a relatively short storage life in refrigeration. Enterprise is harvested around October 10 to 15 in central Missouri and stores well as temperatures are cooler at this time. These apples will continue to hang on the tree even when overripe. Although Enterprise fruit can be eaten immediately after harvest, its spicy, tart flavor continues to develop and is enhanced after a month in refrigeration. Be aware that these cultivars are susceptible to other summer diseases such as fly speck and sooty blotch.

Other old time apple favorites, that continue to be planted, are Arkansas Black, Red York, and Winesap. All three of these cultivars have withstood the test of time because of their disease resistance, late harvest dates, and quality during long term cold storage. As with nearly all apples, two different cultivars with overlapping flowering dates are required for cross-pollination and fruit set. Winesap is one of the few pollen-sterile cultivars so it cannot be used to pollinate other cultivars.

When choosing pear trees, select cultivars with fire blight resistance. As with apple, this bacterial disease can kill young trees. Timely spraying of a bactericide is often difficult in a backyard situation. Unfortunately, the high quality pears grown in the Pacific Northwest, such as Bartlett, Anjou, Bosc, and Comice, are very susceptible to fire blight. However, Moonglow, Starking® Delicious, and Seckel are resistant to this disease.

When choosing stone fruit cultivars, cold hardiness is important. For this reason, apricots, sweet cherries, and Japanese plums are not generally recommended for planting

in Missouri. These fruit do not bear fruit reliably due to bud loss during periods of fluctuating temperatures in February and late spring frosts in central and northern Missouri. For peach, cultivars should also be resistant to bacterial spot. Some of the cultivars that have relatively good bacterial spot resistance and are therefore recommended include Biscoe, Redhaven, Redskin, Loring, Belle of Georgia, etc. The most reliable plums are the European types (also called prune-plums) such as Stanley and Earliblue. Tart cherries generally produce better than sweet cherries in Missouri because of their superior cold hardiness. Montmorency was first introduced into the United States in 1760 from France and remains a standard in home gardens. However,

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# Granulate Ambrosia Beetle: Another Exotic Pest of Ornamentals to Watch For

It seems that there is a constant stream of exotic insect and disease pests that affect ornamental trees and shrubs. The Granulate Ambrosia Beetle is another one to watch for. This tiny insect (*Xylosandrus crassiusculus*) is native to Asia and arrived in the Carolinas on wooden packing crates in the early 1970's. It is now well established in the Gulf States and has been recently found in the Midwest, including Missouri. Ambrosia beetle has a wide host range, including maples, peach, cherry, plum, dogwood, certain oaks, magnolia and black walnut and others. We have found it on the MU campus



Figure 1. Frass columns on a yellowwood tree.

in yellowwood and goldenrain tree.

Despite its miniature stature (2 mm), Ambrosia Beetle kills trees by creating extensive feeding galleries for its young. The insect does not feed on plant tissue but on a fungus (Ambrosia fungus) that the female spreads within the galleries. A telltale sign of this pest is the presence of toothpick-like columns



Figure 2. Ambrosia Beetle

of frass that are pushed out of tiny holes in the bark during gallery excavation.

Unfortunately, Ambrosia beetle is difficult to manage because symptoms and signs may not be evident early in an infestation. The pest is easily spread by movement of infested nursery stock and may go undetected for some time in a new location. There is no effective treatment for eradicating the insect once it has entered the host. Therefore, the best management approach is to destroy infested plants and treat the trunks of nearby susceptible plants with insecticide.

So, if you see what appear to be toothpicks sticking out of the trunk of a tree, call your local Extension office to report your observation. It may be possible to eradicate the infestation before it becomes established.

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bright sunshine immediately following rain near harvest often results in fruit loss due to skin cracking. All of the stone fruits are plagued by brown rot, which is especially problematic during wet weather. Be aware that some of the exotic hybrids such as apriums (apricot x plum), plumcots (plum x apricot), cherums (cherry x plum) and peacotums (peach x apricot x plum) developed in California may not perform well under the Midwest climatic conditions. If you lured by the novelty of these exotics, it's probably best to purchase them at the grocery store.

The biggest problem home gardeners face is finding enough area in full sun during the day to plant all these terrific fruit trees. Pare down you list and only plant climatically adapted

cultivars with good disease resistance in the well-drained spots in your yard. Choose wisely and place those orders now for on-line or mail-order fruit trees to ensure that the ones you want are available for planting during late March or early April 2011.

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# Cyclamen: Hearts and Flowers

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The term “hearts and flowers” originally was the title of a tune composed during the late 19th century. Evidently it was quite popular as an accompaniment to silent movies early in the history of cinema. Today, “hearts and flowers” is synonymous with love and romance, as is Valentine’s Day. A gift of hearts and flowers symbolizes the heart-felt admiration of a loved one displayed through the sentiment of flowers.

A flowering houseplant that displays both hearts and flowers is cyclamen. The flower of a cyclamen has petals that flair backwards and resembles a “shooting star”; cultivars are available in shades of red and pink along with white. Additionally, many species of cyclamen bear nearly perfectly heart-shaped leaves. The intrigue of the latter often is enhanced with markings of silver or grayish-white. As an added bonus, many cultivars of cyclamen are sweetly fragrant, making it a perfect gift for Valentine’s Day.

The association of cyclamen with matters of the heart predates Valentine’s Day. The Greek’s used it as an amorous medicine which was supposed to cause the person who took it to fall madly in love. Additionally, they used it as a purgative, a medication to speed the delivery of babies and (of all things) a cure for baldness. Years later it was demonstrated that, in fact, the tubers of cyclamen contain a toxic compound that in humans can lead to violent diarrhea, convulsions and paralysis if eaten raw and in fairly large quantities. The leaves of the plant are not considered to be toxic.

*Cyclamen* is a genus that contains more than 20 species of flowering plants in the *Primulaceae* family. The name comes from the Latin word for wheel and refers to the round, corm-like tubers formed by the plant. All cyclamen are perennials in their native habitat which ranges from Europe and the Mediterranean region eastward to Iran. Cyclamen are cool-loving plants that in their native habitat usually emerge from tubers in the fall, grow and flower during the cool, mild winter and die back in late spring as temperatures warm.

*Cyclamen persicum*, or Florists’ Cyclamen, is perhaps the most commonly grown species of cyclamen today. Although quite popular in Europe for many years, it has been slow to gain favor in the United States due perhaps to its affinity for cool temperatures. Americans tend to keep their homes a bit warmer than most Europeans do, much to the dismay of cyclamen.

The breeding efforts of German, Dutch and Swiss growers can be credited for the large-flowered, standard-sized cyclamen we enjoy today. More recent cyclamen breeding has been focused on producing smaller types known as minis and miniatures. These cultivars tend to produce smaller plants than standard-sized cyclamen and they flower faster when grown from seeds. Although they bear flowers that are slightly smaller, mini and miniature types bear them in greater abundance resulting in

a more robust display of color. They also are more likely to be fragrant than standard types.

If a cyclamen is on the gift list for a significant other (or yourself) this Valentine’s Day, look for plants that appear healthy and have a multitude of buds in the center of the plant. Avoid plants with chlorotic leaves or necrotic leaf margins since this can be a sign of root problems. Cyclamen may flower for several months if kept in bright light and fairly cool temperatures. Night temperatures near 50 degrees Fahrenheit are best, however, a range from 50 to 60 degrees is acceptable. Day temperatures should be kept at about 70 degrees since high temperatures cause the immature flower buds to abort. Never place a cyclamen near a heat register or hot air duct.

Cyclamen should never be allowed to wilt and uniform watering is critical for the plant to perform well. The first sign of inadequate amounts of water, other than wilted foliage, is the appearance of yellow leaves. This may be followed by the collapse of small flowers and/or buds in the center of the plant. Conversely, never allow cyclamen plants to sit in water since, like most plants, they are susceptible to root rots brought on by overwatering.

As mentioned above, cyclamen is a perennial plant and may be forced into bloom in subsequent years if the proper regimen is followed. To rebloom a cyclamen it first must be forced into dormancy. After flowering subsides, gradually withhold water until the foliage dies back. This begins its dormancy or rest period. Do not water the plant for six to eight weeks.

By midsummer, begin watering the plant gradually. Repot if the tuber in the pot is fairly large. When repotting, keep about half of the tuber above the soil line. At this time, a lightly shaded, cool spot outdoors, or a cool, shaded window indoors provides the best location. As new leaves develop, resume normal watering and fertilization and move the plant to a more sunny location. Remember to keep the growing medium moist at all times, and feed with a houseplant fertilizer according to manufacturer’s directions. In the fall, move the plant indoors before the danger of frost. Plants treated in this way should rebloom by midwinter.

Cyclamen is quite susceptible to infestation by cyclamen mites. If young leaves of a cyclamen become stunted or curled, the pest may be present. It is very difficult to detect cyclamen mites because of their extremely small size and translucent appearance. Although insecticides are available to combat this pest, control is difficult and infected plants probably are best discarded before the mites can spread to other plants.

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# Why Apple Rootstocks?

For many years, seedling apple rootstocks were commonly used for grafted trees. In North America, seeds of commercial cultivars, such as Delicious were obtained from processing or juice plants and grown for rootstocks. Seeds of French Crab and Antonovka were also imported for seedling rootstock production. However, dissatisfaction with variability in tree size, intolerance of climatic or soil extremes, and lack of pest resistance of seedling rootstocks led to the development of clonal rootstocks at the East Malling Research Station, Kent, England beginning in the early 1900's.

Today the most common clonal rootstocks from the East Malling program are the Malling (M.) or Malling Merton (MM) series, including M.9, M.26, M.7, MM.106, and MM. 111. Other clonal apple rootstocks include the Budagovsky (Bud), Polish (P.) Vineland (V.), Supporter (S.) and the Geneva series (Table 1). The Cornell Geneva breeding program was initiated in 1968 to develop rootstocks with improved disease resistance (especially fire blight) and tolerance to low winter temperatures.

One of the main reasons clonal rootstocks are used is to control tree size or vigor. Interstems, which are three-part trees with an additional rootstock piece grafted between the scion cultivar and the lower rootstock, are also used to reduce tree size. With small trees, placed at close spacings, a greater number of trees can be plant per unit area of land. Thus, high density planting is a strategy used to increase apple production. Small trees are also desirable for homeowners with limited space for trees in full sun. Table 1 lists the relative vigor of rootstocks currently used by commercial nurseries. However, many other clonal rootstocks have been tested at the University of Missouri for more than 30 years.

Another important attribute of clonal rootstocks is their capacity to induce precocity or apple production at a young tree age. For example, dwarf trees on a M.9 rootstock generally bear fruit two to three years after planting. In contrast, a less dwarfing rootstock, such as MM.11 generally does not bear fruit until age five. In many cases, the more dwarfing the rootstock, the sooner fruiting is initiated.

Rootstocks also influence tree anchorage and root brittleness. Generally, more dwarfing rootstocks have shallower root systems and more vigorous rootstocks are deeper rooted. However, depth of rooting is also influenced by soil type, compaction and drainage. Some of the dwarfing rootstocks, such as M.9 and B.9 have short wood fibers which makes them brittle. For this reason, subclones of M.9 rootstock, such as M.9 Nic 29 have been selected with less brittle roots. Under

**Table 1. Influence of Commercially Available Apple Rootstocks on Tree Vigor**

Rootstock	Vigorous	Semi-vigorous	Semi-dwarf	Dwarf
<b>Malling series</b>				
M.7A	X			
M.9				X
M.9 Nic 29				X
M.9 NAKB T337				X
M.9 Pajam 2				X
M.26		X		
MM.106	X			
MM.111	X			
<b>Russian series</b>				
B.9				X
B.118	X			
B.490		X		
<b>Polish series</b>				
P.2				X
P.22				X
P.18	X			
<b>Geneva Series</b>				
G.11		X		
G.16				X
G.30	X			
G.41			X	
G.935			X	
<b>Supporter series</b>				

windy conditions (>40 mph) large structural roots break cleanly at the base of the trunk. Trees on these rootstocks, as well as those as vigorous M.7 should be supported by a stake or trellis structure to prevent leaning or tree loss.

Clonal rootstocks also vary in their adaptability to soil textures, temperatures, and moisture content. For example trees on MM.111 grown in heavy clay soils generally perform better than those on M.9 rootstock. Also, MM.111 and M.7 trees are relatively resistant to high soil temperatures, whereas M.9 trees perform poorly at soil temperatures >77°F. MM.111 also survives summer drought conditions better than many other rootstocks. However, MM.111 has poor survival in flooded soil conditions during the growing season as compared to M.7, M.26, and M.9 rootstocks.

Rootstocks also vary in their capacity to cease growth in the fall, acclimate to cold winter temperatures, and to initiate

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**Table 2. Susceptibility of Selected Apple Rootstocks to Various Disease**

Rootstock	Crown Rot	Fire Blight	Latent Viruses
<b>Malling series</b>			
M.7	MR	R	T
M.9	R	S	T
M.26	MS	S	MS
MM.106	MS	M	T
MM.111	M	M	T
<b>Russian series</b>			
B.9	VR	S	T
B.118	R	S	NT
B.490	MR	M	T
<b>Polish series</b>			
P.2	R	MS	NT
P.22	R	MS	NT
P.18	VR	MR	NT
<b>Geneva Series</b>			
G.11	MR	MR	NT
G.16	T	R	NT
G.30	T	MR	NT
G.41	NT	R	NT
G.935	R	R	NT
<b>Supporter series</b>			
S.4	S	S	NT

**Rating System:** S=susceptible, MS=moderately susceptible, M=intermediate, MR=moderately resistant, R=resistant, VR=very resistant, T=tolerant, and NT=not tested.

growth in the spring. M.7 rootstock induces early vegetative maturity in the fall, resulting in resistance to early winter resistance to freezing. However, M.7 and M.9 rootstocks have poor mid-winter hardiness as compared to B.9, P.2, P.22, Antonovka 313, and most Geneva rootstocks.

Pest resistance of apple trees is also influenced by the rootstock (Table 2). The MM series were developed specifically to resist woolly apple aphids which infested many of the orchards in England, Australia, and New Zealand. Infestations of dogwood borer are often less severe on rootstocks that rarely produce burrknots (root initials on the trunk), including

B.9, G.41, G.16, and G.65. In contrast, M.9, M.26, M.7 and MM.111 rootstocks frequently develop burrknots and are more susceptible to dogwood borer injury. Pine and meadow vole feeding is particularly severe on rootstocks with thick bark, such as M.9.

Two predominant diseases affecting apple rootstocks are fire blight and crown rot. Fire blight can cause rapid death to trees on M.9 or M.26 rootstocks or in trees with these used as an interstem. G.16 and G.41 are two of the more fire blight rootstocks in the Geneva series. Fire blight infection can also occur on root suckers or burrknot and can be translocated to the trunk, resulting in tree death. M.9 and M.26 also prolong the bloom period and cause flowering on one-year old wood. This longer bloom period increases the likelihood of optimum weather conditions that result in fire blight infection. Also, the combination of an extremely fire blight susceptible cultivar (Jonathan, Gala) on a susceptible rootstock should be avoided. On sites with poorly drained soils, rootstocks such as B.9 or G.16 are recommended for their resistance to crown rot, whereas MM.106 and M.7 should be avoided.

A relatively new virus in the U.S. is apple union necrosis, which is caused by tomato ringspot virus and is spread through the soil by dagger nematodes. Affected trees break cleanly at the graft union. Trees on MM. 106 and M.26 are susceptible, especially with Delicious as the scion cultivar. In contrast, M.7 rootstocks in combination with less sensitive cultivars (Empire, Golden Delicious, York) appear to be resistant. In the original Malling rootstocks, latent viruses are also present, but have no apparent adverse effects on apple trees. In an attempt to remove viruses, but not all latent ones, some (rubbery wood, apple mosaic, star crack, and chat fruit) were removed and these rootstocks were designated with an "A" (e.g., M.7A, M.9A). Later efforts to produce virus-free rootstocks resulted in the EMLA designation (M.9 EMLA). This effort resulted in a slight increase in tree size with most rootstocks. However, the greatest increase in size occurred with M.9 EMLA, which can be as much as 50% larger than the original clone. In conclusion, clonal rootstocks provide many beneficial attributes to apple production, but some that are available in the marketplace also have shortcomings. Thus, whenever possible, carefully select a rootstock that best matches your site conditions to avoid many of the problems that plague apple growers.

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# March Gardening Calendar

## Houseplants

- **Weeks 1-4:** Two handsome houseplants that provide fragrant blossoms indoors this month are the Confederate Jasmine (*Trachelospermum jasminoides*) and Japanese Pittosporum (*Pittosporum tobira*). Both thrive in average home conditions and are easy plants to grow.
- **Weeks 1-4:** As day lengths increase, plants begin new growth. Repot root bound plants, moving them to containers 2 inches larger in diameter than their current pot. Check for insect activity and apply controls as needed. Leggy plants may be pruned now.

## Ornamentals

- **Weeks 1-4:** Trees, shrubs and perennials may be planted as soon as they become available at local nurseries.
- **Weeks 1-4:** To control Iris borer, clean up and destroy the old foliage before new growth begins.
- **Weeks 1-4:** Loosen winter mulches from perennials cautiously. Re-cover plants at night if frost returns. Clean up beds by removing all weeds and dead foliage at this time.
- **Weeks 1-2:** Heavy pruning of trees should be complete before growth occurs. Trees should not be pruned while the new leaves are growing.
- **Weeks 3-4:** Ornamental grasses should be cut to the ground just as the new growth begins.

## Lawns

- **Weeks 1-4:** Mow lawns low to remove old growth before new growth begins.
- **Weeks 2-4:** Apply broadleaf herbicides now for control of cool-season perennial and annual weeds. These must not be applied to areas that will be seeded soon.
- **Weeks 2-4:** Apply controls for wild garlic. It will take several years of annual applications for complete control.
- **Weeks 3-4:** Thin spots and bare patches in the lawn can be over seeded now.

## Vegetables

- **Weeks 1-4:** Any root crops such as horseradish, parsnips, Jerusalem artichokes, or carrots still in the ground from last year should be harvested before new green top growth appears.
- **Weeks 1-4:** Fertilize the garden as the soil is being prepared for planting. Unless directed otherwise by a soil test, 1 to 2 pounds of 12-12-12 or an equivalent fertilizer per 100 square feet is usually sufficient.
- **Weeks 1-2:** Delay planting if the garden soil is too wet. When a ball of soil crumbles easily after being squeezed together in your hand, it is dry enough to be safely worked.
- **Weeks 2-4:** Plant peas, lettuce, radishes, kohlrabi, mustard greens, collards, turnips, Irish potatoes, spinach and onions (seeds and sets) outdoors.

## Fruits

- **Weeks 1-4:** Gradually remove mulch from strawberries as the weather begins to warm.
- **Weeks 1-3:** Continue pruning apple trees. Burn or destroy all prunings to minimize insect or disease occurrence.
- **Weeks 3-4:** Aphids begin to hatch on fruit trees as the buds begin to open.
- **Weeks 3-4:** Apply dormant oil sprays now. Choose a dry day when freezing temperatures are not expected.
- **Weeks 3-4:** Spray peach trees with a fungicide for the control of peach leaf curl disease.
- **Week 4:** Mulch all bramble fruits for weed control.
- **Week 4:** Peaches and nectarines should be pruned just before they bloom.