UNIVERSITY OF ARKANSAS
DIVISION OF AGRICULTURE
Cooperative Extension Service

Agriculture and Natural Resources

Apple Production in the Home Garden

Dr. R. Keith Striegler
Extension Horticulturist - Fruit

Apples are a popular fruit and can be grown successfully in most areas of the state. The key to producing quality fruit in a home orchard is proper and timely care of the trees and variety selection.

Site and Soil Requirements

Plentiful sunlight is a key to maximizing fruit production. Choose an area in your landscape that will be in the sun most or all of the day. Otherwise, expect reduced performance from the trees. Early morning sun is particularly important to dry dew from the plants, thereby reducing the incidence of diseases.

Good drainage is more important to consider than soil fertility. Avoid soils and sites that are not well-drained. Poor drainage would be expected in an area where water stands for more than 24 hours after a rain. In areas of poor drainage, roots will not receive enough oxygen, resulting in stunted growth and eventual death of the tree. If such conditions exist, planting on a raised bed will help.

Purchasing Trees

The old adage "you get what you pay for" is an important consideration when buying apple trees. Bargain plants may not be healthy or may be a variety not adapted to your area. Buy only trees of recommended varieties from a reliable source.

Keep the following points in mind when purchasing apple trees:

- A healthy 1-year-old whip approximately 2- to 3-feet tall with 1/2-inch diameter trunk and a good root system is preferred.
- A small tree with a good root system is more desirable than a large tree with a poor root system.
- Trees that are 2 years old or older are often not as good as 1-year-old trees. The older trees frequently lack sufficient buds on the lower portion of the trunk to develop a good framework. If older trees are purchased, they should be cut back to force out buds lower on the main trunk.
- Do not purchase trees that appear stunted, poorly grown, diseased or to have suffered insect injury.
- Labels should be checked closely to make sure the selection is the desired variety and rootstock.
- Do not purchase dried, shriveled trees even at discount prices.

Pollination

Apple varieties require pollen from another variety to set fruit. Therefore, plant two or more varieties with overlapping bloom periods. Some varieties bear heavy crops when pollinated by another pollen-producing variety but do not themselves produce good pollen. Table 1 lists common and promising varieties of apples suggested for planting.

Arkansas Is Our Campus

Visit our web site at:
http://www.uaex.edu

Table 1. Characteristics of Recommended Apple Varieties

Harvest Season	Cultivar	Disease Susceptibility	Disease Resistance	Color	Size	Texture/Flavor	Type	Storage	Comments
Early (July-Aug)	Ginger Gold	FB, PM		G-Y	M/L	firm, juicy, good flavor	C,D	yes	Stores well for early apple
	Gala	CAR,FB,PM,AS		O-R-Y	S/M	firm, crisp, sweet	C,D	yes	Many strains
	Jonathan	CAR,FB,PM		R	S/M	tart	C,D	no	Many strains
	William's Pride		AS,FB,PM	P-R	M/L	sweet-tart	D	no	Best disease resistance available
	Pristine		AS,PM	O-Y	M	somewhat tart	D	no	
Mid (Sept)	Jonagold	AS,FB,PM		O-R-Y	L	rich, sweet flavor	C,D	yes	Will not pollinate other trees
	Suncrisp			Y	M/L	firm, crisp, rich flavor	C,D	yes	Very flavorful
	Red Delicious	AS	FB	R	L	mild	D	yes	Many strains
	Empire	AS		R	S/M	crisp and juicy	C,D	yes	Only adapted McIntosh strain
	Golden Delicious	AS,CAR		Y	L	mild and juicy	C,D	yes	Many strains
	Winesap	AS,CAR,PM		R	S/M	spicy, wine-like flavor	C,D	yes	
Late (Oct-Nov)	Arkansas Black	AS,FB		R	M	hard, distinctive flavor	C,D	yes	Arkansas favorite, long storage time
	Rome	CAR,FB,PM		R	L	hard, mild flavor	C	yes	Spur-type best to grow
	Granny Smith	FB,PM		G	L	firm, crisp, tart	C,D	yes	Avoid spur-types, long storage time
	Fuji	AS,FB		R-Y	M/L	crisp, mild and sweet	C,D	yes	High quality apple, will crack in rain
	Pink Lady	FB		R-Y	M/L	firm, sweet-tart	D	yes	Promising cultivar, very late
	Gold Rush	CAR	AS,FB,PM	Y	M	very firm and crisp, very unique flavor	D	yes	Best disease resistance available
	Enterprise		AS,CAR,PM	R	M/L	spicy, full flavor	D	yes	Best disesase resistance available

KEY: Disease: AS-Apple Scab, CAR-Cedar Apple Rust, FB-Fire Blight, PM-Powdery Mildew
Color: G-Green, O-Orange, P-Purple, R-Red, Y-Yellow
Type: C-Cooking, D-Dessert

Variety Selection

Many of the 6,000 named apple varieties have given way to superior-tasting varieties. Some apple varieties such as 'Red Delicious' and 'Golden Delicious' are also available in various strains. A strain is a mutation of a variety that has been selected and propagated for an improved characteristic. Strains may differ in fruit characteristics, growth characteristics or both. Some varieties have many strains; for example, over 250 different strains of 'Red Delicious' have been described and cultivated.

Strains may be spur-type or nonspur-type. Spur-type strains are ideally suited for home gardeners with space limitations because fruit spurs and leaf buds are more closely spaced than on nonspur trees. Two-year-old wood on spur-types will usually form fruit buds rather than develop side shoots. Spur strains of a variety generally grow only about 60 to 70 percent as large as the nonspur strains of that variety.

It should be noted that some varieties of red apples will not color properly in the warmer parts of the state. Do not pick apples according to color, rather sample fruits occasionally to determine ripeness. Lack of color does not indicate lack of flavor.

Characteristics of the recommended apple varieties are given in Table 1.

Standard Trees Versus Dwarf Trees

The two dominating influences on tree size are the rootstock and the type of strain used (spur or non-spur). Other factors that influence tree size include general care, variety, soil type, earliness of fruiting and time and severity of pruning.

Apple tree size as influenced by rootstock selection is generally divided into three categories: standard, semidwarf and dwarf. Standard trees are propagated on seedling rootstock and produce large trees that may grow 30 feet tall.

Semidwarf trees are propagated on one of the clonal (vegetatively propagated) rootstocks that produce trees about three-fourths the size of standard trees if both are grown under similar circumstances. The most common semidwarf rootstocks used for apples are MM 106 and MM 111. Trees on MM 106 produce the earliest bearing trees. The MM 106 rootstock produces trees that are 70 to 80 percent the size of seedling trees. Trees grown on MM 111 rootstock will be slightly larger.

The interstem tree, a different type of semidwarf rootstock, may be available from certain nurseries. These have a small section of M 9 grafted between an understock, such as MM 111 or MM 106, and the variety. These trees are slightly larger than dwarf trees but smaller than the semidwarf. Because of the extra propagation needed, interstem trees are the most expensive. Current recommendations suggest planting these trees with a portion of the M 9 piece below the soil line.

Trees on semidwarf and dwarf rootstocks are ideally suited for home fruit production. Although more expensive to purchase, the smaller trees are easier to prune, spray and harvest; and they produce fruit at an earlier age than do full-sized trees. Dwarf trees will be about 40 to 50 percent as large as standard trees and require support by either a trellis or a post. The recommended dwarfing rootstocks are M26, M9 and B9.

Soil Preparation and Planting

When fruit trees arrive from the nursery, open the bundles immediately and inspect for damage and general condition of the trees. Soak the roots in water for 1/2 to 1 hour before planting. Trees should be planted while dormant. Fall planting is recommended if possible, or early spring when soil is not too wet.

The soil should be thoroughly prepared before planting by deep cultivation. The soil pH should be maintained between 6.0 and 6.5. Therefore, a soil test should be taken and recommended adjustments made before planting. You can get information on soil testing from your county Extension office.

When planting, dig holes large enough to receive the roots freely without cramping or bending from their natural position. Cut off all broken or damaged parts of roots with pruning shears. Set the plants with the graft or bud union 2 to 4 inches above the soil line (Figure 1). Work soil in and around the roots. When the hole is half filled, firm the soil with your feet. Finish filling the hole and again pack the soil firmly. Do not leave a large depression around the tree. Also, do not place fertilizer in the planting hole or fertilize immediately after planting. Fertilizer should be applied after the soil is settled by a rain or irrigation and tree growth begins.

After planting, apply sufficient water to thoroughly soak the soil in the area of the tree roots. This watering brings the soil into closer contact with all sides of the roots and eliminates air pockets around the roots.

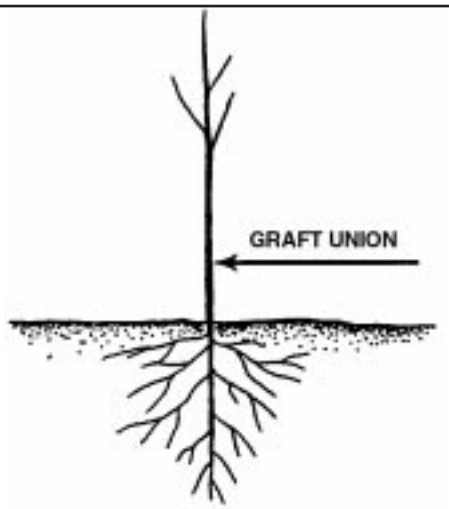

Figure 1. Planting depth is important in establishing new apple trees. If an interstem tree is planted, place the base of the interstem just underground. Trees without interstems should not have their graft union buried.

Training and Pruning

The day you plant your trees is the day you begin to prune and train for future production. Neglect will result in poor growth and delayed fruiting. Pruning a young tree controls its shape by developing a strong, well-balanced framework of scaffold branches. Unwanted branches should be removed or cut back early to avoid the necessity of large cuts in later years. The preferred method of pruning and training nontrellised trees in the home orchard is the Central Leader System.

Pruning should be done in late winter. Winter pruning of apple trees consists of removing undesirable limbs as well as tipping terminals to encourage branching. Summer training is most beneficial if done in early June and early August.

First Growing Season

Figure 2A shows the height to which the tree should be cut back at planting. Heading back the tree to this height will bring the top and the roots back into balance and cause buds just below the cut to grow and form scaffold branches (Figure 2B).

Begin training the tree when 2 or 3 inches of growth are evident. Position wooden spring-type clothespins between the main trunk or branch and the new succulent growth (Figure 2C). The clothespins will force the new growth outward and upward and form the strong crotch angles needed to support the fruit load in years to come. Allow the most vigorous upright branch to continue growing straight up and become the central leader.

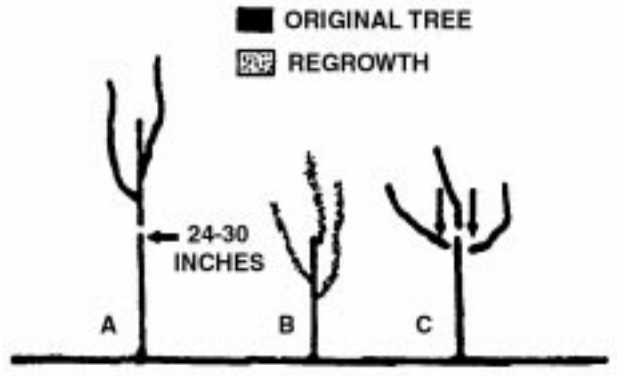

Figure 2. Pruning at planting (A), resulting regrowth (B) and location of clothespin placement (C).

One-Year-Old

A number of branches will develop during the first growing season. If they were clothespinned, they will have formed good crotch angles. The objective now is to develop a strong central leader and framework of scaffold branches. Figure 3 illustrates what the tree might look like before and after pruning done in the winter following planting. The objective is to leave only four to five main scaffold branches spaced around the tree. When viewed from above, the tree should present a branch arrangement similar to that shown in the inset in Figure 3. Always prune the ends of the scaffold branches so they are below the end of the central leader, head the central leader back by one-fourth to one-half in length each year.

Special Note: Occasionally a tree does not grow as well as it should during the first year. In that case, prune the tree back to a whip and start over again. You will delay fruiting by a year, but you will have a much more manageable tree in the long-run.

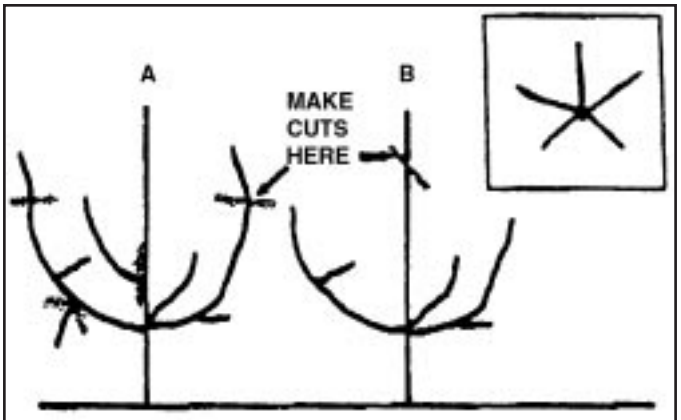

Figure 3. Pruning done during the first winter after planting – before pruning (A), with cuts marked, and after pruning (B).

Second Growing Season

During the second growing season, develop a second layer of scaffolds 24 to 36 inches above those established the year before. Be sure to clothespin the second level to develop wide crotch angles. Figure 4 illustrates a properly trained apple tree late in the season.

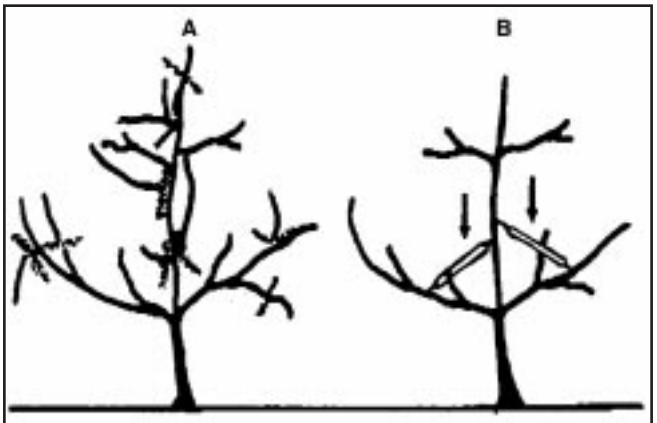

Figure 4. Two-year-old tree before (A) and after (B) pruning. Note the placement of the spreaders in the tree.

Two-Year-Old

The use of limb spreaders encourages earlier fruit production, better tree shape, stronger crotch angles and better fruit color. Spreaders can be short pieces of wood with sharpened nails driven into each end or sharpened metal rods. Limbs should not be spread below a 60° angle from the main trunk; when spread wider, limbs produce vigorous suckers along the topside of the branch. Leave spreaders in place for 1 to 2 years while the branch stiffens.

Always spread the tree before pruning. The pruning consists of entirely removing undesirable upright limbs and reducing the length of new shoot growth by one-fourth.

Succeeding Years

Continue to head back the new terminal growth by one-fourth each year and remove other upright limbs. Broken or diseased limbs should be removed. Always maintain the central leader as the highest point on the tree; the ends of the primary and secondary scaffolds should be kept below the top of the tree. Prune the trees every year in late winter (February or March).

Fertilization

Apple trees are generally fertilized with nitrogen each year. Phosphorus and potassium are needed in relatively large amounts until the trees reach maturity.

One month after planting, broadcast over a 2-foot circle 1 cup of 10-10-10 if the tree has made 6 inches of growth. Keep the fertilizer 6 inches away from the trunk and broadcast it evenly over the recommended area. In May and June following planting, broadcast another 1 cup of 10-10-10 around the tree.

In early spring of the second season, broadcast 2 cups of 10-10-10 fertilizer over a 3-foot circle; again avoid contact with the tree. Repeat this again in June. In succeeding years, the following guidelines should be followed for the different trees.

Standard Trees

Increase the diameter of the broadcast circle by 1 foot and the amount of fertilizer by 1 cup per year. Apply the fertilizer only once per year in late March or early April. Trees 7 years old and older only need nitrogen fertilizer. Use 4 cups of ammonium nitrate per tree. Maintain this level of fertilization throughout the life of the tree. Soil test every 3 years to determine the need for other elements.

Dwarf and Semidwarf Trees

During the third and fourth season, broadcast 4 cups of 10-10-10 over a 4-foot circle around each tree. Trees in their fifth and sixth years should receive 6 cups of 10-10-10 over a 5-foot circle. Trees 6 years old and older should receive only nitrogen at a rate of 2 cups of ammonium nitrate per tree broadcast over a 5-foot circle.

Once the trees begin to bear fruit, use the length of shoot growth as a indication of whether you need to decrease or increase the fertilization rates previously suggested. Growth of 12 to 18 inches per year is ideal for bearing trees.

Irrigation

In most sections of Arkansas, supplemental water is required for healthy tree growth. Young trees should be watered weekly. Mature trees will normally receive adequate moisture in a landscape setting if the lawn or garden area is irrigated.

Weed Control

Elimination of weed competition around young trees is critical for tree survival and rapid growth. Ideally, the soil surface should be kept weed free in an area at least as wide as the limb spread of the tree.

The safest way to do this is with a hoe. Chemicals are available that will do a good job, but they are hazardous if used carelessly. Chemical weed control should not be attempted unless all aspects of safety and sprayer calibration are well understood.

Maintaining a lawn around a tree is acceptable. Slightly increase nitrogen fertilization and maintain adequate soil moisture if this is done.

Fruit Thinning

Apple trees grown under favorable conditions will set more fruit than they are capable of successfully carrying to maturity. Removing excess fruit from the trees ensures satisfactory development of color, shape and size of the apples that remain on the tree. Failure to remove the excess fruit decreases the formation of flower buds for the following year and causes the trees to produce a crop only every other year.

The earlier hand thinning is completed, the more effective it will be in achieving the desired results. Midsummer thinning will help to improve fruit size; but it will not aid the formation of next year's flower buds. Most of the flower buds for next year are initiated during a 4- to 6-week period following full bloom; thinning should take place before this period.

Fruit should be removed by hand. Leave one apple per cluster, and space the clusters about every 6 inches. Simply start at one end of a branch and systematically remove fruit. To remove the fruit without damaging the spur or other apples on the spur, hold the stem between the thumb and forefinger and push the fruit from the stem with the other fingers. This method removes the apple and leaves the stem attached to the spur.

Caution: The insecticide carbaryl (Sevin) can cause thinning if applied shortly after petal fall. Avoid using it during this period. If using a general purpose home orchard mix, check the label for ingredients.

Harvesting

Harvest time varies with individual tastes and locality within the state. One may consider a fruit ripe while another individual believes it to be immature. However, fruit picked too soon does not store well and does not develop full flavor.

When picking apples, it is important to avoid injury to the fruit. The apple should be removed from the spur by pulling upward and outward while rotating the fruit slightly. On some of the thin, long-stemmed varieties such as Golden Delicious, it is sometimes necessary to firmly place the index finger at the point of attachment of the stem and spur to prevent the spur from breaking. Apples picked with their stem attached to the fruit will keep longer.

Disease and Insect Control

The best quality fruit is produced when diseases and insects are controlled. Common diseases of apples that should be controlled include scab, cedar apple rust, fire blight, sooty blotch and bitter rot. Damaging insects are spider mites, plum curculio, aphids and coddling moth. Home orchard fruit spray guidelines are available from your local county Extension agent. Be sure to read and follow all label instructions when applying any pesticide.

Acknowledgment is given to Dr. J. N. Moore, John R. Clark and Curt R. Rom for their review and input on the manuscript.

DR. R. KEITH STRIEGLER is Extension horticulturist - fruit, Cooperative Extension Service, University of Arkansas, Fayetteville.

FSA6058-5M-6-00N

Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Director, Cooperative Extension Service, University of Arkansas. The Arkansas Cooperative Extension Service offers its programs to all eligible persons regardless of race, color, national origin, religion, gender, age, disability, marital or veteran status, or any other legally protected status, and is an Equal Opportunity Employer.