THE OHIO STATE UNIVERSITY EXTENSION

Extension FactSheet

HYG-1401-00

Horticulture and Crop Science, 2001 Fyffe Court, Columbus, OH 43210-1096

Growing Apples in the Home Orchard

Gary Gao
Extension Agent, Horticulture, Clermont County
Ohio State University Extension

Should I Attempt to Grow Apples in the Home Orchard?

A home apple orchard can conveniently provide tasty, fresh fruits for family consumption. One can also have cultivars that may not otherwise be readily available at grocery stores or local orchards. A well-established and maintained apple orchard also enhances the appearance of the home landscape as specimen, border, espaliered, or trellised plants, while producing food for the family.

However, there is more to growing fruit than planting the trees and harvesting the crop. Growing high-quality apples requires considerable knowledge about cultivar selection, planting site, soil types, planting techniques, training, pruning, fertilization, and pest management. Without sufficient and proper care for apple trees, fruit quality will be quite poor.

What Apple Cultivars Should I Select?

Many apple cultivars are currently available. When selecting apple cultivars for a home apple orchard, one must consider fruit size, taste, color, bloom period, ripening season, disease resistance, and pollen compatibility, all of which are important factors.

Home apple growers should consider growing cultivars that are resistant to important diseases such as apple scab, cedar apple rust, and fire blight. Some of the more common disease-resistant apple cultivars are Enterprise (Figure 1), Goldrush, Jonafree, Liberty, Pristine, Redfree, and Williams' Pride. Disease-resistant apple cultivars recommended for home orchards in Ohio are summarized in Table 1, which also gives their cultural characteristics. It is not practical to list all of the disease-resistant cultivars in this fact sheet.

There are also many excellent apple cultivars that are not disease resistant and are much better suited for commercial production. Nonresistant cultivars can be successfully grown in home orchards if an effective disease-management program is followed. This generally requires the use of fungicides. Home apple growers need to be fully aware of the work, time, and pesticides involved in disease- and pest-management programs before selecting apple cultivars that are not disease resistant.

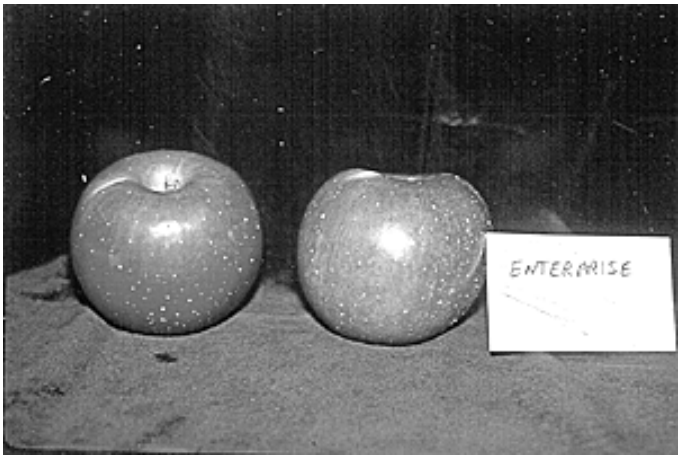

Figure 1. Fruits of Enterprise. Photo courtesy of Dave Koester, Campbell County Cooperative Extension Service, University of Kentucky.

All apple cultivars are considered self-incompatible, meaning that they cannot pollinate themselves or any flowers of the same cultivar. You will need to plant at least two different cultivars of apple trees together in order to achieve maximum fruit yield and quality. In addition, the two cultivars selected need to have viable pollen and bloom at the same time to ensure successful pollination. Some nurseries also offer apple trees that have two or more compatible cultivars grafted on the same tree.

Should I Grow Dwarf Trees or Standard-Size Trees?

Home apple growers should grow either dwarf or semi-dwarf trees instead of standard or full-size trees. Dwarf and

Table 1. Apple-Scab Resistant Cultivars Recommended for Home Orchards in Ohio.

Apple Cultivar	Ripening Season	Bloom Season	Brief Description of Cultivar
Pristine	Early	Early	Fruit is medium to large in size and has a canary-yellow color, often with a blush. Texture is fine. Flavor is somewhat tart, excellent for cooking or fresh eating. The cultivar is field immune to apple scab, highly resistant to powdery mildew, resistant to cedar apple rust, and moderately resistant to fire blight. Pollinates with Pristine, Williams' Pride, Redfree, Jonafree, and Liberty.
Williams' Pride	Early	Mid	Fruit is medium to large in size, slightly striped with dark red to purple red. Flesh is firm, very juicy, and spicy. It keeps very well. It is good for fresh eating and cooking. The cultivar is field immune to apple scab and apple rusts, and is resistant to powdery mildew and fire blight. Pollinates with other mid- and late-blooming cultivars.
Redfree	Early	Mid	Fruit is medium sized with bright red color. Flesh is firm with good texture. Flavor is sweet and aromatic. Fruit stores one month or more in refrigeration. It is good for fresh eating and cooking. The cultivar is field immune to apple scab and cedar apple rust, and is moderately resistant to powdery mildew. It has good resistance to fire blight. Pollinates with other mid- and late-blooming cultivars.
Jonafree	Mid	Mid	Fruit is medium in size with a 75-90% medium red blush. Flesh is firm, crisp, and moderately rich in flavor. Its flavor is similar to Jonathan and good for fresh eating, sauce, pies, and cider. It is not prone to bitter pit or Jonathan spot. The cultivar is field immune to scab, and is less susceptible to powdery mildew, fire blight, and cedar apple rust than Jonathan. Pollinates with Goldrush or Enterprise.
Liberty	Mid	Mid	Fruit is medium in size and is mostly red-striped over a greenish-yellow background. Flesh is white, fine-textured, crisp, and juicy. Flavor is very good, sprightly, subacid, and sweet. Good for eating fresh, cooking, canning, and desserts. The cultivar is highly resistant to apple scab, and is resistant to cedar apple rust and fire blight. It is moderately resistant to powdery mildew. Pollinates with other mid and late blooming cultivars.
Enterprise	Late	Mid to late	Fruit is large in size. It has a bright red and glossy finish. It is firm and crisp. Its flavor is spicy and juicy. It is good for fresh eating and cooking. It stores well if refrigerated. The cultivar is field immune to apple scab, is moderately resistant to powdery mildew, and is highly resistant to cedar apple rust and fire blight. Pollinates with Goldrush, Gala, and Golden Delicious.
Goldrush	Late	Late	Fruit is large in size, firm, very crisp. The yellow fruit is semi-tart and juicy and has exceptional storage life. It is good for fresh eating and cooking. It is field immune to apple scab, moderately resistant to powdery mildew, and highly resistant to fire blight. Pollinates with Enterprise, Gala, and Golden Delicious.

semi-dwarf trees are easier to manage, and they produce fruits earlier than standard-size trees. However, some of the dwarf or semi-dwarf apple trees need to be supported since they have poor root anchorage (Figure 2).

Apple cultivars are usually grafted onto different rootstocks. In theory, all apple cultivars can be available in dwarf, semi-dwarf, and standard sizes since it is mainly the rootstock that determines the tree size. Dwarf apple trees will grow to be about 10 feet tall. Semi-dwarf apple trees will reach about 15 feet in height, while standard-size trees will be at least 20 feet tall.

Figure 2. "Goldrush" apple on M9 dwarf rootstock. Note the supports for the trees. Photo courtesy of Dave Ferree, Department of Horticulture and Crop Science, Ohio Agricultural Research and Development Center, The Ohio State University.

Where Should I Plant Apple Trees?

Apple trees need full sun for proper growth and quality fruit production. The early morning sun is particularly important since it dries the dew from the leaves, thereby reducing the incidence of diseases. Apple planting sites should be free of spring frosts and have good air circulation.

Apple trees grow well in a wide range of soil types. They prefer soils with a texture of sandy loam to a sandy clay loam soil. Good soil drainage is also critical for successful apple production. Ideal soil pH for apple trees is near 6.5.

When and How Should I Plant Apple Trees?

Apple trees can be purchased through mail-order catalogs as bare-rooted whips which are one year old and single-stem trees without any side branches. They can also be purchased from local nurseries or garden centers as container-grown trees. However, a much greater selection of apple cultivars is available through catalogs.

If home apple producers choose to grow apple trees from whips, they should order apple trees early for spring planting in March or April. When plants arrive, do not allow the roots to dry out. It may be best to "heel in" the plants until the soil is dry enough to prepare for proper planting. To heel in the plants, dig a small trench and cover the plants with 2 to 3 inches of soil.

Before planting, soak the tree roots in water for half an hour. Dig a deep and wide hole to accommodate the root system. Spread the roots before filling the hole. Hold the tree in place so that the bud union is 2 to 3 inches above ground level. Otherwise, the scion or cultivar will form roots, and dwarf or semi-dwarf trees will turn into standard-size trees. Cover the roots with top soil and leave the sub soil for use last.

Before the hole is completely filled with soil, add two gallons of water. After planting, apply water at the rate of two to three gallons per tree every two to three weeks.

Keep an area at least 12 inches away from the tree trunk free of grasses and weeds. Mulch applied 2 to 3 inches deep over the root zone can help control weeds and conserve soil moisture.

If home apple growers choose to plant container-grown trees, they can plant these trees any time during the growing season as long as sufficient water is supplied. The depth of planting is dependent on soil type or texture. In sandy loam soils that drain well, plants should be positioned in the planting hole at the level they were originally grown in the nursery.

Most Ohio soils, however, are not well-drained. They usually consist of silt and clay particles, and drainage is often less than desirable. In soils that drain poorly, plants should be planted somewhat higher than they were in the nursery. More air needs to reach the root system when soils drain poorly. In these soil conditions, plants can be placed from 2 to 4 inches higher than they were during their growth in the nursery.

The width of the planting hole should be at least two or three times the diameter of the root ball. After placing the container-grown tree in the planting hole, back fill with soil. Apply water at the rate of two to three gallons per tree every two to three weeks. Mulch 2 to 3 inches deep. Refer to Ohio State University Extension Fact Sheet HYG-1014-97 *Preparation and Planting of Landscape Plants,* for more information.

Plant dwarf trees about 8 feet apart in the row and allow 14 feet between rows. Semi-dwarf trees should be spaced 10 feet apart in the row with 16 feet between rows.

How Do I Prune and Train Young Apple Trees?

Bare-root whips need to be pruned and trained so that they will develop into properly shaped trees. Container-grown apple trees are normally two- to three-year-old trees. These trees need lime spreading and light pruning.

Bare-root trees should be cut or "headed" back to 24 inches to 28 inches above ground at planting. All broken or damaged limbs should be removed. This procedure allows branches to form at desired heights, improves the strength of the tree, and provides a balance between the top and roots.

As the branches reach 4 to 6 inches in length, spring-loaded clothes pins can be used to form proper crotch angles (Figure 3.) These clothes pins should be removed at the end of the first season. Branches that begin to grow at 18 inches or lower can be cut off during the summer.

After one and two years of growth, all lateral branches below 18 inches or below the first lateral are removed. Remove limbs that have narrow crotch angles (less that 45 degrees).

Apple trees are trained to the central-leader system which will allow three to four groups of four branches to develop for a standard-sized tree. The central leader is cut in March at 18 inches to 24 inches above the last group of limbs to ensure the development of more limbs (Figure 4).

A two- or three-year-old apple tree needs limb spreading to achieve a tree that is wide at the bottom and tapers to a point as shown in Figure 5.

During the third and fourth years, remove all unwanted branches from central leaders and continue to spread limbs as necessary. The central leader will eventually be cut back into second-year wood, to bring the central leader into balance with the rest of the tree. Maintain a central leader and pyramidal form on into maturity. Never allow an upper tier to shade out or outgrow lower limbs.

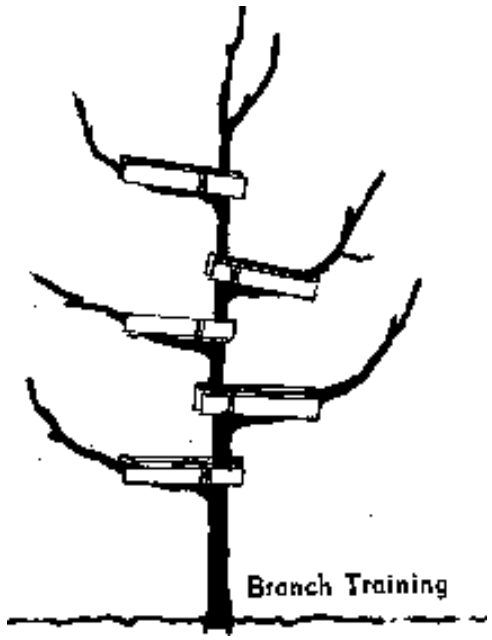

Figure 3. Clothes pins are used to hold young branches at desired branched angles.

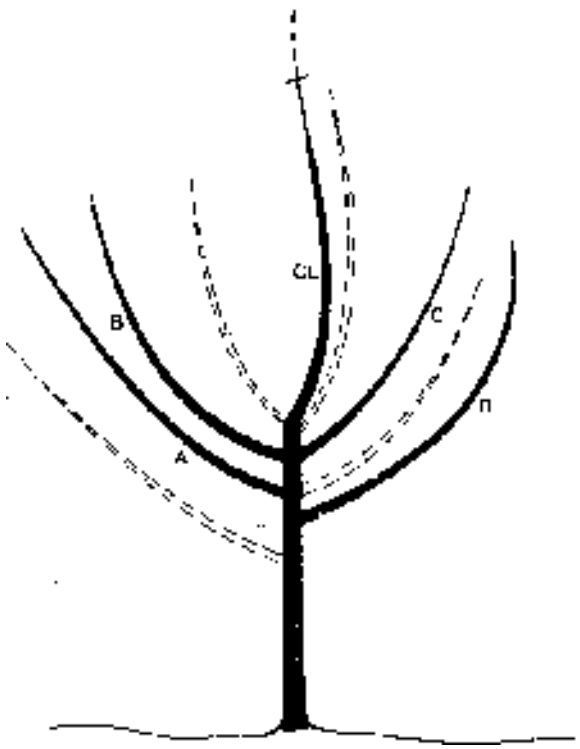

Figure 4. A one-year-old apple tree with lateral branches and central leader (CL).

How Do I Prune Mature Apple Trees?

Apple trees should be pruned annually in March. Refer to OSU Extension Fact Sheet HYG-1150-93 *Pruning Mature Apples and Pears* for more information. Home apple growers are also encouraged to attend fruit-tree pruning clinics offered through many local Extension offices.

How Do I Prune Old and Neglected Apple Trees?

Pruning neglected trees normally requires the removal of many large limbs. Try to picture what a perfectly pruned tree should look like and decide which limbs should be removed. Remove two to three large limbs each year and bring the tree back to shape in three years rather than one year. Cut large limbs flush with the bark of a lower limb.

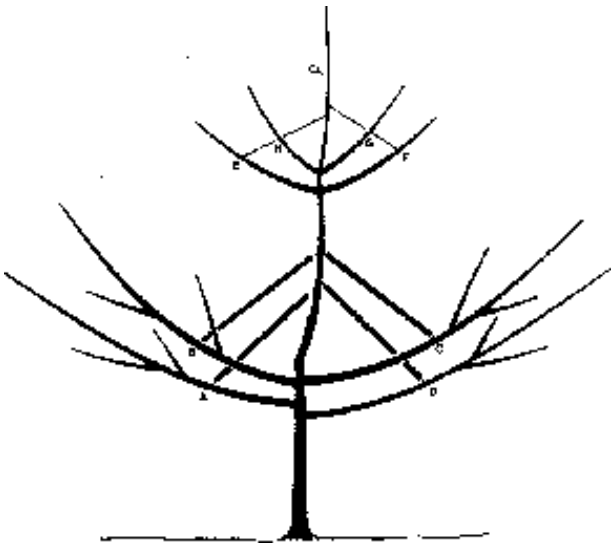

Figure 5. A two-year-old apple tree with spreaders.

Table 2. Pounds of 10-6-4 fertilizer to apply to each apple tree according to tree age when trees are grown in sod.*

Tree Age	Amount of Fertilizer Applied (Pounds)
1	0.5
2	1.0
3	1.5
4	2.0
5	2.5
6	3.0
7	3.5
8	4.0
9	4.5
10	5.0
11	5.5
12	6.0
13	6.5
14	7.0
15-35	7.5

*Double the amount for 5-10-10 fertilizer or decrease the amount by half for 20-5-10 fertilizer. If trees are not grown in sod, reduce the amount by half.

How Do I Fertilize My Apple Trees?

Apple trees should be fertilized each year in the spring. For optimum tree growth and fruit quality, conduct a soil test every two to three years to determine the appropriate fertilizer and application rates. Refer to Table 2 for suggested fertilizer application rates. Apply the recommended fertilizer as a broadcast over the area under the tree drip line.

How Can I Tell if My Apples Are Ripe?

Apples reach maturity at different times, depending on variety and climate. There is not a specific date at which you can expect to harvest your apples.

Instead, you can observe your apples as they grow and inspect the fruit for certain changes that indicate maturity. The “ground” or base skin color of the apple changes from green to yellow as the fruit matures. Flesh color also loses its greenish tint and turns yellow or white.

When you are convinced that the apples look mature, take a bite! A mature fruit will be crisp and juicy. A pleasing taste is the final indicator of fruit maturity.

Why Do My Apple Trees Fail to Produce Fruits?

Apple trees sometimes fail to produce fruits for many reasons. Some of these reasons include lack of time to reach bearing age, lack of compatible pollinating cultivars, absence of honeybees or bumblebees, attack by insects and diseases, too much shading, unfavorable weather, improper pruning, too much nitrogen application, and the tendency of some cultivars to produce heavy for one year and light for the following.

Should I Spray My Apple Trees?

Apples have many diseases and insect pests. Some of the common diseases that attack apple trees are apple scab, powdery mildew, black rot and frogeye leaf spot, rusts, collar rot, sooty blotch and fly speck, and fire blight. Some of the common insects and mites attacking apples are apple maggot, codling moth, plum curculio, San Jose Scale, European red mite, and aphids. Apple cultivars listed in Table 1 are not resistant to insects or mites. A certain amount of pesticide (insecticides and fungicides) use is generally required for quality apple production.

Many fact sheets that deal with apple disease and insects are available on *Ohioline* at: http://ohioline.ag.ohio-state.edu/lines/fruit.html

Refer to OSU Extension Bulletins 780, *Controlling Disease and Insects in Home Fruit Planting*, and 506A2, *Ohio Commercial Tree Fruit Spray Guide*, for more information on disease and insect management.

Useful References

1. Utzinger, J. D., R. C. Funt, M. Ellis, R. L. Miller. 1986. OSU Extension Bulletin 591. *Growing and Using Fruit at Home*.

2. Welty, C., R. C. Funt, R. N. Williams, T. Wall, M. Ellis. 1998. OSU Extension Bulletin 780. *Controlling Disease and Insects in Home Fruit Plantings.*

3. Ellis, M., C. Welty, D. Miller, F. Hall. 1999. OSU Extension Bulletin 506A2. *Ohio Commercial Tree Fruit Spray Guide.*

The author wishes to thank Mike Ellis, Dave Ferree, and Jane Martin for reviewing this fact sheet.

3/00-des