Apple

Only in the counties west and north of the Fall Line or Sandhills region of South Carolina are soil and climatic conditions conducive for good apple (*Malus domestica*) production. Attempts are being made to produce apples throughout the state, but with varied success. Higher temperatures increase the difficulty of controlling certain diseases.

**Site & Soil Requirements**

Sunlight, and plenty of it, is the key to increasing fruit production. Trees should be in the sun most or all of the day. The early morning sun is particularly important because it dries the dew from the leaves thereby reducing the incidence of disease. If the planting site does not get plenty of sun, then performance from the tree will be inferior.

Although apple trees will grow well in a wide range of soil types, a deep soil ranging in texture from a sandy loam to a sandy clay loam is preferred. Apple trees will not thrive in a soil that is poorly drained. In areas of poor drainage, roots will die, resulting in stunted growth and eventual death of the tree. Conversely, apple trees will also perform poorly on droughty soils. Shoot growth can be stunted and fruit size and quality reduced.

Most fruit plants, including apples, grow best when the soil pH is between 5.8 and 6.5. Since the natural pH of most South Carolina soils is often below that level, it is necessary to incorporate lime before planting to raise the pH to the desired level. A soil test is always the best method of determining the fertilization needs of the crop. The soil test report will indicate if additional liming is required. About every three years, the soil pH should be rechecked. Information on soil testing and liming recommendations is available in the fact sheets **HGIC 1650, Changing the pH of Your Soil**, and **HGIC 1652, Soil Testing**.

**Purchasing Trees**

The old adage of "you get what you pay for" is an important consideration when buying apple trees. Often, bargain plants are not healthy or may not be a cultivar adapted to the area. Growers should buy only trees of recommended cultivars from a reliable source. Keep the following points in mind when purchasing apple trees:

- The preferred type of tree for planting is a healthy, 1-year-old whip or a 2-year-old feathered tree that is about 4 to 6 feet tall and has a vigorous root system.
- A small tree with a good root system is more desirable than a large tree with a poor root system.
- Trees that are older than 2 years do not usually grow as well as younger trees. Frequently, older trees do not have sufficient buds on the lower portion of the trunk to develop a good framework.
- Do not purchase trees that appear stunted, poorly grown, diseased or insect-injured.
- Check the tree labels closely to make sure they are the desired cultivar and rootstock.

**Variety Selection**

There are apple varieties adapted to most parts of South Carolina. Variety selection should be based on the geographic area of the state. The Coastal Plain is not ideally suited for apples. In most years, late frost will kill some of the apple flowers on some of the cultivars recommended for this area, thus reducing the crop. In addition, fruit diseases can be more severe in the Coastal Plain. Recommended varieties for the various areas of the state are listed at the end of this fact sheet.
Some apple varieties such as Red Delicious and Golden Delicious are also available in various strains. A strain is a mutation of a certain cultivar selected for an improved characteristic and vegetatively propagated by grafting. A strain may differ in fruit characteristics or tree characteristics or both. There are many strains of some varieties; for example, about 100 different strains of Red Delicious have been described and cultivated.

The most common strain difference that the backyard grower needs to be concerned with is spur versus non-spur strains. A spur-type apple is a strain that has fruit spurs and leaf buds that are more closely spaced than on non-spur or standard types. Spur-types have a stiff, upright growth habit that minimizes limb breakage and enables the trees to hold heavy crop loads without having their limbs propped up or tied. Spur-types offer a size and space advantage to the home garden because they are naturally dwarfing trees. Spur strains of a cultivar may grow 60 to 70 percent as large as the non-spur strains of that cultivar. Spur-type strains produce fruit at an earlier age than standard strains.

Spur-types, because of their compact form of growth, are ideally suited for home gardeners with limited space. Growth on spur-types is more compact because fruit spurs and leaf buds are spaced closer together than on non-spur trees. Also, 2-year-old wood on spur-type trees will usually form fruit buds rather than develop side shoots.

Several varieties are available in spur and non-spur strains. As a general rule of thumb, spur strains of the same variety on the same kind of rootstock as non-spur strains will result in trees only 70 percent as large as the non-spurs. Thus, a spur-type strain grown on a seedling rootstock will result in a semidwarf tree and a spur-type grown on a semidwarf rootstock will result in a dwarf tree.

Rootstock influences apple size. There are three general categories of tree size: standard, semidwarf and dwarf. Standard trees are propagated on seedling rootstock and produce large trees that may get to be 15 to 20 feet tall. Semidwarf trees are trees propagated on one of several clonal (vegetatively propagated) rootstocks that produce trees that will be about three-fourths the size of standard trees if grown under similar circumstances. The most common semidwarf rootstocks used for apples in South Carolina are MM.106, MM.111 and M.7. Trees on M.7 will produce the smallest trees in the semidwarf category while MM.106 will produce trees nearly as large as trees on seedling rootstocks.

True dwarf trees will be about 30 to 40 percent as large as standard trees and require support by a trellis or post. The most common dwarf rootstocks are M.9 and M.26. Trees grown on M.9 are the smaller of the two. Growers should use dwarf and semidwarf trees if space is greatly limited. The rootstocks M.9, M.7 and MM.111 are better adapted to the Piedmont and Mountains, while MM.106 has shown promise in the lower half of the Piedmont and the Sandhills and Ridge. In the Coastal Plain, only standard trees (seedling rootstock) are recommended because of poor performance of semidwarf and dwarf rootstocks.

**Soil Preparation & Planting**

Have the soil tested several months prior to planting. If liming is recommended, soil preparation should be done at this time so the lime will be incorporated into the soil at the time of planting. If phosphorous is recommended it should be incorporated along with lime before planting based on soil test results. Lime an area 10 feet by 10 feet where each tree will be planted. Plow or spade the area, followed by disking or raking to smooth the surface.

When fruit trees arrive from the nursery, open the bundles immediately. Soak the roots in water for 6 to 12 hours if they are not moist. The trees should then be planted if the soil is not too wet.

If the soil is not prepared where the trees are to be planted or the ground is too wet, heel the trees in by placing them in an open trench deep enough to cover all roots. The north side of a building is the best place for heeling-in because the trees will
remain dormant longer. Place soil over the roots to the depth they will be planted.

Before planting, cut off all broken or mutilated parts of roots with a sharp knife or pruning shears. Keep root pruning to a minimum. Dig a hole large enough to receive the roots freely without cramping or bending from their natural position. Set the plant with the graft or bud union 2 inches above the soil line. Work soil in and around the roots. When the hole is half-filled, firm the soil lightly with your feet before completely filling the hole. When the hole is filled, pack the soil firmly. Do not leave a depression around the tree. Do not place fertilizer in the planting hole or fertilize immediately after planting.

Post-Plant Care
After planting, apply sufficient water to soak the soil thoroughly. Watering will help bring the soil into closer contact with all sides of the roots and eliminate air pockets around the roots.

Keep weeds out of a 3-by-3-foot area around the tree because they compete with the tree for moisture and nutrients during the growing season. This will also keep mowers away from the trees and reduce trunk damage. Mulching will help to control weeds as well as conserve moisture.

Training & Pruning
The day apple trees are planted is the day to begin to train and prune for future production. Too often backyard growers plant apple trees and leave them untended for several years. This neglect results in poor growth and delayed fruiting. Information on pruning, training and fruit production through thinning is available in HGIC 1351, Pruning & Training Apple & Pear Trees.

Fertilization
Generally, apple trees in South Carolina need fertilizing each year. (Note: Tree vigor, variety, rootstock and soil fertility should be considered when making fertilizer applications.) Nitrogen is the most important nutrient needed. Two other nutrients, phosphorous and potassium, are needed in relatively large amounts, particularly on young trees. After the trees reach maturity, fertilization with phosphorus and potassium will probably not be required.

Do not put any fertilizer in the hole before or during planting. To fertilize apple trees the year they are planted, broadcast over a 2-foot-wide circle 1 cup of 10-10-10 fertilizer about a month after planting. In June following planting, broadcast another cup of 10-10-10 fertilizer around the tree.

In early spring of the second season (when the tree is a year old), broadcast 2 cups of 10-10-10 fertilizer over a 3-foot circle. 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 and the amount of fertilizer (10-10-10) by 2 cups per year. When the tree is 6 years old and older, only nitrogen fertilizer is needed. Use 4 cups of ammonium nitrate (33-0-0) per tree for trees 6 to 8 years old and 6 cups for trees 9 and older.

For severely pruned trees, do not apply any fertilizer that year. Likewise, if growth is excessive, omit fertilizer for a year or two until growth is reduced to a desirable length (ideally, terminal growth on bearing trees should average between 10 to 15 inches per year).

**Semidwarf Trees:** Increase the diameter of the broadcast circle and the amount of fertilizer such as 10-10-10 by 2 cups per year. Once the trees reach 4 years of age, apply 8 cups of 10-10-10 per tree. Apply this amount in years five through seven. For trees 8 and older, apply 4 cups of ammonium nitrate per tree. If in any given year the trees are severely pruned or the trees are growing too vigorously, omit fertilizer that year.

**Dwarf Trees:** During the third and fourth season, broadcast over a 4-foot circle 4 cups of 10-10-10 around each tree both years. Trees in their fifth and sixth seasons should receive 6 cups of 10-10-10 per tree broadcast over a 5-foot diameter circle. Seven-year-old and older trees should receive only nitrogen at a rate of about 2 cups of ammonium nitrate per tree. Broadcast this over a 5-foot diameter area.

**Caution:** When fertilizing, never dump large amounts in a small area because root injury may result. Also, keep fertilizer 6 inches or more away from the trunk. Always broadcast the fertilizer evenly over the recommended area.
Once the trees begin to bear, use shoot growth to determine if you need to reduce or supplement the fertilization rates previously suggested. Ten to 15 inches of growth are ideal for bearing trees. If growth is more than this, reduce the rate of fertilization. If growth is less, apply a little extra fertilizer the next season.

**Harvesting Apples**

When picking apples, it is important to be careful to avoid injuring 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 cultivars 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 should always be picked with their stems attached to the fruit; otherwise, they will not keep as long.

**Diseases & Insects**

A grower who produces the best-quality fruit controls diseases and insects. Several of these pests damage the tree and fruit.

Diseases common to apples are cedar apple rust, scab, black rot, bitter rot and fire blight. Damaging insects are codling moth, mites, scales, aphids and fruit worms. Information on diseases and insects of apples is available in the fact sheets [HGIC 2000, Apple & Crabapple Diseases](https://www.ars.usda.gov/SP204/914/5017/301/pdf/HGIC%202000%20Apple%20and%20Crabapple%20Insects.pdf), and [EIIS/FV-9, Apple and Crabapple Insects](https://www.ars.usda.gov/SP204/914/5017/301/pdf/EIIS%20FV-9%20Apple%20and%20Crabapple%20Insects.pdf).

The most successful home orchardist follows recommendations to the letter and uses the recommended kind and rate of spray material. It is imperative that complete coverage is maintained by applying the spray material at the proper time interval. The wise fruit gardener will also handle these pesticides carefully, keeping them stored in their original containers with labels intact, behind locked doors and out of reach of children and pets.

### Apple Varieties Recommended for Home Use in the Different Zones of South Carolina

<table>
<thead>
<tr>
<th>Variety1</th>
<th>Area2</th>
<th>Characteristics3</th>
<th>Pollination Code4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anna</td>
<td>CP</td>
<td>Excellent-shape fruit with blush of red; ripens mid-June to early July; spur-type.</td>
<td>A</td>
</tr>
<tr>
<td>Dorsett Golden</td>
<td>CP</td>
<td>Yellow apple of good quality; ripens mid-June to early July; spur-type.</td>
<td>A</td>
</tr>
<tr>
<td>Jerseymac</td>
<td>M, P, SR</td>
<td>Very early red apple of excellent quality; good for fresh eating, sauce and pies; ripens in July; non-spur.</td>
<td>B</td>
</tr>
<tr>
<td>Ginger Gold</td>
<td>M, P, SR</td>
<td>Very early crisp yellow apple of excellent quality; good for fresh eating, sauce and pies; ripens late July to early August; non-spur. Susceptible to fireblight.</td>
<td>B</td>
</tr>
<tr>
<td>Gala</td>
<td>M, P, SR</td>
<td>Excellent quality apple; good for fresh eating or salads; ripens in early August; non-spur.</td>
<td>B</td>
</tr>
<tr>
<td>Priscilla</td>
<td>M, P, SR</td>
<td>Red skin color; crisp flesh; mildly sub-acid; excellent dessert quality; ripens late July to early August; non-spur.</td>
<td>C</td>
</tr>
<tr>
<td>Mollie’s Delicious</td>
<td>M, P, SR</td>
<td>A versatile apple; good for fresh eating, pies and sauce; susceptible to fire blight; ripens in late July; non-spur.</td>
<td>B</td>
</tr>
<tr>
<td>Ozark Gold</td>
<td>M, P, SR</td>
<td>Matures late July to early August; yellow, russet-free apple of excellent quality; non-spur.</td>
<td>C</td>
</tr>
<tr>
<td>Red Delicious</td>
<td>All</td>
<td>Early fall variety ripening in late August; large, firm, crisp; sweet; good for fresh eating or salads; non-spur and spur strains available.</td>
<td>B</td>
</tr>
<tr>
<td>Golden Delicious</td>
<td>All</td>
<td>Early fall variety ripening in late August; large, firm, crisp; sweet; good for fresh eating or salads; non-spur and spur strains available.</td>
<td>C</td>
</tr>
<tr>
<td>Jonagold</td>
<td>M, P, SR</td>
<td>Ripens early September; very large, yellow apple with red blush; very high quality; sweet, juicy apple.</td>
<td>C</td>
</tr>
</tbody>
</table>
### Apple Varieties Recommended for Home Use in the Different Zones of South Carolina (continued)

<table>
<thead>
<tr>
<th>Variety</th>
<th>Area</th>
<th>Characteristics</th>
<th>Pollination Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuji</td>
<td>M, P, SR</td>
<td>Fall variety ripening in early October; does not color well, but quality is superb; good for cooking, eating and baking; non-spur strains available.</td>
<td>B</td>
</tr>
<tr>
<td>Mutsu</td>
<td>M, P, SR</td>
<td>Ripens early October; yellow apple of exceptional quality; crisp and juicy; slightly tart; all-purpose.</td>
<td>B</td>
</tr>
<tr>
<td>Rome Beauty</td>
<td>M, P</td>
<td>Ripens early October; red apple primarily grown for baking; spur and non-spur.</td>
<td>C</td>
</tr>
<tr>
<td>Stayman</td>
<td>M, P</td>
<td>Ripens early October; rusty red finish; superb quality, tart, all-purpose apple; fruit-cracking a problem when dry period is followed by rainy period.</td>
<td>C</td>
</tr>
<tr>
<td>Arkansas Black</td>
<td>M, P</td>
<td>Fall variety ripening in October; very dark and red and very firm; great keeping; tart, juicy; good cooking, eating and baking; non-spur and spur strains available.</td>
<td>C</td>
</tr>
<tr>
<td>Yates</td>
<td>All</td>
<td>Late fall variety ripening in October; small, dark red; juicy; mellow, sub-acid; best keeper; non-spur.</td>
<td>B</td>
</tr>
<tr>
<td>Granny Smith</td>
<td>All</td>
<td>Matures in late September to early October; yellow-green apple of excellent quality; good all-purpose variety; non-spur and spur strains available; susceptible to fire blight.</td>
<td>B</td>
</tr>
</tbody>
</table>

1Listed in order of ripening.
2Major land resource areas of South Carolina: M-Mountain; P-Piedmont; SR-Sandhills and Ridge; CP-Coastal Plain.
3Ripening dates for all cultivars except Anna and Dorsett Golden are based on averages from Clemson, South Carolina. Ripening dates for Anna and Dorsett Golden are based on averages from Monticello, Florida.
4Varieties followed by a common letter bloom at about the same time. Since most apple varieties are self-unfruitful (require pollen from another variety to set fruit), plant two or more varieties that have the same letter so fruit set will occur. Stayman, Mutsu and Jonagold have sterile pollen and should not be used as pollen sources for other varieties; therefore, plant at least two other varieties with any of these varieties.

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Prepared by Bob Polomski, Extension Consumer Horticulturist, and Greg Reighard, Extension Specialist, Clemson University. (New 02/00.)

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