



Growing Peaches and Nectarines in Virginia

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Introduction

An orchard is a long-term investment and careful planning is essential to ensure economic success. Establishing and maintaining a peach planting to bearing age (three years) costs about \$3,500 per acre. Mistakes made at planting often cannot be corrected; other mistakes that can be corrected could seriously jeopardize the economic success of the orchard. Because profit margins for commercial fruit plantings are small, orchards should be established only under the most favorable conditions for success.

Orchard Location

The geographic location of an orchard can have a major impact on the profitability of the operation. While selecting a location, it is important to consider how the fruit will be marketed. Choose a location with proximity to markets, nearby transportation systems, agricultural suppliers, equipment dealers, and other commercial orchards. The availability of water for irrigation, spraying, and hydro cooling should also be considered.

If land is already owned or orchards already exist and factors are not favorable, it is best to purchase new land where success is more likely. Planting new trees at a poor location is often the cause of nonprofitable orchards.

Site Selection

The specific piece of land on which an orchard is planted has a major impact on tree growth, yield, and fruit quality. The two most important factors for site consideration are air drainage for frost control and soil water drainage. Cold air is heavier than warm air and collects in low laying areas. Peach flowers can be killed by air temperatures of 25 to 28oF. Therefore, peach trees should be planted on the tops or sides of hills at higher

elevations than the surrounding area. Sometimes, just 10 feet in elevation can mean the difference between having or not having a crop.

Peaches do well on a wide variety of soils. Because soil fertility can be easily adjusted, it is not a major consideration. Soils with high fertility should be avoided because trees grow too vigorously, produce low yields at a young age, and produce poor quality fruit. Soil providing a rooting depth of about 4 feet is preferable. Shallow soils have poor water holding capacity. Soil water drainage properties can be evaluated by digging a hole 2 feet deep. If water drains out of the hole within three days after a heavy rain the soil should be suitable for tree growth. Soil drainage often can be improved with tile and raised bed systems, but they are expensive. For more information on site selection, see VCE Publication 426-311, Orchard Site Selection.

Soil Preparation

Soil preparation methods vary depending on soil quality and on the crops previously grown on the site. Before planting, test the soil for pH and nutrients and correct any deficiencies. Soil test kits can be obtained from your county agent.

Before replanting an existing orchard, map the orchard so as to identify areas of poor tree growth. Then identify and correct the causes of any poor growth or deficiency. If trees were recently removed, remove all roots and deep plough the soil. Many broadleaf weeds and woody plants contain tomato ring spot virus which can then be spread by dagger nematodes feeding on the roots. This virus causes stem pitting and tree death. Therefore, all broadleaf plants should be destroyed with herbicides and a grass covercrop grown for at least a year to reduce the transmission of the virus.

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Establish a grass sod in the fall before planting. In the early spring, kill a 3- to 5-foot sod strip with herbicides and plant trees in the killed sod strip. Research data indicate that the killed sod is more effective than other soil preparation techniques in reducing erosion, enhancing water penetration into the soil, and enhancing tree growth.

Rootstocks

Fruit trees grown from seed are not genetically identical. To maintain the horticultural characteristics of a variety, fruit trees are grafted or budded onto rootstocks. Peach rootstocks are usually trees grown from seeds. Rootstocks can influence tree size, productivity, cold hardiness, and tree longevity. Lovell and Halford rootstocks are recommended because they have performed well in the mid-Atlantic region. Dwarf rootstocks should be avoided because some varieties die after 6 to 8 years due to incompatibility with the scion variety.

Varieties

There are more than 100 peach varieties available from commercial nurseries. Variety selection should be based on climatic conditions, how fruit will be marketed, disease susceptibility, and season of ripening. Varieties requiring less than 800 hours of chilling often bloom early and are susceptible to early spring frosts. Many varieties developed by Southern breeding programs have short chilling requirements and are adapted to southern growing conditions. Many varieties perform well in Virginia, below is a list of varieties that have performed well at Blacksburg. Blacksburg's elevation is about 2,200 feet above sea level. Peaches grown at locations with lower elevations may ripen 3 to 20 days earlier than at Blacksburg. Peaches and nectarines are essentially the same, differing only in genes for surface fuzz. Throughout this publication, peach and nectarine are assumed to be the same.

Planting Distances

Tree spacing is determined by soil fertility, growing habits of the variety, tree training systems, and management practices such as irrigation. Typical spacings are 24' x 18', 20' x 14', and 20' x 12' for very fertile, moderately fertile, and low fertile soils, respectively. On steep slopes, 2 to 4 feet should be added to the between-row spacing to allow for sliding of orchard equipment.

Pollination

Peaches and nectarines are typically self-fruitful and do not require cross pollination with other varieties. Therefore, trees of a single variety may be planted in large blocks.

Tree Quality

To ensure that the desired variety, rootstock, and tree size is available, trees should be ordered from reputable nurseries a year or two before planting. Tree prices usually increase with tree size. Southern nurseries often sell "June-buds." These trees are budded onto rootstocks in June and the bud develops into a 12- to 24-inch long shoot by fall. These small trees produce excellent trees and are less expensive than the larger August-budded trees produced by northern nurseries. In general, moderate-sized trees grow well and are easiest to develop into productive trees. Very large and very small trees should be avoided.

Tree Care

Trees are shipped from nurseries as bare-rooted trees. Trees are bundled, the roots are covered with moist moss or sawdust, placed in cardboard boxes and shipped by truck. Upon receiving trees, the boxes should be opened to evaluate tree condition, and to confirm that the variety, rootstock, grade, and tree numbers agree with the order.

Make sure the roots are covered with moist material. Store trees in the box until planting. Trees can be held for several weeks at about 36°F. Do not store trees in cold storage rooms where apples were stored. Ethylene gas produced by apples, even at low concentrations, can injure or kill peach trees. Before placing trees in cold storage rooms, the rooms must be totally flushed out. An alternative is to heel-in the trees in soil. Dig a trench, preferably on the north side of a building. Place the roots of the trees along the trench and lean the trees toward the south at about a 40° angle to minimize exposure to sun. Cover the roots with moist soil and pack the soil around the roots to remove air pockets, and water as needed.

Planting Time

Before planting, roots should be immersed in water for 24 to 48 hours. If dormant trees can be obtained, trees can be planted in the fall about a month after the first

Variety	Ripening Date	Comments
Garnet Beauty	July 17	Yellow flesh peaches small to medium - Cling Stone
Laural	July 25	Medium, well colored freestone, recommended for trial
Redhaven	Aug. 1	Medium size, very cold hardy, semi-cling stone
Rich Lady	Aug. 1	Large, firm, well colored yellow fruit, recommended for trial
Topaz	Aug. 7	Large, attractive freestone
Contender	Aug. 10	Large, attractive freestone
Earnie's Choice	Aug. 12	Large, firm attractive, freestone
Loring	Aug. 18	Very large, firm freestone
Harcrest	Aug. 29	Medium to large, very attractive freestone
Fayette	Sept. 6	Very large, firm, well colored, freestone
Encore	Sept. 12	Large, firm, attractive freestone
WHITE FLESH PEACHES		
Morton	July 25	Small, highly colored, soft, good flavor
Raritan Rose	July 26	Medium size, attractive, excellent flavor
White Lady	Aug. 5	Large, attractive, firm, excellent flavor
NECTARINES		
Summer Beaut	Aug. 3	Medium size, semi-freestone, good flavor
Sunglo	Aug. 10	Large, attractive, firm, good flavor
Red Gold	Aug. 21	Medium to large size, attractive, good flavor
Flavor Top	Aug. 21	Medium to large, attractive, good flavor

killing frost. Otherwise trees should be planted as early in spring as possible. Fall-planted trees have the opportunity to produce roots while soil temperatures are above 40F and to absorb moisture and nutrients before spring growth. The disadvantages of fall-planting include: 1) trees can be winter-injured, 2) soil freezing and thawing may heave trees out of the ground, and 3) wildlife may injure trees.

Planting Trees

After the soil is properly prepared and has been staked, trees can be planted with a tree planter, backhoe, or an auger. Dig a hole large enough to allow spreading of the roots. If the soil is too moist, the sides of the hole may be compacted or glazed. Because roots cannot penetrate the compacted soil, the sides of the hole should be broken with a shovel. Plant the tree at the same depth as at the nursery. Firm the soil around the roots to eliminate air pockets. In the absence of rain, trees should be watered within several days of planting. During the planting process keep the roots of remaining trees covered, out of the wind, and in shade to prevent drying. On replant sites that have not been covercropped for several years, tree growth may be improved by filling the planting hole with new soil. When replanting a former orchard site, do not plant a new tree in the same place where a tree was removed. Plant the new tree between the former trees or between the former rows.

Fertilization

Several weeks after planting, apply 0.05 pounds of actual nitrogen in a band on the soil surface about 6 to 12 inches from the trunk. Repeat this treatment one and two months after the first application, for a total quantity of 0.15 pounds of nitrogen per tree. The choice of fertilizer depends on soil fertility as measured by preplant soil tests. Where soil phosphorous and potassium levels are medium or high, only nitrogen fertilizer is needed. The choice of nitrogen fertilizer should be based on price per pound of actual nitrogen. Urea (45% nitrogen) is usually the most economical, but calcium nitrate (16% nitrogen), sodium nitrate (16% nitrogen), and ammonium nitrate (33% nitrogen) are often used. When soil tests indicate low levels of phosphorous or potassium, or on sandy soils, use a complete fertilizer such as 5-10-10 or 10-20-20. Several days after planting, water trees with soluble fertilizer at the rate of 5 pounds per 100 gallons of water.

In the year after planting, trees should again be fertilized three times for a total of 0.3 pounds of actual nitrogen per tree. Apply 0.1 pounds of nitrogen at monthly intervals starting one month before bloom. In the third year, apply 0.15 pounds of nitrogen per tree at three monthly intervals. By the fourth year, trees should produce a partial crop. Apply 0.35 pounds a month before bloom and again at shuck split. If the crop is lost to spring frost, apply only 0.1 pounds of nitrogen when shuck split would occur. Starting in the fifth year, trees should receive about 70 to 100 pounds of nitrogen per acre per year. Sandy soils should receive about 120 pounds of nitrogen. Fertilizer should be made as a split application: apply half one month before bloom and apply the second half at shuck split, only if there is a crop. Non-cropping trees grow more vigorously than cropping trees, so noncropping trees require less fertilizer to produce moderate growth.

Weed Control

Weeds and grass compete with trees for water and nutrients and suppress tree growth. Growth of young trees is proportional to the size of weed-free zone around the tree. Herbicided trees usually grow better than cultivated trees because cultivation injures shallow roots. For young trees, weeds should be controlled out to at least 3 feet from the trunk. For mature trees, weeds should be controlled out to the drip line of the canopy. Chemical weed control recommendations may be found in VCE Publication 456-419, Virginia Spray Guide for Commercial Fruit Growers.

Irrigation

Irrigation is required for peach growing in Virginia because mid-summer droughts are common. Newly planted trees should receive water once a week for about six weeks. Following the establishment period, an inch of water every two to three weeks until early August will improve tree growth. Water for older trees is most critical during the final six weeks of fruit growth (final swell) before harvest. In Virginia, water is rarely limiting in the spring. Slight water stress is actually beneficial from about 45 days after bloom until six weeks before harvest. The length of this period will vary from just a few days for very early varieties to about seven weeks for late-season varieties. This period is referred to as Stage II of fruit growth when most of the carbohydrates produced during photosynthesis are partitioned into vegetative growth

rather than fruit. Trees that are water stressed at this time produce less shoot growth that shades the tree interior, but fruit development is not detrimentally affected. Therefore, do not water trees until six or seven weeks before anticipated harvest. If overhead irrigation is used, trees should receive at least 1 inch of water at six, four, and two weeks before harvest. With overhead irrigation, the root zone is allowed to become dry before being rewetted with a large amount of water. The concept with trickle irrigation is to replace the water a tree uses on a daily basis. The need to trickle irrigate can be estimated from pan evaporation data or soil tensiometer measurements. For more information on irrigation, see Publication #93-EFRA-1-0013, *Managing Drought*, North Carolina Extension Service. Poorly drained soils can easily be overwatered, leading to root disease problems such as collar rot.

Pruning

Peach trees are trained to an open vase system, consisting of three or four scaffold (primary) branches originating from the trunk about 2 feet above ground. Trees are trained to a low spreading form and mature trees should be only 8 or 9 feet tall. Prune trees in late winter to avoid winter injury.

At planting. Immediately after planting, trees should be pruned. Some trees come from the nursery with branches. If branches have wide crotch angles, are unbroken, and are located 20 to 26 inches above ground, they may be retained and headed to 3 buds. If branches do not meet the above criteria, they should be removed. Head the tree at 28 inches above ground or at 8 inches above the top usable branch. Heading the tree will induce branching for about 6 inches below the cut.

First winter. Select three or four wide-croched branches originating on the trunk 18 to 26 inches above ground and positioned symmetrically around the trunk. Remove all lower branches. Head the trunk above the highest usable branch. The tree should now have only three or four branches.

First summer. Watersprouts (vigorous upright shoots) often develop at the tree interior and shade the lower part of the tree. During June these watersprouts should be removed.

Second winter. Remove any remaining water sprouts and keep scaffold branches spreading by cutting back to outward growing shoots.

Bearing Trees

Annual summer pruning to remove watersprouts is usually needed until trees are about six years old and grow less vigorously. Annual winter pruning should consist of removing upright watersprouts, downward hanging shoots and excessive fruiting shoots. For detailed information on pruning, see VCE Publication 422-020, *Pruning Peach Trees*.

Fruit Thinning

Peach trees usually produce some fruit in the third year and full production can be expected by the sixth or seventh year. Peach trees produce several thousand flower buds, but usually only 20 to 50% of the flowers set fruit. Most mature peach trees can properly size only about 800 fruits. When trees have too many fruits, the fruit are small with poor color and taste, and the branches may break. To prevent limb breakage and ensure good fruit quality, excess fruits must be removed or “thinned.”

From bloom until about 50 days after bloom (Stage I of fruit growth) fruit growth is the result of cell division. Stage II of fruit growth begins when cell division ceases and is characterized by a lack of visible fruit growth. Stage III of fruit growth begins about six weeks before harvest and is characterized by very rapid fruit growth as the cells fill with water and expand.

Fruit thinning anytime before harvest will reduce fruit to fruit competition for water and carbohydrates, but thinning early in the season will result in the greatest increase in fruit size. Bloom thinning with fingers or stiff brushes will remove about 60% of the flowers. Additional follow up thinning is usually required at about 45 days after bloom. Because some flowers may be killed by spring frost, many growers prefer to only partially thin at bloom. At 45 to 50 days after bloom, there are usually two or three different sizes of fruits on the tree. The smaller fruits likely were not fertilized and will fall on their own. The largest fruits at thinning time will be the largest fruits at harvest. A general rule of thumb is to thin fruits so the average distance between fruits is 6 to 8 inches along the shoot, but no two fruits should be closer than 2.5 inches.

Harvest

As peaches mature they increase in size, the flesh softens and turns yellow, the fruit surface facing the sun turns red, the ground color (the surface color on the side of the fruit not exposed to direct light) changes from green to yellow, acidity declines, and sugars increase. The eating quality of the fruit improves until the ground color is yellow and flesh is soft. If fruits are to be eaten within a day of harvest, then fruits can be allowed to ripen on the tree. If fruits are to be stored for several days, they should be harvested when ground color turns greenish-yellow.

All fruit on a tree will not ripen uniformly. Usually fruits on the outside and top of a tree will ripen five to 10 days before those at the lower interior part of the canopy. Peaches typically require two to five spot pickings, depending on variety, to ensure all fruits are harvested at the proper stage of maturity.

Post Harvest Handling

When harvested at the firm stage, peaches can be stored for 10 to 20 days. Fruits should be cooled to 40°F as soon after harvest as possible, and should be held at that temperature. Several days before fruits are consumed, hold them at room temperature until they develop yellow ground color and suitable flesh firmness.

Pest Control

There are many insects and diseases of peaches. Growing quality peaches in Virginia without pesticides is very difficult and should not be attempted unless one is willing to accept relatively low yields and fruits that are damaged by insects and diseases. Pesticide registrations change frequently. Therefore, commercial growers should purchase VCE Publication 456-419, The Spray Bulletin for Commercial Tree Fruit Growers, and noncommercial growers should purchase the VCE Publication 456-017, Virginia Pest Management Guide for Horticultural and Forestry Crops.

Tree Longevity

Virginia does not experience very low winter temperatures that kill or weaken trees, and we do not have some of the diseases and short-life problems of other regions. Virginia is well suited to growing peach trees and, when planted on a good site, a properly managed tree should live 20 to 30 years.

Avoid Winter Injury

Mid-winter temperatures of -10 to -15°F often kill peach flower buds, and shoots and branches may be injured or killed at -20 to -25°F. We have no control over winter temperatures, but there are several ways to minimize low temperature injury.

Plant hardy varieties. Varieties such as Redhaven, Cresthaven, Encore, Harken, and Harcrest are quite winter hardy, but Loring, Topaz, O'Henry, and Rich Lady are marginally hardy in Virginia.

Prune in late winter. Pruning temporarily reduces tree hardiness. Therefore, delay pruning until two or three weeks before bloom.

Paint trunks white. During winter the low sun angle increases the trunk temperature. The rapid alternating of heating and cooling during the day and night can cause bark splitting, especially on the south side of the tree. White paint on the trunk reflects the light and heat and minimizes such injury. In November, paint trunks and lower branches with white latex paint. Do not use oil-base paint.