Planting and Early Care of the Peach Orchard

Becky Carroll
Extension Assistant
Commercial Pecans and Tree Fruits

A peach orchard can be a profitable enterprise or a financial failure, depending to a large extent on how well the grower has planned ahead in choosing the site and cultivars, and prepared for the essential cultural operations involved. From February until late August, the grower will be involved regularly, and often intensively, with the orchard. The three most hectic times of the year will be from late February through March for pruning, late April for thinning, and then at harvest time. A 20- to 25-acre peach orchard is a full-time occupation for one person. During the busy times, it is usually necessary to hire outside help. Peaches will begin bearing a crop on the third year and full production by year five.

Site Selection

The single most important aspect to growing peaches successfully is site selection. Important considerations for selecting a peach orchard site include elevation and air drainage, soil type and drainage, water quality, previous site history and access to markets and competition. Planting in a low frost pocket will spell disaster for a peach orchard. In central Oklahoma, peaches bloom around March 20 to 25, but the chance for a frost is still 10 percent by April 15. This leaves the blooms vulnerable to freezing temperatures for several weeks. Having the best site on the highest elevation possible will allow easiest flow of cold air out of orchard site.

Soil

1) Start with the soil survey map. This will give you an idea of the type of soil you have or where you should look for a deep, well-drained soil. Peaches cannot tolerate "wet feet" or having their root system waterlogged for any length of time. Soils need to have good internal and external soil drainage.
2) Check the vegetation - short, weak growth may indicate shallow soil or shallow areas in the field. Look for any rock outcroppings, wet seepy areas, or low, poorly drained areas.
3) Check the soil depth at several places in the field using a soil auger or post-hole digger. Go to four feet if possible. Check for: a. absence of restrictive layers (heavy clay, hardpan, bedrock, water table); b. absence of mottling, which indicates poor water drainage; c. soil type; preferably the soil will have loam or sandy loam throughout the 4-foot rooting depth; d. depth of rooting of existing vegetation. This is a good indicator of the ability of roots to penetrate the soil horizons.
4) Check the soil drainage by performing a simple percolation test. Dig a hole two feet deep, fill with water and allow it to drain out completely. Refill with water. The water should drain out within one day. If the roots of the existing vegetation extend three to four feet deep, drainage is probably okay.

Site

1) Look for a site with good air drainage. On a still, clear night, the ground loses heat rapidly and cools the air near the ground surface. This cold air is heavier than the warm air above it, and like water, will flow downhill and collect in lower-lying areas. Putting the orchard on high ground will help avoid cold damage from such 'radiant frosts.' Overgrown fencerows, forested areas, and buildings on the orchard edge create barriers that can impede the drainage of cold air out of the orchard.
2) A north-facing slope is preferred since it will warm more slowly in the spring than a south-facing slope, and thus delay bloom slightly.
3) There should be good drainage of surface water so there will be no standing water in the orchard after heavy rains.
4) Ideally, there should be no woody plants on the site for the previous five years to avoid damage from *Armilleria mellea* (Armillaria root rot: also known as Mushroom root rot or Oak root rot), which can survive on roots and pieces of wood in the soil and later infect the roots of the fruit trees. Keeping the land out of woody plants for five years allows any roots present to decay completely. Ideally, the land should be cropped in a grass such as wheat or hybrid sudan during this time. Planting a fruit orchard in land just cleared of woody plants does not necessarily mean the trees will succumb to Armillaria, but since the only effective control is prevention, it is best to play it safe. Newly cleared oak forest land is extremely likely to support organisms that will kill peach trees.
5) Very steep slopes should be avoided because of the erosion hazard and difficulty in machine operations. Acceptable orchard slope is a 1 percent to 10 percent slope.
6) Access to roads and the proximity of markets (and other competitors) are important considerations.
7) Since fruits are mostly water, the availability of water for supplemental irrigation is important in getting the largest sized fruits.

Modifying the Site

An ideal location for the peach orchard would have four feet of loam or sandy loam soil with unimpeded drainage on

a hillside with slight slope and at least 50 feet of elevation between the lower edge of the orchard and any low spots, would not have had any woody plants on the site (especially oaks or fruit trees) for five years, would be on a good road, close to a large population center, and would have unlimited irrigation water available.

What if the site is not ideal? Can anything be done to improve the site? To a certain extent, yes.

Lacking soil depth - Pushing the soil up into berms and planting the tree rows along the tops of the berms can add soil rooting depth. Irrigation is essential to maintain good tree growth and fruit size when trees are planted on berms. If the soil is well drained, but only two to three feet deep, supplemental water will often compensate for the lack of soil depth.

Lacking perfect water drainage - Berms, tile drains, and ditches can often help sites with slightly imperfect drainage. Peaches are the most susceptible to damage from waterlogged soil during budbreak and rapid shoot extension in the spring. Especially rainy springs may cause tree damage or loss on poorly drained soils even when these precautions are taken to improve soil drainage.

Lacking elevation - Not much can be done. Wind machines, overhead sprinklers and heaters can help in frost protection, but the best frost protection method is site selection. Any elevation is better than none. Orchards that are planted in low-lying frost pockets will not be profitable.

High erosion potential - Many of the best peach orchard sites are on highly erodible sandy loam soils on a slope, and should be handled with care. Terraces and/or contour planting may be required. Preparing only the strip of soil in the row for planting and leaving the row middles in ground cover can be effective in reducing the erosion potential.

Limited irrigation water - Reduce weed competition, increase spacing between trees, ensure good soil depth, and reduce water runoff. If irrigation is available but water is limited, the most profitable time to irrigate is during the final three weeks before fruit ripening. There is usually little benefit derived from irrigation after fruit harvest, but if conditions are extremely dry there will be more "double peaches" the following year.

Soil fertility should not be a consideration in site selection. Mineral nutrients can be added, but soil depth, soil drainage and elevation for frost protection can make or break an orchard enterprise.

Land Preparation

The first step is to take a soil sample of the field. Fact Sheet PSS-2207 "How to Get a Good Soil Sample" details the procedure in collecting a representative sample. Lime, phosphorus, and to a lesser extent, potassium move slowly into the soil from a surface application, and work best when plowed into the soil prior to planting. Proper soil pH is important, since it affects the availability of soil nutrients and the longevity of the orchard. Nitrogen is generally not applied pre-plant because of its tendency to leach through the soil profile. See OSU Fact Sheet HLA-6232 "Fertilizing Pecan and Fruit Trees" for preplant fertilizer recommendations.

Orchard sites will benefit from cover cropping with warm season species such as hybrid sudan grass, buckwheat, or cowpea, and cool season crops such as wheat, annual ryegrass, crimson clover or tillage radish (forage radish) the year before planting to increase the organic matter content of the soil. If this is done, add sufficient nitrogen for good growth of the cover crop. Controlling perennial weeds, such as johnsongrass and bermudagrass, before planting will be much easier than trying to control them after planting. Consult OSU Current Report CR-6242 "Weed Control in Pecans, Apples and Peaches," for control recommendations. The soil should be sampled for nematodes, and nematode counts reduced if necessary before planting to peach trees. Instructions for nematode sampling can be found at the Plant Disease & Insect Diagnostic Lab's webpage: http://entoplp.okstate.edu/pddl/.

Planting

Nursery trees should be grown on fumigated soils and be certified disease and nematode free. Trees are normally planted in February to early March. Trees should be dormant and the roots should not be allowed to dry out or freeze. As long as irrigation is available, 18- to 24-inch trees are perfectly adequate. Where irrigation is lacking or inadequate, there is a benefit to starting with larger trees. Plant trees at the same level as they were in the nursery. Peach trees planted too deeply will grow poorly or die. Refill hole with soil and tamp soil firmly. Water well to eliminate air pockets around the root system. Within-row spacings can be as close as 12 feet, though 18 feet leaves plenty of room for growth. The closer spacings will bring the orchard into full production earlier, but this must be balanced against the increased initial cost of planting and the more severe pruning required to keep the trees in bounds as the orchard matures. By the third year of production (fifth growing season), close and wider spaced orchards have similar yields per acre. If irrigation water is not available, increase the within-row spacings to 25 feet to allow a greater soil volume as a water source for the tree during the dry months. Between-row spacings should be about 6 feet greater than the within-row spacings to allow room for equipment. An 18 x 24 foot spacing is a good standard spacing. High density plantings have not been tested in Oklahoma, but some surrounding states do use these methods.

Cultivars

Peach cultivars can be selected that will give a long season of harvest. OSU Fact Sheet HLA-6210 "Apple and Peach Varieties for Oklahoma" describes cultivars that do well in Oklahoma. The season of ripening will vary from year to year, so try to choose cultivars with seven days between ripening dates to avoid having them ripen at the same time. Early ripening varieties are considered cling or semi-cling. Freestone peaches normally ripen after July 4 in central Oklahoma. Bacterial Leaf Spot can be severe on susceptible cultivars, especially in central and eastern Oklahoma, but it is not as important in western Oklahoma, except in wet years. Choosing Bacterial Leaf Spot resistant cultivars is the most effective way to control this disease. Choose varieties that are in the high chilling categories from 700 hours and up. Low-chilling varieties are grown in southern coastal areas and will meet chilling requirements early winter in Oklahoma, blooming in February. The recommended rootstocks for Oklahoma are 'Lovell,' 'Halford' or 'Guardian' seedlings.

To ensure getting the cultivars desired, order early. Ordering custom-budded trees will result in a one-year delay in getting the trees, but is the surest means of getting the desired cultivars. Do not settle for a second choice if you can avoid it—you will be living with these trees for years.

Training and Pruning

Proper training of the young tree to establish strong branch structure and proper annual pruning of the established tree

are required for early and continued productivity of the orchard. Consult Fact Sheet HLA-6228 "Annual Pruning of Fruit Trees." Setting structure begins at planting. After tree is planted, cut off trunk to about 18 to 24 inches tall. This cut will push buds that will produce shoots for new scaffold branches. If left unpruned, the tree will not have the open center structure necessary for proper fruit ripening.

Fertilization

By far the best method for determining fertilizer need for established peach orchards is by taking yearly leaf samples for analysis. For instructions on how to collect and submit a leaf sample, and for guidelines for fertilizing newly planted and young orchards, consult Fact Sheet HLA-6232 "Fertilizing Pecan and Fruit Trees." Timing of leaf sample collection is important to the accuracy of the lab results.

Pests

Sprays in non-bearing peach orchards are only needed for those insects and diseases that affect the leaves and trunk, such as aphids, greater and lesser peach tree borers, Bacterial Leaf Spot (on susceptible cultivars), and Peach Leaf Curl. Production of unblemished fruit will require a full spray schedule starting from before budbreak and extending to just before harvest. Consult Current Report CR-6240 "Commercial Peach and Nectarine Insect and Disease Control," for control recommendations.

Weeds compete with the young tree for water and nutrients and should be kept three to four feet from the trunk with herbicides. Pre-emergent herbicides can be used to help keep new weed seeds from germinating. Older trees should be grown in a six to eight feet wide weed-free strip. Consult Current Report CR-6242 "Weed Control in Pecans, Apples and Peaches" for current recommendations. Always read and follow the label with any herbicide application.

An airblast sprayer is highly recommended for growers with more than a few trees. Handgun sprayers are adequate for young trees, or when only a few trees are involved, but become inefficient and time consuming when there is more than a half acre involved. It is absolutely necessary to have separate sprayers for the foliar sprays (insecticides and fungicides) and for herbicide sprays. A water source capable of quick filling of the sprayers will save time.

Locate your mixing and loading area where accidental spills will not contaminate surface water or wells. Federal and state regulations for storage and disposal of pesticides are becoming increasingly strict, so check into current regulations to assure compliance.

Irrigation

Because of the long, hot, and dry summer season in Oklahoma, irrigation of peach orchards has proven beneficial, both in bearing orchards to improve fruit size and therefore yield, and in young orchards to promote vigorous growth and early production. Even orchards in areas of the state with higher rainfall will benefit from irrigation.

The most common irrigation systems for peach orchards are the 'drip' or 'trickle' systems, which deliver the water slowly and in precise locations. Trickle irrigation is the most efficient method as far as water loss from evaporation is concerned, but it requires a clean source of water—either filtered ground water or surface water.

For most orchard applications, 1/2-inch semi-rigid polyethylene tubing is used for the lateral lines, which run down the tree row. Generally, the laterals should not be longer than 250 to 300 feet to minimize pressure differences from one end to the other. It is very important to get ultraviolet stabilized tubing or the lateral lines will last only a matter of months rather than years because of exposure to the sun. Several laterals are usually attached to a common manifold line and are run simultaneously during irrigation. A two inch PVC manifold will deliver enough water to irrigate up to five or six acres of orchard. To cover more than six acres, more than one manifold can be run at the same time (if your pump capacity can handle it), otherwise the manifolds can be run separately, but consecutively.

Young, developing orchards should be irrigated separately from older, bearing orchards because of differing water use rates. If the water supply is limited, it will make sense to have the early, mid-season and later ripening cultivars on separate irrigation 'zones' so that irrigation water can go to those trees still sizing a crop, rather than to those that have already been harvested.

The first year of planting, each tree should have one emitter, 1 foot from the tree. A second emitter is added the second spring 3 feet from the trunk on the opposite side. An alternative strategy is to place an emitter 3 feet from the trunk on both sides of the tree the first season. This way, if the irrigation line shifts, at least one emitter will be close to the tree. For either system, in the fourth year, which is generally the first big crop, two more emitters are added for each tree, located 6 feet from the trunk in each direction. The irrigation lines will tend to move somewhat because of expansion as they heat in the summer and contraction as they cool in winter. Do not pull the lines taut and/or tie them tight—they will pull apart when they contract. Fastening the end of the irrigation line to a spring, then staking the other end of the spring will provide some 'give,' but still keep the line in place. In-line emitters or emitters built into the drip line are used commonly in many orchards today. Emitter spacing can be chosen and can range from 1- to 4-foot spacing. These in-line emitters have less upkeep and do not clog as much as the button type emitters.

Water use by the tree is greatest in July and August, with slightly less required in June and September. The daily water use rates given below are for peach trees planted at an 18 x 24 foot spacing (100 trees per acre) and during July at peak water use rates.

Approximate Daily Water Use

	gallons/tree	*gallons/acre*
year 1	3.0	300
year 2	5.5	550
year 3	10.0	1,000
year 4	15.0	1,500
year 5 and beyond	30.0	3,000

Assuming an irrigation season from mid-June until mid-September (92 days) at peak use rate (3,000 gallons per acre per day), one acre of mature peach orchard would need 276,000 gallons of water during this three-month period. To supply that quantity of water would require a little more than 10 inches of water depth from a one acre pond, or a 30-gallon per minute well running 5 hours every third day.

The trees will need about 1 inch of rain per week to satisfy their needs early in the growing season, increasing to two inches of rain per week during July and August. In almost all years natural rainfall will be adequate for the tree's needs until early June. The available moisture stored in the soil will vary according to soil type and depth, but on most suitable peach sites there will be an additional three to four weeks of water available from the soil profile before the tree starts undergoing stress.

There are two general methods for scheduling irrigations for peach orchards. The first involves applying enough irrigation water to meet the estimated daily water use of the trees. Do not wait until all the soil is dry before you begin irrigating; start two weeks after the last good rainfall. Irrigate every three days, applying three days worth of water (for example - fifth year trees should receive 9,000 gallons per acre every three days). If you receive a good summer rain, you can cut back or skip an irrigation.

The second method uses tensiometers to measure the available soil moisture. Four units per orchard block, located four and one half feet from the tree in the herbicide strip at a twelve inch depth, will give a good average reading. Irrigation is applied when soil moisture reserves reach about 50 percent of field capacity (50 millibars of soil water tension), and water is turned off when field capacity is reached (10 millibars of soil tension). Tensiometers require regular monitoring and maintenance, but give a much more accurate reading of water needs.

Priority in irrigation should be given to those cultivars within three weeks of ripening, since that is when the fruit is increasing the most in size.

Thinning Fruits

There is a limit to the number of peaches the tree can mature to perfection. The leaves on a peach tree can only produce so many carbohydrates (sugars) to go into the developing fruits. If there are too many fruits, none of them get enough carbohydrates to develop properly, and they will be small, poorly colored, and of poor flavor.

The proper crop load for a peach tree would be where the fruits average a minimum of six inches apart on the branches throughout the tree. To maximize the percentage of large, premium fruit, a spacing of eight to ten inches would be preferable. The fruits that remain will respond to the increased supply of water, nutrients, and sugars (from the leaves) by greatly increasing in size, with the result that total yield will not be greatly reduced by proper thinning. Any yield reduction is more than offset by the increase in marketable yield. To achieve these spacings, it is not uncommon to have to remove 3/4 or more of the developing fruits. This can be a painful process, especially for a new grower. But to get good-sized, high-quality fruit, you must thin out the excess.

Thin when the fruits are the size of a quarter. The fruit can be thinned later than this, but for maximum benefit, the sooner the tree is thinned, the better. Thin your earliest ripening cultivars first, since they have less time to mature their fruit than later cultivars.

The excess fruits are generally removed by hand, removing the smallest fruits along with any that are deformed or damaged. The process of thinning can be sped up by the use of mechanical tree shakers, or by using plastic ball bats or a pole with a short length of rubber hose attached to shake excess fruit from individual branches. A good strategy is to use the mechanical means to thin off most of the excess fruits, and use follow-up hand labor to finish the job. There are no chemical thinners available for peaches. Some growers use rope thinners to knock off blooms. This may be risky, since freeze damage may occur after bloom and if thinning is completed, there is no way of putting that fruit back on the tree. Thinning later can allow the grower to adjust the crop load if freeze damage has occurred.

Thinning peaches is one of the most time-consuming chores in the orchard, but it is absolutely necessary for the production of good quality fruit. Excess crop load can also weaken the tree and make it more susceptible to cold injury next winter, and it can physically break the branches on a tree because of the excess weight.

Harvesting and Handling

There is no getting around the fact that harvest is a hectic time period, but it can be made less hectic by proper selection of cultivars to spread the harvest evenly over the season. All peach cultivars will require two or three pickings to harvest all the fruit at the optimum maturity.

Peaches can be sold as U-pick, at a roadside stand, or packed and sold on the wholesale market. Each sales method will have different sets of challenges. The target market will determine at what stage of maturity the fruit will be picked. As the fruit matures, the ground color (not the red blush) changes from green to yellow, the firmness decreases, and the sugars and flavors increase. The best eating quality will be if the fruit is allowed to fully ripen on the tree, but it will be so soft that it will not survive much of any transport without severe bruising, let alone washing, grading, and long-distance shipment. Immature peaches that still have a green ground color are quite firm and hold up to handling well, but will never develop a good flavor. Deciding when to harvest involves reaching a balance between firmness and ripeness. The closer the market, the longer the fruit can be allowed to stay on the tree.

A fruit where the ground color has almost completely changed from green to yellow is still firm enough for handling, but will develop good flavor as it softens. Watch your trees carefully during harvest. In some years, the ripening order of the cultivars may shift, or the fruit may ripen faster near the pit than on the surface. Cut open some fruit to be sure.

Peaches are easily bruised, especially as they approach tree-ripeness, and should be picked and handled with care. Every time the fruit is handled, the chances of bruising are increased, so minimizing the number of times the fruit must be transferred from one container to another will minimize bruising. Peaches should be cooled as rapidly as possible and kept as close to 33°F as possible (without freezing the fruit) for maximum storage life. Even under the best of conditions, storage life is only a couple of weeks. Fruit should be sold as soon as possible.

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