



Pruning and Training Fruit Trees in the Home Landscape

RUTGERS
New Jersey Agricultural
Experiment Station

Wesley R. Autio¹, Winfred P. Cowgill, Jr.², and Jon M. Clements¹

¹University of Massachusetts and ²Rutgers University

Deciduous fruit trees have long been a part of the home landscape. The grace of the tree and beauty of the bloom make them very attractive plants, but the taste of fresh fruit from a well managed fruit tree is unsurpassed. Unfortunately, however, fruit trees provide several horticultural challenges, a significant one being tree training. We use “training” rather than or in addition to “pruning” to reflect the wide variety of techniques that should be used to manage both the vegetative (shoots and leaves) and the reproductive (flowers and fruit) growth of the tree.

Because of the brevity of this publication, we will concentrate on two species of tree fruit, apples and peaches. They, generally, typify two categories: trees which flower and fruit largely on spurs originating on 2-year or older wood (apples, pears, plums, apricots, and cherries) and trees which flower and fruit on 1-year-old wood (that which was produced last year) only (peaches).

General Considerations

Why prune and train? A desirable fruit tree in the landscape is one which produces high quality fruit annually, is structurally sound, and is aesthetically pleasing. Pruning and training are used to enhance light penetration into the tree canopy and as a result cause the tree to produce large and tasty fruit throughout. Pruning and training are used to increase branch strength and eliminate weak branches so that the resulting canopy is capable of carrying a fruit crop without limb breakage. Both pruning and training also are used to maintain the tree canopy in the available space and to make that the most visually pleasing tree possible. Be aware that there may sometimes be a conflict between optimal fruit production and aesthetics.

Tools. Pruning of fruit trees requires three primary tools (see Figure 1). Bypass hand pruners are a necessity. Good quality pruners, such as Felco or Pica, should cost between \$35 and \$60. You also should have a pair of bypass loppers (24-26”) with a nicely curved hook on the blade. Barnell, Corona, and Bahco produce loppers in this category cost between \$45 and \$100. The last tool is a good saw. Our favorite is a 13” curved blade pruning saw with a Japanese-style blade (Tri-cut, Tiger Tooth, Turbo Cut, etc.). This is a pull saw with a very sharp blade and costs between \$20 and \$30. It is best also to purchase a sheath or scabbard for the saw to both protect the blade and you from the blade (\$20 to \$30).



Figure 1. Basic tree-fruit pruning tools.

Season of pruning. Pruning is best done on dry days in the late winter or early spring. Apples,

however, can be pruned as late as early June with no ill effects. Water sprouts can be removed in mid-summer. Removal of larger branches in the summer, fall, or early winter greatly enhance the odds of winter damage, since pruning is physiologically stimulating to the tree and reduces hardening. Peaches are very sensitive to trunk diseases, so pruning is best timed to occur in the early spring, near bloom. At this time of year, the tree's metabolism is active and trees are able to heal the damage quickly.

Pruning and Training Apple Trees



Figure 2. Conical shape of a central-leader apple tree.

As noted above, apple trees flower and fruit on spurs borne on 2-year-old and older wood. The greatest number and highest quality fruit are produced on wood that is between 3- and 4-years old. Pruning and training efforts are focused on maximizing the amount of fruitful wood in a tree and providing the conditions where this wood can produce fruit of high eating quality. Much research and experience has shown that the easiest tree form with which to attain these goals is a central leader, a tree with a single trunk and generally a conical shape (see Figure 2). We will detail a few of the approaches necessary to obtain and maintain the ideal tree.

To prune or not to prune! With a young, newly planted tree, it is important to avoid pruning as much as possible. Pruning will delay the onset of flowering and fruiting, and it will reduce the amount of fruit obtained early in the life of the tree. This is not to say that you should avoid working with your newly planted tree. This is the time, instead, when you will rely on other techniques to manage the growth of the tree.

Limb bending. It is amazing how much the limb angle from the trunk can affect the growth and fruiting of that limb. It starts when the limb is very small. Moving the young limb so that it has about a 90° angle from the trunk will ensure that it will have a strong connection to that trunk, one that will not break under several pounds of fruit. The best time to establish this angle is when the shoot is about 6 inches long, may be some time in late May or early June. This angle is

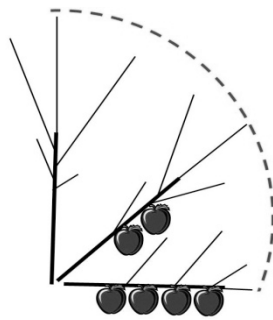


Figure 4. Limb angle can affect both shoot growth and fruiting.

easily set with a clothespin clamped onto the trunk above the shoot (see Figure 3).



Figure 3. Wooden clothespin used to maintain a wide angle between the branch and the trunk (at the end of the season).

After a strong "crotch angle" is established, limb bending is used to alter vegetative growth and flowering/fruiting. More specifically, a limb growing vertically will produce a very strong growth, mostly from the tip buds, and very little fruit. One growing horizontally, on the other hand, will produce only a small amount of growth distributed throughout the branch and will produce many more fruit. Adjusting the angle between vertical and horizontal (or even below horizontal) allow you to manipulate growth and fruiting (see

Figure 4). In general, a conically shaped tree can be obtained by maintaining lower branches inclined at about 45° and upper branches horizontal or declined by $10\text{-}20^\circ$. This approach can result in the development of a conical shape without pruning. It is important to realize that the vigor of a tree is naturally greater at the top than the bottom, so if you set the angles throughout the tree to the same angle, the strongest branches will be at the top and the weakest at the bottom (see Figure 5). Limb bending can be performed with any approach which gives the desired results. Popular approaches include tying with string or rubber bands, weights, spacing with sticks or wires.

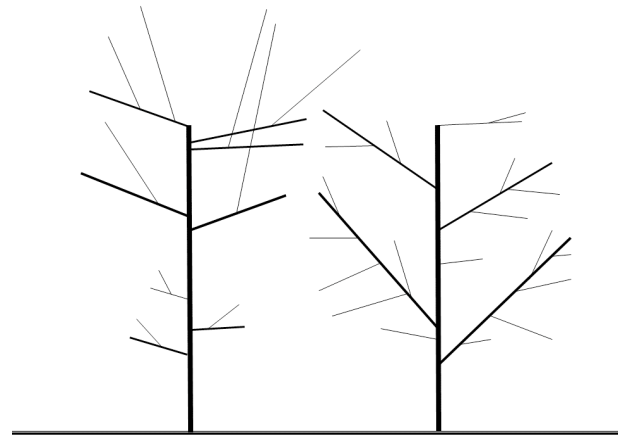


Figure 5. Limb angle affects growth, but natural growth is more vigorous at the top of the tree than at the bottom, with the same branch angle.

Pruning. When a tree begins to mature, pruning becomes a more important part of the training process. It is difficult to give a full description of the art and science of pruning. Instead, we will give you seven basic rules to follow as you pruning your trees. Before we discuss rules, realize that exposure of the inner part of the tree canopy to sunlight is critical for the development of flower buds, and training and pruning should strive to maximize the amount of sunlight intercepted by the tree. Shade is your enemy! Remember also that new shoots grown this season will produce flower buds next season, which will bloom and hopefully produce fruit in the next season. Seven rules:

1. Remove 2 or 3 of the largest limbs in the top two thirds of the tree. Remove these branches with a renewal (or bevel) cut (see Figure 6).
2. Remove any scaffold branch or limb that is half the diameter or larger at its base than the central trunk at the same point ("2-to-1 Rule"). A branch of this size chokes out the leader, not allowing the tree to reach optimal fruiting. Remove such branches with a renewal cut.
3. Avoid heading cuts (ones where only a portion of the branch is removed). Instead, remove the entire limb.
4. Reduce the complexity of branches in the lower one third of the tree. As branches on lateral limbs get older, they develop additional branches. This is what we call a complex branch. Leave the smaller, pencil-thick fruiting shoots.
5. Remove downward hanging branches.
6. Remove shoots that are growing straight up.
7. Leave one shoot as the central leader, and do not prune it.



Figure 6. Renewal or bevel cut with increase the chances of a new usable shoot being produced.

Pruning and Training Peach Trees

Pruning peach trees differs greatly from the pruning and training of apples. Since they fruit on

the shoots that were produced in the previous season, it is important to obtain good growth each year for the following years fruiting. Peach trees are very vigorous and have the capacity to grow a great deal each year. Because of the nature of the tree and the way fruit are produced, peaches are best grown to an open center (or vase) form (see Figure 7). Trees should have 3 to 5 main scaffold branches originating from a trunk, 2-3 feet from the soil surface. This structure should be developed by pruning in the first few seasons after planting.



Figure 7. Peach tree trained to an open center (vase) form.

One-year-old shoots that are reasonably long and about 1/4" in diameter produce the best large fruit, so the goal in pruning is to maintain as many of those as possible. A well managed tree, however, will produce more than enough of these shoots. A mature peach tree needs only between 75 and 90 of these shoots to produce a full crop. Peaches cannot mature as many fruit as they normally set, requiring removal of significant numbers of young fruit each year. Reducing the number of shoots, particularly the ones of lower fruiting potential, can dramatically reduce the need to remove young fruit. Peach pruning and training rules:

1. Delay pruning until just prior to the opening of flowers, on a dry day.
2. Remove the strongest, most upright shoots completely, if possible.
3. Remove shoots that are drooping significantly below horizontal.
4. Of the shoot produced in the previous season, select between 75 and 90 which are long, without side branches, and at least the diameter of a pencil. Remove ALL other shoots. See Figure 8.
5. After the flower has fallen off and the developing fruitlet is visible (late May to early June), remove excess fruit, leaving no more than one fruit every 10 inches along the length of these shoots. See Figure 9.
6. In early July, remove very strong, vertically growing, new shoots.



Figure 8. High quality shoots on peach trees.

Peach trees often are short-lived, but if they are pruned properly in dry conditions and thinned well each year, they should be able to produce fruit for 10 to 15 years before they need to be replaced.



Figure 9. Thinning peach fruitlets is required for a crop of large, high-quality fruit.