COOPERATIVE EXTENSION
University of California – Sacramento County
Environmental Horticultural Notes

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#82

TRAINING AND PRUNING FRUIT TREES

There are many ways to train and prune fruit trees – no single method is right for all situations and needs. One important consideration is tree size. Many people prefer small trees because they are easier to manage and harvest and more fruit types can be grown in a limited space. Other people prefer large trees because they provide shade and more fruit. For many backyard gardeners, ease of management and variety of fruits are increasingly are increasingly preferred over shade.

Summer vs. Dormant Pruning

No matter which training method you choose, use summer pruning to train young trees and shorten the time to full fruit production. On mature trees, summer pruning involves mainly: 1) removing vigorous, upright shoots that are not needed to create permanent branches and 2) heading shoots to control tree height. Summer pruning is done in both spring and summer. When useful, bend and stake any shoots of young trees that you want to grow in a different direction during the spring and summer. Bending branches hastens branch development compared to removing or heading those in undesirable locations and waiting for a new branch to form.

If trees received appropriate summer training and pruning, far less dormant pruning is necessary. However, the absence of leaves provides a clear view of the framework of the tree, so thin or head any branches that were not adequately summer pruned.

When you dormant prune, it is preferable to prune stone fruits in late February to early March rather than in the fall or early winter. Pruning wounds made late in the dormant season heal faster than those made earlier, allowing less time for disease organisms to infect the wound; also, there is less rain after February. Furthermore, spores of many organisms causing branch diseases are more prevalent with early season rains than later. This is especially true with Eutypa disease, which infects apricots (and grapes) and causes severe gumming and branch dieback, so it is especially important to prune apricots late in the season. Apples and pears can be safely pruned at any time.

Genetic Dwarf Trees

Genetic dwarf trees usually produce very short internodes (the space on a shoot between two leaves). These trees make beautiful landscape shrubs that are easily managed and provide adequate amounts of fruit. Trees grow to 8 to 10 feet tall and wide. Excellent varieties are available in peaches, nectarines, and citrus, and more are being developed for other fruit types. Lower fruiting wood of genetic dwarf trees, especially peaches and nectarines, tends to quickly die due to shading by the dense growth, but trees are small, so production of fruit on the extremities of trees is not a serious problem. Pruning mainly involves thinning branches to open up the canopy and cutting back to maintain tree height and spread. Size controlling pruning cuts can also be made; this should be done by pruning to lateral branches rather than heading.

Full-Sized and Semi-Dwarf Trees

Full-sized trees are those on standard or semi-dwarfing rootstocks. Full-sized trees can grow to 25 to 30 feet tall. Even semi-dwarf trees often grow to 15 to 20 feet, which is still too tall for most backyard situations. Truly dwarfing rootstocks are being developed for most fruit species, and an excellent selection of small growing semi-dwarf apples is usually available. As will be discussed later, both standard and semi-dwarf trees can be pruned to remain relatively small.

Open Center. The open-center or vase-shaped system is most commonly used on almond, apricot, cherry, fig, nectarine, peach, pear, persimmon, plum, pomegranate, and prune. Many apple and pistachio trees are also trained to this system. With this method, the center of the tree is kept free of branches and vigorous upright shoots in order to allow sunlight to reach lower fruiting wood.

To create an open center tree, in late April of the first growing season select three or four shoots that will become the primary scaffold branches (main structural branches) and pinch back all other shoots to 4 to 6 inches. When possible, the scaffold branches should be several inches apart vertically and they should are distributed evenly around the trunk. In about early June, pinch back or head the selected scaffold branches to 2 to 3 feet to promote side branching and the development of secondary scaffold branches. Also, continue to pinch or head back unwanted branches, but small lateral shoots are left for fruiting and shade. The unwanted branches are removed later, but provide shade for the trunk and main branches of young trees. If summer pruning was not done, or was insufficient, create the open center during the dormant season (Fig. 1). Continue to develop secondary scaffold branches in subsequent growing seasons.

Do not select scaffold limbs that are directly above one another; remove one or the other. Avoid upright limbs with narrow, acute angles from the trunk or main limbs because they tend to be poorly attached. Flat or horizontal limbs should be avoided for scaffold limbs, but they can work if new shoots coming from them are directed upward and outward. For most species, angles for limb attachments of about 45 degrees are desirable. If the tree grows poorly the first year, severely prune primary scaffolds to three or four buds to promote vigorous growth the next year, and correct the causes of the poor growth.

Cherry, plum and pear produce very upright growth and the scaffolds should be bent outward or cut back to outside lateral branches to provide tree spread. Other trees, like apricots, peaches, and almonds, have a spreading growth habit and tend to produce lateral branches without heading. With these varieties it is often necessary to remove flatter-angled branches and leave upright laterals, thus maintaining the upward, outward growth pattern.

Pruning of mature open center trees involves keeping the center free of vigorous, upright shoots, reducing tree height, and thinning out branches to reduce crowding. For peaches and nectarines, one-year-old lateral fruiting branches should be selected to originate close to main branches and these fruiting branches should be thinned (one-third to half of them can be removed) and headed by one-third if they are long.

Central Leader. Central leader training is often used for apples and sometimes for pears and Asian pears. It is used because these species naturally tend to grow this way. In this method, trees are kept shaped like Christmas trees, with lower branches wider than upper branches. Therefore, instead of sunlight reaching lower fruiting wood through the center, as with the open center method, it reaches lower wood from the sides. For young central leader trees, it is important to establish and maintain the dominance of the central leader. This is done during spring and summer by heading back (and later removing) or bending down any shoots that grow upright and compete with the central leader. Create the first whorl of four lateral branches by tying or staking branches outward, just above horizontal. Late in the first growing season or early in the second season, create the second whorl of four branches, offset from the first whorl, by tying or staking branches and always maintaining the dominance of the central leader. Then create the third and fourth whorls. Avoid bending branches directly over one another and maintain lower branches wider than upper branches.

Some side branching of these main lateral branches should be encouraged. However, vigorous, upright shoots are removed or headed back to only 3 or 4 buds throughout the growing season. Heading these shoots creates fruit-bearing spurs. Heading also creates more vigorous shoots; simply remove these shoots or prune them back again to create more spurs.

"Fruit Bushes". Fruit bushes are standard (full-sized) trees or trees on dwarfing rootstock that are kept small by frequent summer pruning. Pruning begins in about late April or early May of the first growing season, when new growth is about 2 feet long (Fig. 2). At this time, cut the new growth in half with hedge shears. In about June when the subsequent new growth is about 2 feet long, cut that new growth in half. The new growth may need to be cut once or twice more. With all the heading cuts, there can be an excess of branches, so be sure to thin them out a bit (remove some shoots) to allow sun to reach the lower branches. Prune out additional crowding branches in the late dormant season when they are more visible.

In the second year, continue cutting new growth in this manner until the trees reach 6 to 7 feet, at a height at which you can easily prune the top. Pruning in subsequent years involves cutting off any shoots above the tree's permanent height, thinning crowding branches, and removing non-productive fruiting wood during bloom when this wood is visible. Avoid heading cuts during the dormant season; this stimulates growth.

Pruning Overgrown Trees

Many people have one or more large, neglected fruit trees in their yards. The far majority of fruit from these trees must be picked using ladders, and much of it is even higher. It is very difficult to prune, spray, or thin the fruit in these trees, and high branches often break due to the weight of the fruit. Diseases or borers often invade these trees, and you must assess whether it is worth bringing the tree height down or simply removing the tree and planting a new one. In general, where a large tree is desired it is best to use a shade tree rather than a fruiting tree unless you are able to manage a large fruit tree.

If you decide to work with the tree, there are three main ways to prune it: 1) maintain the tree height and make mostly thinning cuts, 2) reduce the tree height slowly over about a three-year period, or 3) drastically cut back all main branches but one. With more extreme methods where large branches must be cut, wait until February or March – even into the flowering period – in order to allow quicker healing and to reduce the chance of disease organisms entering large pruning wounds during winter rains. Do not paint wounds with anything except white paint. When heading cuts are necessary, if possible cut back to a lateral branch at least one-third the thickness of the branch being cut. Also, if pruning results in exposure of branches to prolonged periods of hot afternoon sun, paint them white with tree whitewash or with a 50:50 mixture of interior white latex paint and water.

1. Maintain the tree height and make mostly thinning cuts. This method assumes that the tree is structurally sound and not much taller than you are able to easily manage with an available ladder. If the tree has been neglected many branches will need to be removed, especially high in the tree. Thin out enough branches to allow sunlight to penetrate to lower wood, but don't create such big gaps that main branches become subject to sunburn; paint them if necessary. Remove any branches growing beyond the height you are able to pick the fruit. By keeping the tree at this height, it will produce new, vigorous shoots – especially on the top of the tree. These must be removed each year, preferably through summer pruning.

2. Reduce the tree height slowly over about a three-year period. This approach can be successful with appropriate follow-up pruning, especially summer pruning. Determine how tall you would like the permanent structure of the tree to be, and reduce the height by one-third each year for three years until the final height is reached. Vigorous shoot growth is inevitable, so it is essential to remove or head many of these shoots once or twice in the summer to avoid shading lower fruiting wood. Also, thin out branches as needed to allow sunlight penetration.

3. Drastically cut back all main branches but one. This is an extreme method of reducing tree height in a single season. Not all trees are capable of resprouting from large lower branches. Apples and pears will usually work, but old stone fruit trees may not effectively resprout because lower buds may not be able to push through the thick bark. Also, there are often no small branches or twigs low in these trees from which to

produce a new framework. Another concern is that some backyard trees have no main branches below 6 to 8 feet. Such trees are better off pruned conventionally or removed, since the only major cut low in the tree leaves only a stump, which may not regrow.

Main branches are cut with a saw by first creating a deep cut on the underside (to prevent bark splitting) and then removing the limb with a cut on the upper side. If possible, cut above one or more lateral branches – even if they are small branches. Head or thin these branches as needed; they, along with shoots arising from buds on the main branches, will form the framework for the new, small tree. To prevent sunburn, all exposed main branches must be whitewashed.

Because this method removes so much leaf area but maintains a large root system that must continue to receive products of photosynthesis (carbohydrates), it is important to leave one smaller main branch or a large side branch unpruned. This extra branch is then removed the following year, after new branches have formed from the main branch stumps. Follow-up summer and dormant pruning is essential to reform the tree in the desired manner.

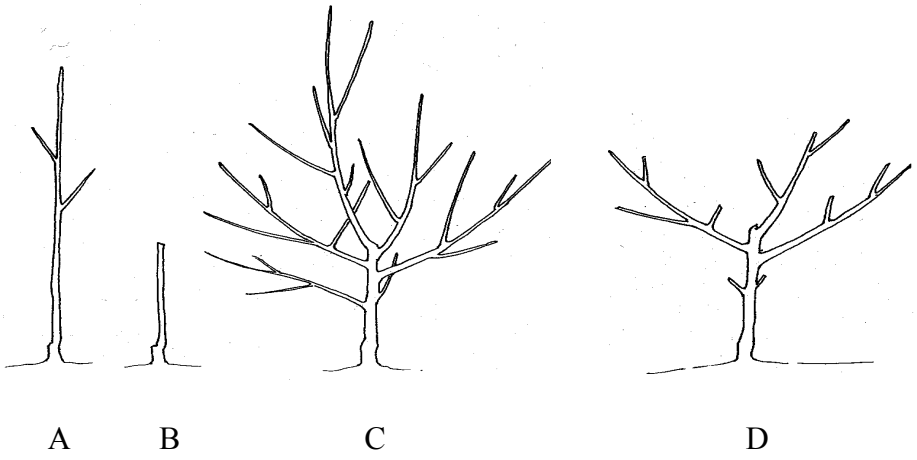

Figure 1. Creating an open center tree. A. Bare root tree just planted. B. Tree headed after planting. C. Growth after one season. D. Tree pruned after one growing season. Further development would have been possible if tree was summer pruned.

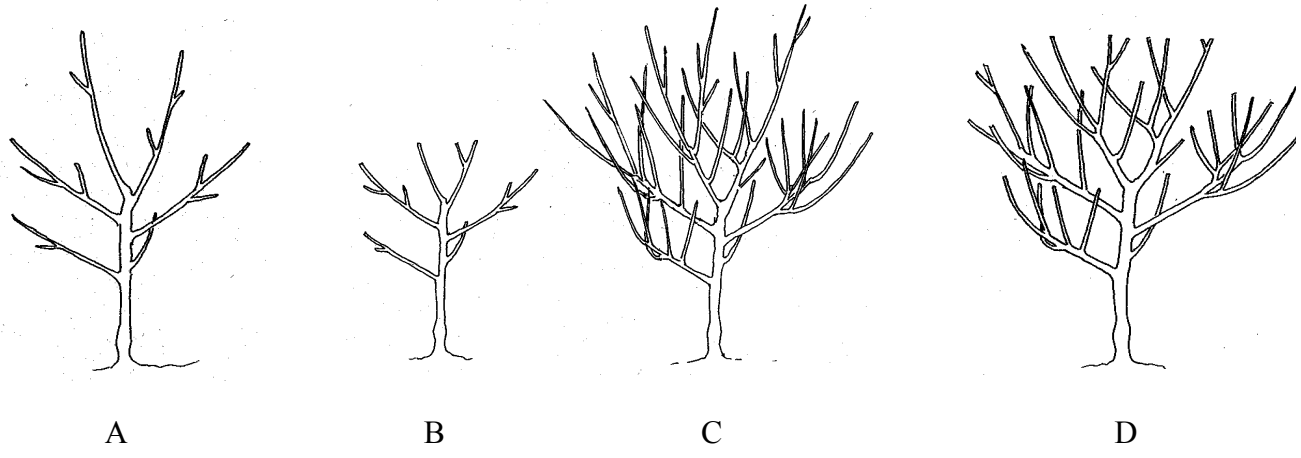

Figure 2. Creating a fruit bush (leaves removed to show structure). A. New growth from trunk in May. B. About half of new growth removed with hedge shears. C. Additional growth in June. D. About half of additional growth removed with hedge shears. Additional new growth may require pruning 1 or 2 more times. Continue each year until tree is at desired height, after which all new top growth is removed through spring and summer.

January, 2000. Written by Chuck Ingels (Farm Advisor) and UC Master Gardener Eleanor Dong. Illustrated by Walter Dong.