Training and Pruning Dwarfed Apple Trees
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Training and Pruning

DWARFED APPLE TREES

Well trained and pruned 5-year old Jonathan tree on East Malling VII rootstock.

TRAINING AND PRUNING DWARFED APPLE TREES

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THE PROPER METHOD of training and pruning dwarfed apple trees is fundamentally no different from that for standard apple trees.

All fruit trees should be *trained* with the purpose of producing high yields of acceptable quality fruit over a long period. Well trained trees are easier to prune, cultivate, spray and harvest. *Training* young trees improves their form and shape. *Pruning* older trees helps to keep their shape; influences their growth, flowering and fruitfulness; improves the fruit quality; repairs injury; and facilitates cultural and harvesting operations.

The difference in training and pruning of dwarfed and standard trees is a matter of size and compactness. Dwarfed trees are smaller at maturity than standard trees. For example, scaffold branches of dwarfed trees should be nearer the ground and closer together than on standard trees. The degree of dwarfing, as determined by the specific rootstock and the variety characteristics, greatly influences the best method to train and prune dwarfed trees. Although the rootstock dwarfs the varieties, correct training and pruning will help keeping the trees compact and productive.

PRUNING THE SEMI-DWARF

The semi-dwarf trees include those on East Malling VII and II and those on Malling Merton 104, 106 and 111 rootstocks. They will vary in size from 12 to 18 feet at maturity depending on the variety/rootstock combination and the orchard soil. Semi-dwarf apple trees are best trained to a modified-leader system. A well-developed modified leader tree is one with a central trunk or axis extending upward through the tree's center from which a number of main laterals or scaffold branches arise. The branches should form *wide angles* at their point of union with the trunk in order to provide maximum strength. Large one-year old nursery trees are usually best for developing this type of tree. (See Extension Folder F-136, *Dwarfed Fruit Trees.*)

The method used to develop a modified leader tree varies with the variety characteristics, but the general procedure of training is described in the sections that follow.

Pruning the First Year

At planting time, head the newly planted tree back to two feet above the ground. This will help force out good scaffold branches down to about 18 inches above the ground.

Large, vigorous and branched trees may be headed up to 3 feet high. One or two well-spaced wide angle scaffold branches may be left on such trees; however, prune these scaffold branches back to 8 to 14 inches in order to keep the leader dominant. The first branch of dwarfed trees should be 16 to 18 inches from the ground.

Summer Pruning—Summer pruning is part of the European training system for dwarfed trees where labor is available. However, summer pruning in the United States may or may not be feasible depending on the individual orchardist. In Michigan, this operation can be eliminated without seriously effecting the shape, form and growth of the trees. For those who would like to include summer pruning, the following suggestions and methods should be helpful.

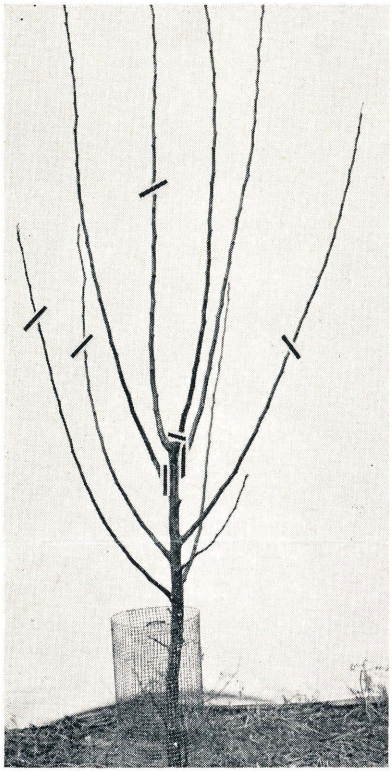

Fig. 1. Second pruning (after one year in the orchard) consists of removing undesirable narrow crotched branches, selecting well-spaced, wide-angle scaffolds, and heading the leader and scaffold branches enough to balance the tree. Note where cuts should be made.

Fig. 2. During third pruning (2-year-old tree), again remove sharp-angled branches, thin out and balance the scaffold branches, select additional scaffold branches, and keep the leader dominant. Left—before pruning, right—after pruning.

For summer training, select the first 2 or 3 permanent scaffolds when new growth is 8 to 10 inches long. These should be wide angled, 4 to 8 inches apart, and rotated away from each other around the trunk. The tips of the branches to be removed at a later time may be pinched out. With some varieties, particularly Red Delicious, 2 or 3 rather narrow-crotched shoots usually are formed near the tip of the leader. The best one of these should be left as the new leader and the others removed or pinched back. Summer pinching should be repeated again 2 or 3 weeks later. The complete removal of growing shoots by summer pruning is not suggested since these young trees need as much leaf surface as possible to provide maximum growth of the top and roots.

Pruning the Second Year

Following one year in the orchard, select 2 or more wide angled scaffold branches (this will be easy if summer pinching was done). The first of these should be 16 to 18 inches above the ground, the others no closer than 6 inches apart along the central axis or leader. If the tree had branches when planted, another 2 or 3 branches can be selected the second year. Remove all undesirable narrow-crotched branches. Head the leader back to 3 to 4 feet from the ground, depending on the vigor of each tree. Head scaffold branches enough to balance the tree. Vigorous side branches tend to dominate and overgrow the rest of the tree unless they are "checked" by this balanced pruning process each year (Figure 1).

Summer pinching may be repeated during the second growing season to select additional wide-angled and well-spaced scaffold branches and to check undesirable double leader shoots.

Pruning the Third Year

Again, select two or more well-formed lateral scaffold branches. If necessary, head these back to keep the leader dominant.

The scaffold branches previously saved will have rebranched, forming secondary shoots or laterals. If need be, thin these out to balance the tree. Remove or head back branches that are too long and those with poor angles or those spaced too closely together.

Keep the several parts of the tree in balance. Do not let the lower branches outgrow the upper portions of the tree, nor the upper branches grow longer and "shade out" the lower ones (Figure 2).

Fig. 3. Remove branches with weak crotch angles in the third and fourth years. Head-back and/or thin out scaffolds to balance tree and keep leader dominant.

Fig. 4. A leaning tree should be lightened on the side closest to the ground by removing 2 or 3 branches on that side. Note arrows.

Pruning the Fourth Year to Maturity

During the fourth and fifth years, additional scaffold branches should be selected and the final training of the tree completed. The mature trees should carry 5 to 8 scaffold branches. Therefore, the trained tree should have at least 8 scaffolds so that in the future, undesirable ones can be removed. Pruning of the young bearing tree should be light and corrective. Prune to encourage formation of strong framework and to keep a proper relationship and balance among the scaffold branches. Keep the central leader dominant until the tree is as tall as desired. The central leader can then be terminated into a well-placed, outward-growing lateral. Correct any tendencies to develop weak crotches (Figure 3). If the tree is leaning, remove a branch or two on the leaning side to balance this condition (Figure 4).

Future pruning of the mature tree should be enough to admit sunlight and facilitate cultural practices and harvesting. Mature semi-dwarf trees can usually be thicker with more foliage and branches than standard trees.

Pruning the Older Trees

Annual light pruning should be done throughout the life of the tree. Remove weak, unproductive wood to promote more vigorous growth of young fruiting wood. Lower branches that tend to rest on the ground should be removed. Completely remove main scaffold branches that are spaced too closely together (Figure 5).

Pruning Specific Varieties

Red Delicious grows vigorously and usually has many sharp angled crotches. Particular care must be given this variety to eliminate undesirable scaffold branches; however, the overall prunning should be held to a minimum. Pruning experiments in south-

Fig. 5. Diagramatic illustration of a 10-year-old, semi-dwarf tree with too many branches. These should be removed as indicated by broken lines.

western Michigan and at East Lansing have shown that even moderate pruning of Red Delicious will delay its coming into bearing by a year or more (Figure 6). Lateral branch tipping of Red Delicious and excessive growth of terminal, sharp angled shoots at the "point" of the pruning cut also tends to delay fruiting (Figure 7). In a study at East Lansing, trees which had the terminal shoots of the leader and major scaffold branches "tipped" produced an average of 4 fruits each in their fourth growing season, compared to an average of 15 fruits each for those that were not tipped. The "tipping" was the only difference in pruning. Tip lateral branches of this variety only when necessary to balance the scaffolds. "Spur pruning" of undesirable shoots arising from or near the central leader is *not* suggested. Either leave the shoot to produce leaf surface with the thought to remove it next year, or take it out.

Jonathan usually spreads out and comes into fruiting before the tree has attained sufficient height, unless it is trained correctly. Prune Jonathan more than

Fig. 6. Five-year-old trees of Red Delicious/EM VII; left trained tree with minimum pruning; right, moderately pruned tree. The lightly trained trees came into production one year earlier and produced an average of 67 pounds as compared to 34 pounds for the moderately pruned trees in the fifth year.

you would Red Delicious. Pay particular attention to keeping the leader dominant and free of fruiting spurs until the tree has reached a desired height. Fruiting spurs on the top of the leader of the young tree should be removed during pruning or the fruit sprayed or picked off in May to prevent the leader of the tree from bending over (Figure 8).

Other open growing varieties, such as *Rome Beauty* and *Stayman Winesap*, will open up too early unless vigorous leader development is encouraged until the tree's height is fully established.

McIntosh should present no serious problem, if well trained during the first 2 to 4 years. A strong leader with 7 or more wide angle scaffolds should be established early. As the tree becomes older and thicker, the number of scaffolds should be gradually reduced to 4 or 5. Keep a McIntosh tree open enough so that the sunlight will penetrate the tree to insure fruitfulness and good fruit color throughout.

Northern Spy tends to produce an excessive number of sharp upward growing scaffolds near the base of the trunk, which if left as permanent branches, will result in girdling and excessive branch "decline" (Figure 6). Careful annual training to form a modified leader followed by gradual removal of crowding branches will insure good structured Northern Spy trees.

Golden Delicious is similar to Jonathan in that it comes into fruiting early, requiring a good scaffold system and early training. An annual thinning out and encouragement of new growth is desirable.

Scoring to Induce Early and Annual Bearing

Although scoring is not a pruning operation, it fits here because it influences productivity of both dwarfed and standard trees. Scoring is done by cutting through the bark with a pruning knife, in a complete circle around the trunk just below the lowest branch. By scoring 12 to 16 days after full bloom, the trees will set more fruit the same year, as well as the following year. Scoring will bring varieties such as Red Delicious and Northern Spy into bearing 2 to 3 years sooner whether or not on dwarfing or seedling rootstocks. Varieties which have not come into bloom or bearing by the fourth or fifth year should be scored.

Fig. 7. "Tipping" Red Delicious shoots as indicated by arrows results in excessive number of sharp angled shoots and delayed fruiting. Tip only where necessary to balance the tree or head back leader and dominant scaffolds. Note arrows where cuts were made.

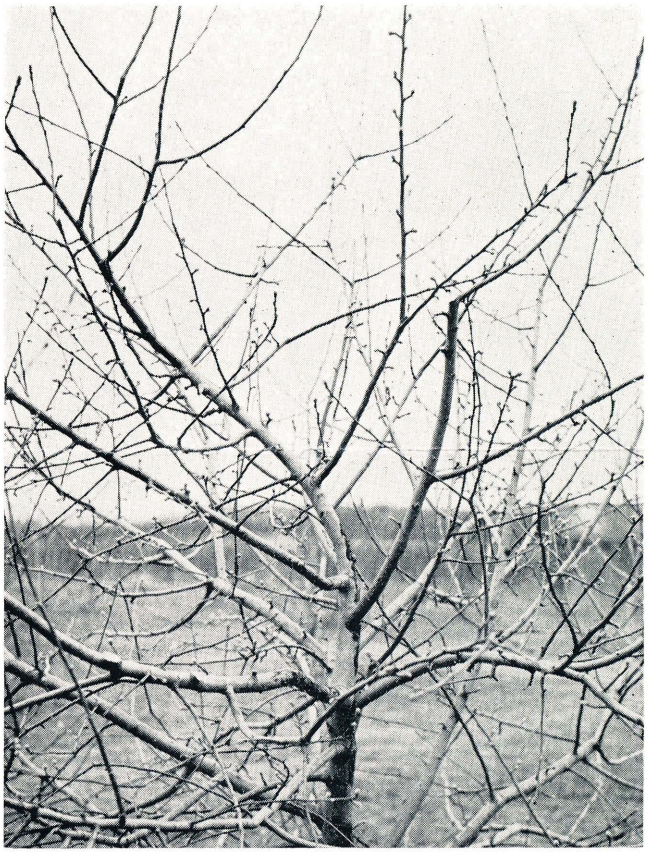

Fig. 8. A 5-year-old Jonathan tree with the central leader lost by bearing a heavy load of fruit. The blossoms or young fruit should be removed from the leader until the tree has reached the desired height.

Annual scoring is not needed. However, if the variety tends to have an "off-year," score during that year. Scoring should not be confused with ringing which is done by taking out ⅛ inch of bark around the trunk of the tree. Ringing is *not* recommended.

PRUNING TRUE DWARFED TREES

A true dwarf tree can be described as one on EM IX rootstock which will reach a maximum height of 6 to 8 feet. These truly dwarfed trees will usually require support, such as stakes or wire trellises. The trees should be grown on good soil in order to produce vigorous, but small compact trees. The type of support will often determine how they are trained. Those trees supported with stakes or posts should be trained in much the same manner as the semi-dwarf trees. A central leader should be encouraged and side branches should be well spaced about 4 inches apart keeping the tree well balanced. Since these trees fruit the second year, heavy fruit thinning is required in order not to stunt the trees. If the tree is trained to a wire trellis, a number of systems can be used. However, it is usually best to train a central leader up to the top wire with side branches running in each direction along the wires. These should be fastened by clothes pins or tied to the wire by aluminum strips,[1] or plastic tape[2] or binder twine. Keep the trees "full" in the early years because extra, unwanted laterals can be removed later if necessary.

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