

Pruning and Training for Optimal Abundance

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The purpose of this workshop is to learn how shrubs and trees grow and how to direct their growth to achieve optimal abundance and long term sustainability.

***Personal note:** My approach to teaching pruning and training is to start with the basics of how plants grow and how they are likely to react to anything you do to them. With this foundation, you should be able to successfully prune and train most trees and shrubs. There are many great books available that provide detailed descriptions of how to prune and train each shrub and tree, and characteristics of how each grows. You should research each of your specific shrubs and trees. I particularly recommend *Pruning and Training* by C. Brickell and D. Joyce. If you have any questions that go unanswered after today, please contact me.*

Do you have goals for your trees and shrubs?

Growing shrubs and trees for abundance and long term sustainability is about directing these plants towards clear goals.

The most common goals for pruning and training trees and shrubs include:

- To improve health for longer life
- To increase the amount of attractive foliage and/or flowers
- To control size and shape and create interesting branch structures like espaliers
- To increase or reduce shade in outdoor areas
- To screen unsightly views
- To develop a wind break to protect outdoor areas
- To increase the production of fruit and nuts

Reading your trees and shrubs

Reading shrubs and trees involves identifying the age of the shoots, stems and branches, the rate of growth, where the buds are located, which buds are likely to develop into new branches, and which buds are likely to develop into flowers.

Age of the shoots

When the branches of most deciduous trees or shrubs stop growing in the fall, they form a bud at the end of the branch. These buds are covered with small protective scales. In the spring when growth starts again, these bud scales fall off and leave a set of bud scale scars around the branch. On conifers, these scars can be difficult to see (or absent altogether), so either a change in the color of the shoot or a cluster of branches is used to identify the end of the previous season's growth.

Rate of growth

The length of the shoot that grows each year tells you how fast the plant is growing. Most trees have several years of branches, so you should be able to tell if it is growing faster or slower than in previous years. You should also notice that the shoots on the top of the tree and all vertical shoots grow faster than shoots on non-vertical branches.

Location of the buds

Buds (future branches or flowers) are produced at the end of shoots (apical or terminal bud) and laterally along the sides of branches (usually at nodes where leaves are attached, sometimes in other areas). Some buds are very small and they can be hidden under the scale-like leaves of Thuja, or even under the bark of some trees.

Potential function of the buds

Buds usually vary in size based on where they are on the plant and whether they are potential flower or branch buds. Your research into each of your trees and shrubs will tell you when they flower (if they flower) and where their flower buds are produced. See if you can tell which buds will grow into flowers and which will be branches.

How shrubs and trees grow

There are two key things you need to understand about plant growth if you want to direct your plants to reach your goals: apical dominance, and how plants react to various levels of light.

Apical dominance

Apical dominance is the control exerted by the apical (topmost) bud over the growth of the buds below it. The apical bud produces plant hormones that flow downward inside the shoot, suppressing the growth of the other buds. Some plants are very strongly apically dominant, others are weakly apically dominant. Strongly apically dominant trees can grow very large; small trees and shrubs are usually weakly apically dominant. By controlling apical dominance, you can direct the height and shape of your trees and shrubs.

Bending: Apical dominance is strongest in vertical shoots. If you bend a shoot horizontally, you will eliminate the dominance and all the buds on that shoot will start to grow. If you bend the shoot to 45 degrees from vertical, some of the apical dominance will be lost. This technique is commonly used when growing apples and pears to produce the small, slow growing branches called spurs that are necessary for fruit production.

Tipping: If you cut the apical bud off a shoot, you eliminate the apical dominance and some of the buds below the cut will start to grow. This technique is used to grow branches where you want them and to change the shape of the tree or shrub.

Hedging: Cutting the apical bud off over and over is how hedges are produced. The more branches you have on a shrub or tree, the less each one of them will grow.

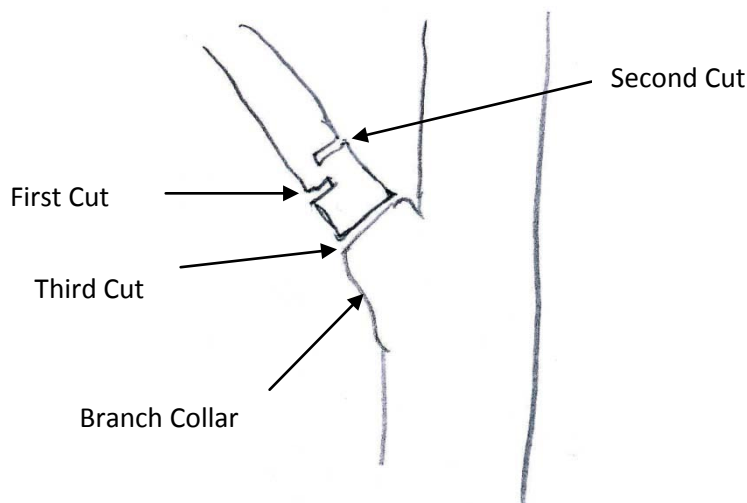
Light

In trees and shrubs, most of the light is received by the leaves on the outside edges of the plant, since the inside areas are shaded. The stronger the shade, the weaker the growth in these inside areas. If you are growing a tree or shrub for flowers or fruit, shaded areas of the tree will produce fewer and poorer flowers and fruit (if they produce any at all). The inside area of heavily sheared hedges is completely dark, so all the inside leaves and buds fall off the plant.

Types of pruning cuts

Tipping cuts are cuts in one-year-old wood removing the apical bud. On some soft new growth, this is also called pinching. These cuts should be made just above a bud. If buds are produced opposite (one on either side of the shoot), cut straight across the shoot just above both buds. If buds are alternate (not opposite), make a slanting cut about 1/4" above the bud.

Thinning cuts remove a branch back to where another branch connects with it. Thinning cuts of small branches are sometimes called fork pruning. On larger branches, the cut should be made just outside the branch collar. This is a slightly swollen area of growth that should be visible where two branches or a branch and the tree trunk connect. Cutting outside the branch collar will reduce the probability of disease entering through the cut and will speed healing. When removing large branches, use the three cut method pictured below, or hire an arborist.



Heading cuts are similar to tipping cuts, but are made in large mature branches or tree trunks. This type of cut rarely heals and often leads to disease infections in the wood. This type of cut is likely to shorten the tree's life.

Timing of pruning

Trees and shrubs can be pruned at any time of the year, as long as you take into account the impact the pruning will have on them and the likely response to the pruning.

Dormant pruning

Pruning during the plant's dormant season usually causes localized stimulation of the tree or shrub in the spring. Some ornamental shrubs and trees flower on branches that grow in the spring; these are usually pruned in the dormant season when there are no flower buds on the plant.

Spring and summer pruning

Pruning while the shrub or tree is actively growing may cause a localized slowing or stopping of the growth of the tree or shrub. However, summer pruning is normal for hedges, fruit trees, and many other trees and shrubs. The critical point is to understand that pruning at this time of year weakens your plant, so it should be done with a clear purpose in mind. Ornamental shrubs that flower in spring on branches produced the year before are usually pruned soon after they flower. Pruning these plants in the dormant season will remove many flower buds.

Fruit trees

Apples and pears fruit primarily on small two-year-old and older branches called spurs. They are usually pruned in both the dormant and growing seasons, taking into account where the flower buds are (don't cut your spurs off!). The trick to more fruit buds on these trees is a balance between too much and too little growth. Upright branches are often spread to about 60 degrees off vertical to slow their growth and produce short, slow growing future spurs.

Cherries, plums, and apricots all fruit on two-year-old spurs and on one-year-old wood. These trees are usually pruned in the dormant season, taking into account where the flower buds are. These trees are much more vigorous than apples and pears, so the balance between fruiting and vegetative growth is not as important.

Peaches, nectarines, and almonds all fruit only on branches that grew the year before, and they are all pruned only in the late dormant season. If it is clear that these trees do not have any flower buds, they should be pruned severely to stimulate new growth for a great crop the following year.

Tools

Hand pruners are used for small branches. Choose the bypass type instead of anvil type to do less damage to the plant. Bypass shears have an anvil-like structure on one side, so to avoid damaging the tree or shrub, ensure the blade is always next to the tree.

Loppers are used for larger branches up to about 1" thick. As with hand pruners, choose the bypass type.

Hand saws with Japanese-type teeth with no set are best. These do a better job of cutting, since they cut when you pull not push. Use larger saws for larger branches.

Pole pruners/saws work well for branches that are out of your reach. Try to make thinning cuts to branch collars.

Shears are used for hedging, and any other application where you want to tip lots of shoots quickly.

Practical Pruning Guide

#1 What to do first

To reduce the complexity of the job, look for and remove the three D's (Dead, Diseased, and Damaged). Cut them with a thinning cut to the branch collar:

- **Dead** branches: determine where the edge of the dead area is, and remove it.
- **Diseased** branches: determine where the edge of the diseased area is, and cut it off a few inches into the live branch.
- **Damaged** branches: same as for dead branches.

#2 What to do next

The general guideline is to never prune off any more than 30% of the foliage on a tree or shrub. However, this would be too much for a weak tree that is not growing well, and can be exceeded with safety on a tree or shrub that is very healthy and growing rapidly. Every situation is different; start cautiously and cut more or less next time based on your results.

Shrubs

- Step back and look at the shrub.
- Most shrubs send up new stems from the soil each year. Remove the thin, weak, and oldest shoots at ground level.
- If you want to change the shape of a shrub, direct its growth by using tipping and thinning cuts. Remember to open the shrub up so light can get to all areas where you want healthy growth.
- If you want to change the shrub into a small tree form, remove all but one shoot and direct it using tipping and thinning cuts.
- If you have holes in your hedges or other shrubs, the quickest and easiest solution is to bend a healthy branch from an area beside it into the hole and tie it in place. Then use tipping cuts to stimulate the new branch to fill the hole.
- **Layer pruning** is the removal of branches that have other branches laying directly on top of them. The bottom branches are usually shaded and in poor health. This technique is often used to reduce the size of evergreens that are encroaching on pathways, and to open up overgrown fruit trees.
- **Coppicing** is the practice of cutting off all stems of a shrub at soil level. These shrubs will send up many new, fresh looking stems. Some dogwoods and willows are commonly coppiced.

Trees

- Step back and have a look at your tree.
- Look at the structure. The branches should be attached to the trunk with strong crotches, ideally 60-80 degrees from the trunk. Branches that are almost vertical and close to the trunk are usually weakly attached and they should be removed when the tree is small. Ideally, branches should also be less than 50% the diameter of the trunk at the point of attachment. Branches should also be spaced out around the trunk and up and down the trunk, not all attached in the same area. Removing branches that do not meet these ideals will result in a stronger tree.
- Mentally separate the tree into components, such as each of the large branches, or left, right, front, and back quadrants. Work on each of these areas individually, remembering your original goal for the tree. Direct the growth of each component using thinning cuts, tipping, and bending. Remember to open the tree up so light can reach all the inside areas.