

Shaping and Pruning Your Ornamental Broadleaf Trees

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Spring is an ideal time to prune your ornamental trees. Warm days allow for pleasant outdoor activities, and trees are just coming out of winter dormancy allowing for easy branch viewing. Plus any pruning cuts will start to heal very rapidly as the tree mobilizes stored sugars for new leaf growth. Some trees naturally grow into the form you want, whereas many others will benefit from some help directing their branches to grow into the right spot that provide the best growth for you and the tree. For most ornamental trees, pruning achieves 3 goals: Access, Efficiency, and Shaping .



Figure 1. The flowering crabapple tree (left picture) had only some haphazard pruning such as removing dead and broken branches in the past. The owner wanted the tree pruned because mowing under it had become a problem from low branch development. He also highly valued the ornamental value of the tree including spring flowers, shade and privacy. After about and hours worth of labor, selective pruning (right picture) resulted in a better shaped tree for easy mowing, greater vigor because interfering and dead branches had been removed, and nice aesthetic appeal and potential future growth. Pruning your ornamental broadleaf trees is not difficult if you follow a few guidelines that are demonstrated in this publication.

Tools

The right tools make tree pruning a lot easier and more fun. A quality set of hand pruners, lopping shears, and small pruning saw will typically cover most applications. Thin leather gloves will spare your hand the abrasions and pokes that come from handling branches, and safety glasses are recommended as branches can hang-up, snap back or whip you as you try to pull them out of the tree. For removing and shaping longer branches, an extendable pole saw/lopper is very useful. Many pole saws are built very heavy and sturdy making handling difficult— the author prefers the lighter built models as they are easier to handle into difficult angles required for proper pruning cuts. Larger branch removal may require a larger hand saw or small chainsaw. Chainsaws are very useful for making shaped cuts on larger or ingrown branches.



Figure 2. Pruning tools you will want are comfortable leather gloves, safety glasses, hand clipper, small pruning saw, lopper, a larger saw or small chainsaw, and a pole saw. Higher quality tools, but not always the most expensive, make the job easier.

Chainsaws are very dangerous tools that require good arm-strength, practice and safe technique. For basic chainsaw safety tips see chainsaw safety videos at www.msuextension.org/videoresources.html



Figure 3. The angle of a good pruning saw should be only slightly curved. The curve helps the saw cut into the wood. Some saws have too much of a curve which causes them to bind in the wood rather than cut. Saws need to be light enough to be easily placed in the right location and angle to make good clean cuts. The rope activated lopper is handy for clipping back smaller branches and branch tips.

Figure 4. A small chainsaw is useful in removing larger and dead branches along the stem where the angle does not allow for a hand saw to be used. Make certain to maintain a good grip on the saw and practice using it in more simple applications before using in more complex situations. Just using the tip to carve out stobs and dead wood can be very dangerous as sawing with the tip can cause the saw to “kick back” at you. Very serious shoulder and facial injuries can occur unless you know how to handle the saw in such situations. Appropriate protective gear is highly recommended, or hire a professional!



Figure 5. Removal of a small branch with a hand clipper should leave a clean cut close to the stem.

Pruning Technique

Most pruning is best accomplished with hand tools. The best pruning cuts are those that heal quickly. Cuts should leave a smooth surface without jagged edges and be made close to tissue that will remain alive because it transports water and sugar between roots and leaves. This will facilitate the growth of new bark over the wound. Branch removal should result in a cut that is either flush with the remaining branch (Figure 5) or on the outside of the slight swelling where the branch attaches to the stem. Any kind of stub that is left attached to a branch or stem (Figure 6) will typically die back to a main stem or branch leaving a perpetual dead-wood entry into the living portion of the tree that will never heal. Such dead stobs allow for the entry of fungi and insects into the living stem of the tree and also disrupt water and sap flow up and down the branch or stem and can be considered similar to a scab on your arm that never heals. Past pruning cuts that left stobs or broken off branches should be pruned back to living tissue.

Branch removal is typically best accomplished by first removing most of the weight in an easy to cut



Figure 6. Branch removal should be done so that the final cut is smooth and close to the main stem. If a stob (left picture) remains, it will never properly heal and eventually allow for wood decay fungi to attack the living tissue in the attached stem or branch. Such stobs should be cut back to living tissue (middle and right picture). Branches that attach with a slight swelling should be removed to the edge of the swelling as cutting flush to the stem will create a larger wound than needed.



Figure 7. When removing larger branches hold the branch with one hand and cut with the other in a convenient location (upper picture). This will keep the branch from splitting or pinching your saw. Once the major portion of the branch is removed make the final cut flush with the remaining branch or stem.

Figure 8. Pruning cuts (upper right) will often bleed sap and present a nutritious wet surface for pathogen spores to land on and infect trees and shrubs. Properly applied pruning paint (lower right) can help seal off cuts and prevent pathogen footholds from developing. They can also slow down suckering from dormant buds in the surrounding bark.

location on the branch. This keeps torque from the weight of the branch from tearing off bark as you make your final cut. Sometimes making the best final cut also requires sawing at a difficult angle and not having the bulk of the branch to contend with allows for a better pruning cut.

There remains some controversy among tree





Figure 9. Area on the stem where a large dead branch removal created an extensive cut surface is where fungi can start decaying out supporting woody stem tissue. The impacted area was carved smooth to the adjacent living bark that can now start to slowly grow over the dead area. Keeping decay organisms out and maintaining a smooth wood surface for living tissue to grow over is very important to help the tree recover this section of stem. Pruning paint applied annually can slow down wood decay.



physiologists concerning the use of pruning paint. In certain climates and warm humid weather it has been shown that pruning paint can trap pathogens on the cut and enhance their spread. In drier climates pruning paint might be beneficial in keeping a pruning cut from drying out which can cause further damage to the water conducting vascular tissue under the bark. If pruning is accomplished during cold late winter and early spring weather when pathogen spores are not actively being dispersed, pruning paint may help seal the cut from infectious spores that may be floating around in the air in warmer months. There is also some anecdotal evidence that pruning paint applied to intact bark around the cut may reduce the activation of dormant buds by sunlight that results in prolific epicormic (suckering) branch formation next to pruning cuts.



Figure 10. Shortening a branch should be done by cutting back to a branch or twig. This keeps water and sap flowing next to the cut and helps it heal more quickly. Ideally the adjacent branch should be similar in diameter to the cut, though this is not always possible. The adjacent branch provides the energy for the cut to heal, thus if the cut is very large and the branch very small, the cut will heal more slowly because less energy is provided to living tissue surrounding the cut. The cut is also less visible if placed next to another branch.

Shortening lateral branches should follow similar principles as removing branches. Cuts should be made next to (about 1/4 inch) existing branches and twigs (Figure 10) so the flow of water and sap next to the cut promotes healing of the wound. Such cuts also allow for a more natural and pleasing tree appearance.

Providing Tree Crown Access

Most trees will grow branches that are lower on the stem than a landowner would like, or branches that droop down and interfere with passage under the tree as may be required for lawn care. Removing such obstructions “lifts” the overall tree crown from the ground and is probably the most common reason many people pruning their trees. From a tree physiology perspective, lower branches are often shaded by the upper tree crown and as a result are not able to contribute much sugar production for the overall health of the tree. Removing lower shaded branches can actually help a tree be more efficient, especially in dry climates where the ratio of overall sugar production to water loss (water use efficiency) can decline with excessive shaded foliage.

The method for lifting a tree is fairly simple. First step back and examine the tree shape from a distance and determine the shape of the crown that is most pleasing and useful to you. Trees can tolerate a lot of pruning, and can be trimmed and guided to grow into the shape that best meets your needs. Using the existing branching structure, determine which branches you want to keep, and which ones you want to remove. Using previously described pruning practices work your way around the tree in a circular fashion removing branches that



Figure 11. Raising or “lifting” the crown will promote a tree to grow slightly taller and allow for easier access around the base. Lifting requires the examination of tree branching and architecture. In this case the drawn lines indicate the potential to lift the crown to different levels using the natural branching configuration and removing lower branches. The owner for this tree only wanted the tree lifted a little (two lower green lines) to make mowing under it easier while preserving the “ball” shape of the crown for maximum spring flowering enjoyment.



are in your way or that do not add to the overall appearance of the tree crown you want. Stop and review your progress periodically from different angles.



Figure 12. After visualizing the branches of the tree that you want to remove, work your way around the tree and remove lower branches back to the stem that interfere with your access under the crown. This is subjective to what you want the tree to look like!

Not all branches need to be completely removed. Pruning back limbs and twigs on a branch can help direct which way a branch will develop in the future (Figure 13). Always prune back to an existing fork or branch as this will promote rapid healing of the cut and also reduce unwanted future branch suckering. Randomly cutting back a branch can leave a sharp branch end that can be hazardous to walk into, and often stimulates prolific sucker development near the cut.

Pruning for Tree Efficiency and Growth

Although all tree species have some genetic blueprint for the shape they want to grow into, individual branches will develop based on some random development of buds and how sunlight, temperature and past pruning or injury stimulates growth hormone production. An ideal broadleaf tree grows into a basket shape with individual main branches reaching into specific space where leaves will get maximum sunlight. However, trees do not cognitively think about where they will grow a branch, rather, they react to circumstances and individual buds may sprout and develop into branches at the same time and grow into the same space. This results in multiple branches in the same space, often interfering with each other and even rubbing together creating open wounds, injuries and restrictions that are harmful to the overall growth, shape and longevity of the tree. In addition, branches consume the sugar that leaves produce, and two branches growing leaves into the same space requires twice the energy as one branch occupying that space. Such configurations are termed “interfering branches” and proper pruning can help alleviate such circumstances. Identifying which is the best branch for any space in the crown of the tree can



Figure 13. Branches can be directed to grow into the proper space by trimming back twigs that are growing into the wrong place. In this scenario the main branches define the tree shape, but branch portions growing too low can be removed. By pruning off portions of branches that are growing in the wrong direction the crown can be influenced to develop upwards, not downwards.



Figure 14. Crossing branches (red circle left) develop when a rogue branch grows into the space (red arrow pointing left) of another well placed branch. As branches grow (red circle right) wind movement causes abrasion between the two branches and resulting injury, where pests and pathogens can attack healthy living tissue and threaten the health of the entire tree. The offending branches can either be entirely removed, or pruned back (left picture - green vertical arrow) to a twig that is growing into an appropriate space. Pruning thus helps guide branch growth into better spacing for both the appearance and physiology of the tree.



Figure 15. Many ornamental tree species will develop suckers that grow into existing branches. Also, initial interfering branches can choke each other off resulting in embedded dead branches (top left picture) in tree forks. Red lines indicate where interfering branches should be removed. Suckers are continually produced by many ornamental and fruit trees and should be periodically removed (top right). The end result should be a “cleaner” looking stem and internal branch structure (compare top left with middle left picture) that is also more efficient and functional for the tree. It is best to start removing the most obvious interfering branches and twigs. Many are intertwined with other branches and are best removed in sections. Some interfering branches have developed where they fill an important niche within the crown and it may be best to leave them in place. Pruning a tree can be a bit like a work of art, there are variations in “what looks good”!



Figure 16. A good example where one lateral branch has grown into the space of another main branch. The offending branch is supporting leaves in the shade of the upper crown and they do not get enough sunlight to be productive. The interfering branch will continue to grow through other branches in search of light and eventually interfere with good branch development and leaf placement and should be removed where it attaches to a main branch (left picture—red hash).

be subjective. Promoting the strongest branch that grows the shortest distance into sunlit space is a good selection method. Taking a step back and looking at the overall architecture of the tree crown can be helpful in determining which branch should be left and which one should be pruned. Using pruning to direct branch growth is best accomplished when the branches are young. Once they have developed as major crown contributing branches, removal can seriously impact the overall appearance of the tree and in such cases it may be best to leave them in place. Likewise, interfering branches in the upper portion of the crown are fairly typical once the tree has reached a mature height. Although these branches cross, they may be important components of the overall upper crown and are best left in place. Lower branches that have a spot where sunlight penetrates the upper canopy and hits a portion of the branch will commonly sprout “suckers” that quickly grow upwards through the existing crown. These are best removed (Figure 17) before they impact the function and growth of the existing upper crown, unless they have a space to grow into.



Figure 17. Some secondary sprouts grow into places where they interfere with existing desirable branches whereas others grow into gaps within the crown where there is space for them to develop into productive branches. In this series of pictures two suckers that are now 3 years old have developed. #1 is growing into a canopy gap where it is a good fit, and #2 is growing into existing branches and needs to be removed using the two step process before it causes problems (branch rubbing and shading of existing crown). Follow up pruning (lower left) of smaller twigs and sprouts that may eventually interfere with existing branch architecture is a preventative measure.



Tree Crown Shaping

A tree crown is a solar collector and its shape is most effective if as many leaves as possible are exposed to full sunlight during the day. Since the sun moves, and

branches cannot move with it, different portions of the tree crown optimally absorb and process sunlight from morning until evening. This is why an “umbrella” or “lollipop” shaped crown is most efficient for tree physiology. Occasionally one or several branches will grow taller more quickly than other branches which results in competitive shading. Pruning such outliers back can help maintain overall crown efficiency and also offer an aesthetically pleasing tree shape. Alternatively, if the desire is for the tree to grow taller, leaving such tall shoot development will allow for a taller crown to develop. For the tree featured in this article, the crown has attained its mature height and pruning back outliers helps maintain a symmetrical shape and efficient tree. Keeping a tree shorter through top pruning promotes more lateral branch development and can create a thicker looking crown, though the tradeoff will be that more interfering branches can develop.



Before



After



Figure 18. A walk around the tree you are pruning can give you a good perspective of the shape you most desire for the tree crown. This flowering crabapple is highly valued for its “ball of flowers” in the spring so maintaining a dense and uniform crown is desirable. Individual branches that grow out of the crown can shade other branches disproportionately and impact overall flower and leaf production and should be pruned back to help create a more uniform shape as seen by the ideal shape drawn in the upper left. After pruning (top right) the crown can be reexamined for the desired result and any missed branches. A pole saw with the attached cord activated lopper is very useful and acts as both a proportional level that helps you determine the best height to bring a branch back to, and as branch pruning tool (left and right picture series). A light pole saw that is easy to maneuver is most desirable and cutting with a sharp jerk on the cord works best. As with other branch pruning always try to cut back to existing lateral branches or twigs.



The end product: all pruned off branches (right picture) in a pile shows that about 10-20% of branches were removed. Subsequent annual maintenance spring pruning may result in an additional 5% branch removal every year .



Credits:

Peter Christian for allowing us to use his tree for demonstration

Robin Kolb for her photography skills

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