

Pruning is a double-edged sword, either helping or hurting according to if, where, when, how, and why it is applied. When properly executed, a variety of benefits can occur. Benefits include reducing risk of branch and stem breakage, better clearance for vehicles and pedestrians, improved health and appearance, enhanced view, and increased flowering. When improperly performed, pruning can harm the tree's health, stability, and appearance and make matters worse.

There are several consequences of not conducting a regular pruning program. These include:

1. increased risk of branch and stem failure
2. development of low aggressive limbs
3. formation of co-dominant stems
4. defects such as included bark and dead branches
5. obstructed views

The first three occur primarily, but not exclusively, in planted trees. These three are less likely to occur on trees growing in a forested area. Formation of codominant stems and defects such as included bark can lead to increased risk of breakage.

One of the most common, unrecognized defects in planted trees is formation of large low limbs. They could overextend and break, or they may droop under their own weight and have to be removed later leaving a large pruning wound. Removal of large branches and those more than about half the trunk diameter are more likely to initiate decay than removal of smaller branches. Appropriate pruning can help treat and avoid some of these problems.

*Information on this web site is adapted from "[Illustrated guide to pruning, second edition](#)" by E. F. Gilman, Delmar Publishers, Albany, NY, 330 pgs. and "[Hortocopia: Illustrated pruning and planting](#)" by E. F. Gilman CD-ROM. Consult these for more detailed information. **Illustrations and photographs may be used by you with credit to the author. Please write the credit as follows: Illustrations (or photos) by Edward F. Gilman, Professor, Environmental Horticulture Department, IFAS, University of Florida. You may not use these in publications that will be sold; you may not use them on your web site without permission. Feel free to link to this web site.***

Introduction

*This tree pruning site is prepared and maintained by
Dr. Edward F. Gilman, Professor, Environmental
Horticulture Department, egilman@mail.ifas.ufl.edu*

Pruning objectives

Pruning can help treat and avoid some certain problems. But it is important to establish the objectives for pruning before starting. Seven main objectives are described below along with pruning types that help meet those objectives. These are presented as examples and can be expanded or shortened to meet site conditions and customer expectations.

1) Reduce risk of failure: Reduce risk by establishing a structural pruning program that begins at planting and carries through the first 25 years. This program should be designed to create structurally sound tree architecture that will sustain the tree for a long period. Medium-aged and mature trees can be cleaned, thinned, reduced, raised, or restored to manage risk. Some structural pruning can be conducted on these older trees as well. The choice among these pruning types depends on the tree and the situation.

2) Provide clearance: Growth can be directed away from an object such as a building, security light, or power line by reducing or removing limbs on that side of the tree. Regular pruning is required to maintain the artificial clearance. Canopy reduction or pollarding helps maintain a tree smaller than it would be without pruning. Utility pruning keeps limbs clear of overhead wires and other utility structures. The canopy can be raised to provide underclearance by shortening low branches so those toward the middle and top of the tree are encouraged to grow.

3) Reduce shade and wind resistance: A lawn, ground covers or shrubs can receive more sunlight when live foliage is removed from the crown. Thinning, reducing and pollarding can be used to accomplish this.

4) Maintain health: Maintain health by cleaning the crown, especially in medium-aged and mature trees. Removing dead, diseased, and rubbing branches in the crown of young trees may be a lesser priority. Root pruning can also be used to reduce the rate of spread of certain vascular diseases, such as oak wilt and Dutch elm disease.

5) Influence flower or fruit production: The number and/or size of flowers or fruit can be influenced by pruning. Fruit size can be increased on certain plants such as peaches by removing some of the developing fruit or flowers. Flower cluster size can be increased on crapemyrtle and some other trees by making heading cuts on many branches. Fruit production can be eliminated by removing flowers.

6) Improve a view: A view can be enhanced or opened by removing live branches. This pruning can include thinning, reducing, pollarding, and raising.

7) Improve aesthetics: A tree can be pruned to make it look more appealing. Cleaning, reducing, thinning, pollarding, and restoring can be used to meet this objective.

A plan for training shade trees

Strategies:

1. Establish and maintain a dominant leader by subordinating all but one codominant stem.
2. Space main scaffold limbs apart by removing or shortening nearby branches.
3. Anticipate future form and function by training and pruning early to avoid cutting large branches later; don't remove large branches because this initiates decay in the trunk (i.e. instead of allowing a low branch from growing large then removing it when it is too low, anticipate this by shortening it earlier).
4. Position the lowest main scaffold limb high enough so it will not droop and have to be removed later.
5. Prevent all branches from growing larger than half the trunk diameter.
6. Maintain a live crown ratio of greater than 60%.

Putting the plan into action: Begin pruning at planting and continue for 25 years. This strategy will provide a good branch and trunk structure.

- **At planting**

- all branches will eventually be removed on trees less than 4" caliper
- do not remove more than 25% of live foliage
- shorten or remove all leaders and branches competing with the one stem that would make the best leader
- remove broken, cracked or severely damaged branches

- **Two years**

- all branches will eventually be removed on trees less than 4" caliper
- do not remove more than 40% of live foliage
- shorten or remove all competing leaders (may have to do in two stages if there are more than 3 leaders)
- shorten or remove large, low vigorous branches to improve clearance
- shorten or remove branches within 12" of largest diameter branches in top half of trees greater than about 4 inches caliper

- **Four years**

- most branches are still temporary and will eventually be removed from the tree
- do not remove more than 35% of live foliage
- shorten or remove competing leaders
- shorten or remove large, low vigorous branches to improve clearance
- shorten or remove branches within 12" of largest diameter branches in top half of tree
- there should be only one large branch per node (no clustered branches) so shorten branches that are nearby so only one is present

- **Eight years**

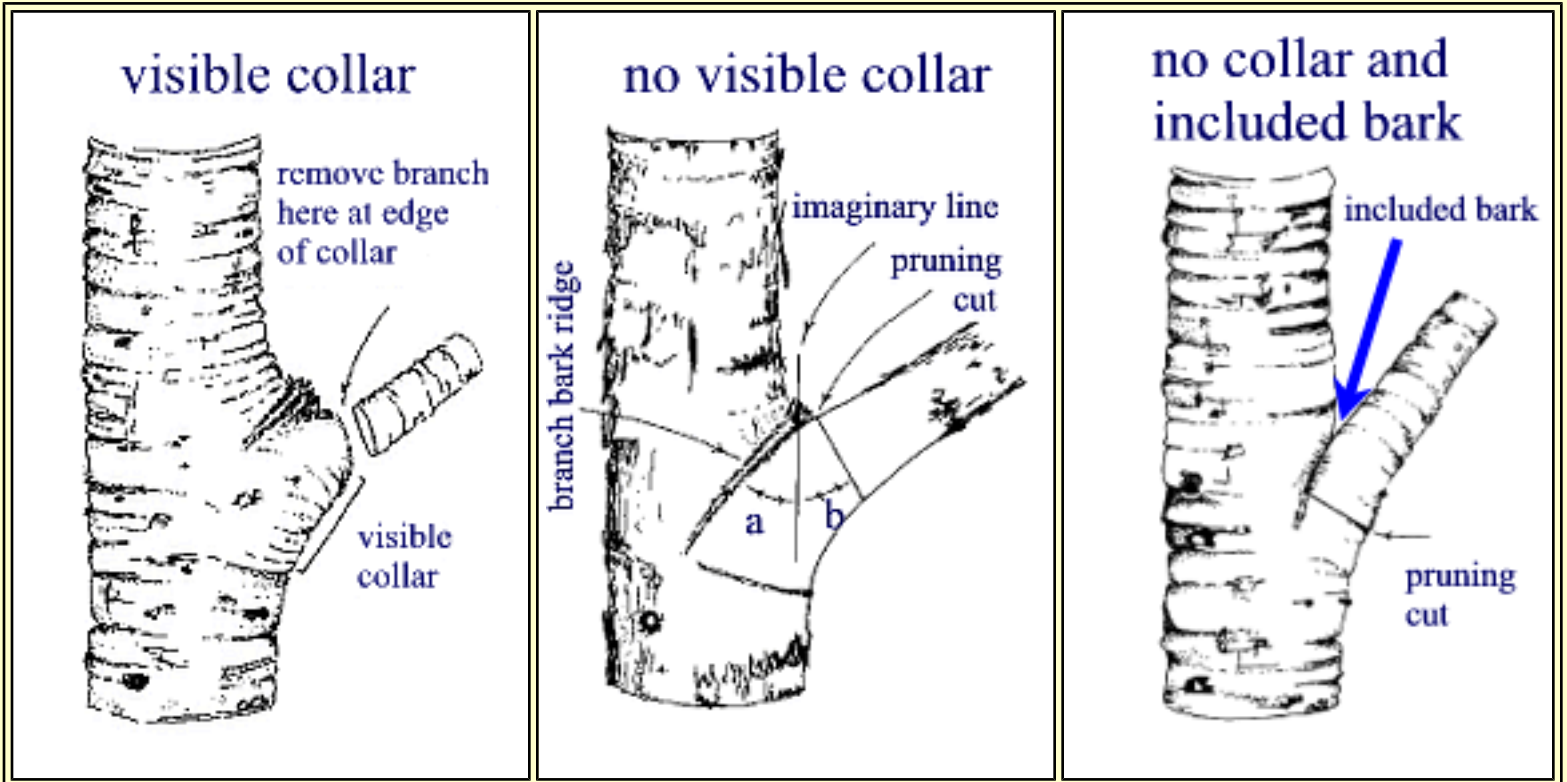
- shorten or remove competing leaders
- do not remove more than 25 to 35% of foliage
- determine where you want the lowest permanent scaffold limb and shorten any aggressive branches lower than this limb

- shorten branches within 12-18" of largest diameter branches (there should be only one large branch per node (no clustered branches)
- shorten low branches that will have to be removed latter so they do not become large
- **Fourteen years**
 - shorten or remove competing leaders
 - identify several permanent scaffold limbs
 - shorten vigorous branches within 18-36" of permanent scaffold limbs
 - shorten or remove large branches lower (on the trunk) than the first permanent limb
 - there should be only one large branch per node (no clustered branches)
 - shorten low vigorous branches that will have to be removed latter
- **Twenty years**
 - shorten or remove competing leaders
 - identify 5 to 10 permanent scaffold limbs
 - shorten vigorous branches within 18-36" of permanent scaffold limbs
 - shorten or remove large branches lower (on the trunk) than the first permanent limb
 - there should be only one large branch per node (no clustered branches)
 - shorten low vigorous branches that will have to be removed latter
- **Twenty-five years**
 - shorten or remove competing leaders
 - continue to develop and space permanent scaffold limbs
 - shorten branches within 36" of permanent scaffold limbs
 - shorten or remove large branches lower (on the trunk) than the first permanent branch
 - there should be only one large branch per node (no clustered branches)
 - shorten low branches that will have to be removed latter

With seven prunings in the first 25 years after planting, a good structure can be developed that can place the tree on the road to becoming a permanent fixture in the landscape. Less frequent pruning may be needed if good quality nursery trees were planted with a dominant leader, and trees were irrigated appropriately until established.

Pruning cuts

Live branches present three possible situations to you. See illustrations below for how to remove live branches.



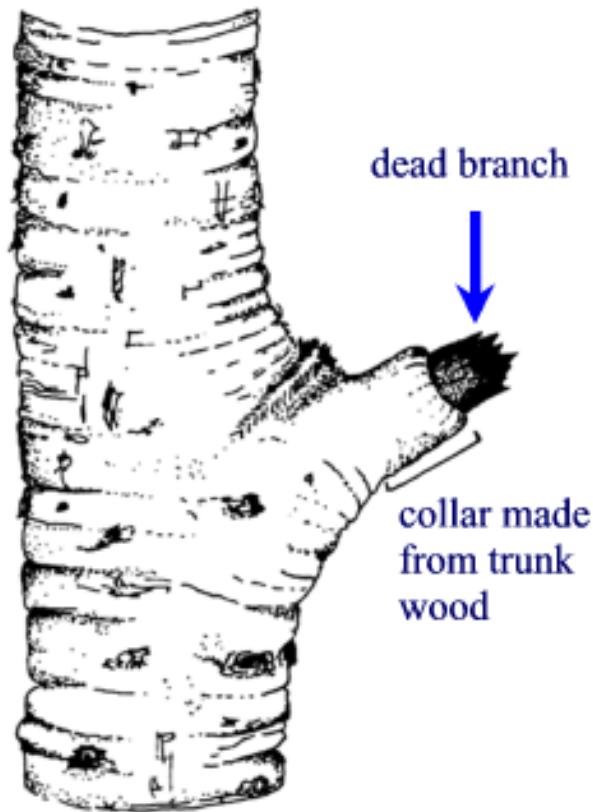
Dead branch removal

Stem reduction

Pruning cuts

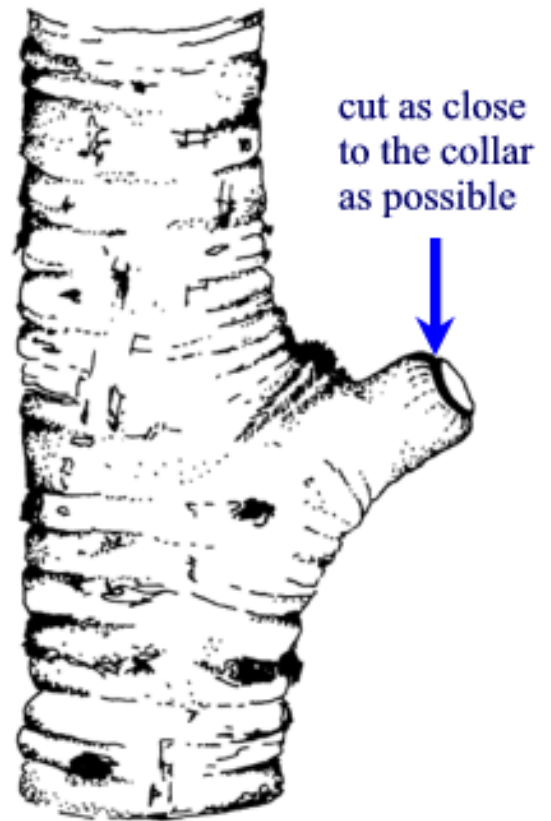
Dead branch removal

before pruning



A collar of trunk wood begins to grow out onto a dead branch that remains on the tree. Be sure not to cut into this collar. Cutting into the collar amounts to cutting into the trunk. Removing dead branches is good for the health of trees.

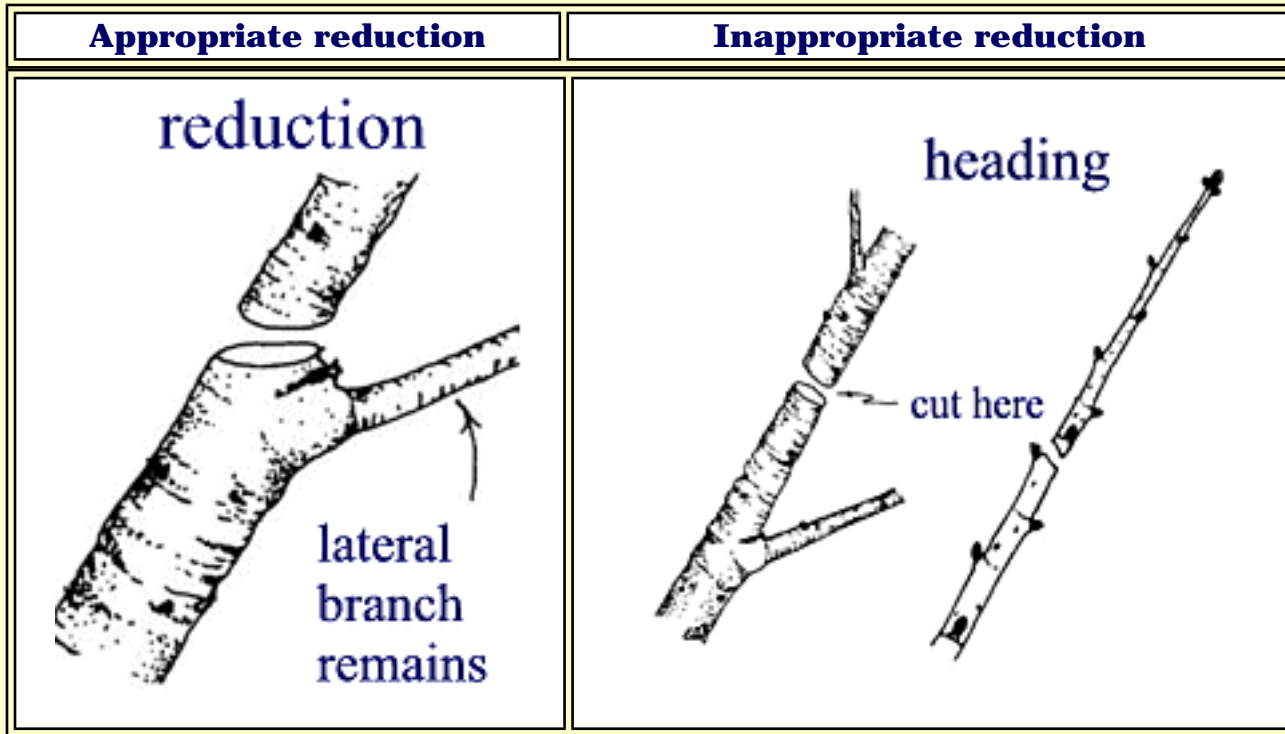
after pruning



Cut all dead branch tissue from the tree, but do not injure the collar. If the branch is small or severely decayed, you might be able to simply break the dead branch from the tree. This often allows you to remove more of the dead tissue inside the edge of the collar. Do not break the dead branch if this could injure the collar.

Pruning cuts

Stem reduction

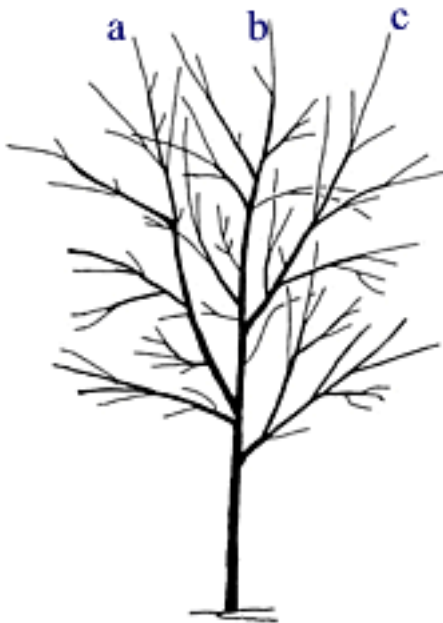


A reduction cut (also referred to as a drop-crotch cut) removes a stem back to a lateral branch that is at least one-third the diameter of the cut stem. Sprouts commonly follow a reduction cut, especially if a large portion (greater than about one-quarter) of the live foliage was removed with the cut. If the branch that remains is less than one-third the diameter of the cut stem, the cut is considered a heading cut. Reduction cuts are used to reduce the length of a stem or branch. Heading cuts are not considered appropriate in most instances in the landscape.

Structural pruning shade trees

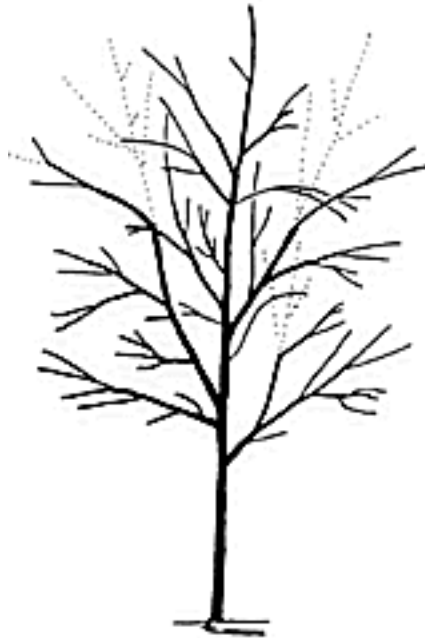
Objective: Increase structural integrity by pruning to one dominant leader. [Click here for older trees](#)

Before pruning



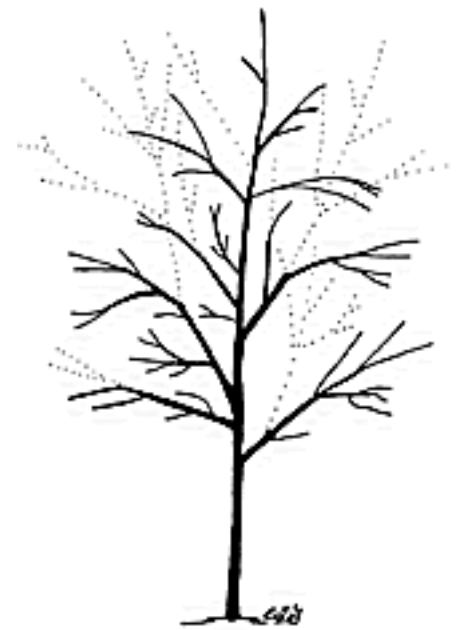
Problem - Before pruning, the young to medium-aged tree has three developing leaders or codominant stems (a, b and c). These are likely to develop into multiple leaders, which are considered weaker than trees with one trunk. Large maturing trees usually perform best and last longest if they grow with one main leader. Structural pruning helps the tree develop one main trunk.

After light pruning



Solution - Reduce the length of (subordinate) leaders 'a' and 'c' using a [reduction cut](#) to encourage leader 'b' to grow faster. This will help leader 'b' become the dominant trunk by slowing growth on leaders 'a' and 'c' and allowing more sunlight to reach 'b'. In most cases on large-maturing trees, branches in the lower 15-20 feet of the tree should be kept smaller than half the trunk diameter using this technique.

After moderate pruning



Solution - This moderate pruning treatment is similar to the light pruning treatment. The main difference is here we are more aggressive. Larger holes are left in the canopy following moderate pruning. This might be appropriate if trees cannot be pruned for several years, or if they might never be pruned again. Up to about 40% of foliage could be removed on young trees, if necessary.

Introduction: Many shade trees in the forest grow straight, tall trunks as they compete with neighboring trees for sunlight. In the landscape, however, the abundance of sunlight encourages trees to develop multiple, competing trunks or leaders. This type of structure is susceptible to mechanical breakage and can reduce tree longevity. But trees with one dominant leader and small well-spaced branches, like trees in the forest, are less likely to suffer this type of mechanical failure. The dominant leader structure also makes trees better able to retard the spread of decay within the tree.

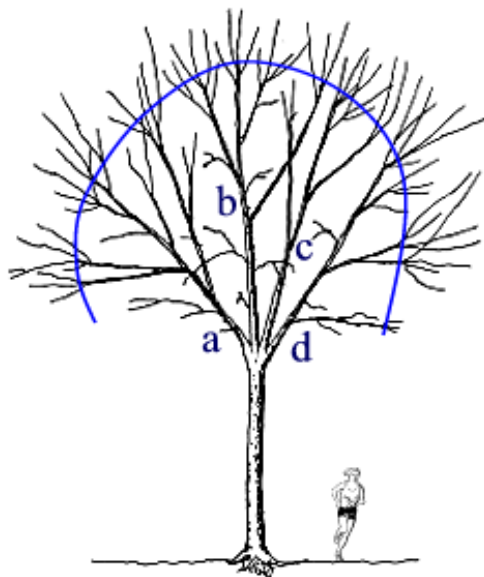
Structural pruning in the landscape aims to develop the strong tree structure we see in the forest. Structural pruning selectively favors a single, dominant leader by suppressing competing leaders using reduction cuts. Reduction cuts shorten stems back to lateral branches at least one-third the diameter of the cut stems. Structural pruning on shade trees should occur regularly when the tree is less than about 20 inches trunk diameter to establish good form early. It is normally performed every few years to gradually encourage more growth in the selected leader. Proper structural pruning should be performed on most tree species that become large at maturity to promote longevity, decrease future maintenance costs, and reduce conditions in the tree that could place people or property at risk.

Execution: Prune to maintain a dominant leader (one main trunk) by reducing the length of or removing competing leaders. Do not allow branches with included bark to grow too large because they could split from the tree. This is accomplished by shortening the branch. Regularly reduce the length of low vigorous branches and limbs that will be in the way later and have to be removed. Strive to prevent branches from growing larger than half the trunk diameter. Older trees can be pruned in a similar manner to create or preserve good structure.

[Click here for older trees](#)

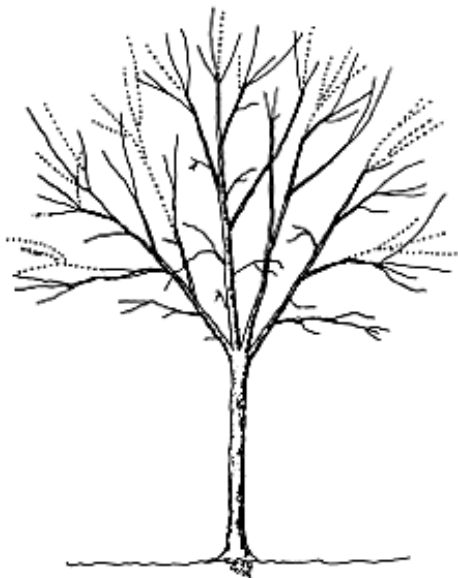
Structural pruning shade trees (older trees)

Before pruning



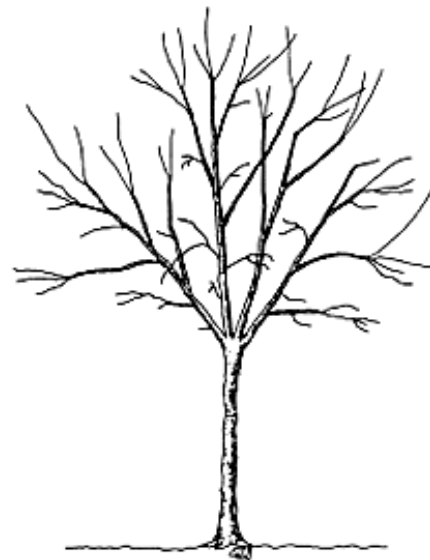
Problem: This medium-aged tree has four main limbs (a, b, c, d) all originating from one point on the trunk. Each limb appears to be equally dominant. This form is considered weaker than the single-trunk form where one stem dominates and is bigger than all others. Large maturing trees usually perform best and last longest if they grow with one main leader and trunk. This tree was tipped (rounded over) at about the position of the blue line drawn through the canopy causing the proliferation of sprouts at the canopy edge. Tipping and topping also encourage development of weak codominant stems.

Remove indicated branches



Solution: Reduce the length of limbs 'a', 'c' and 'd' using [reduction cuts](#) and [removal cuts](#). After pruning, the tip of limb 'b' should be higher than the tops of all other limbs. This will help limb 'b' become the dominant trunk by 1) slowing growth on limbs 'a' 'c' and 'd' and 2) increasing growth rate on 'b' by providing more sunlight to 'b'. In most cases on large-maturing trees, branches in the lower 15-20 feet of the tree should be kept smaller than half the trunk diameter using this technique. And they should not be allowed to grow up into the tree to become a permanent part of the canopy. Note that no small diameter interior branches were removed.

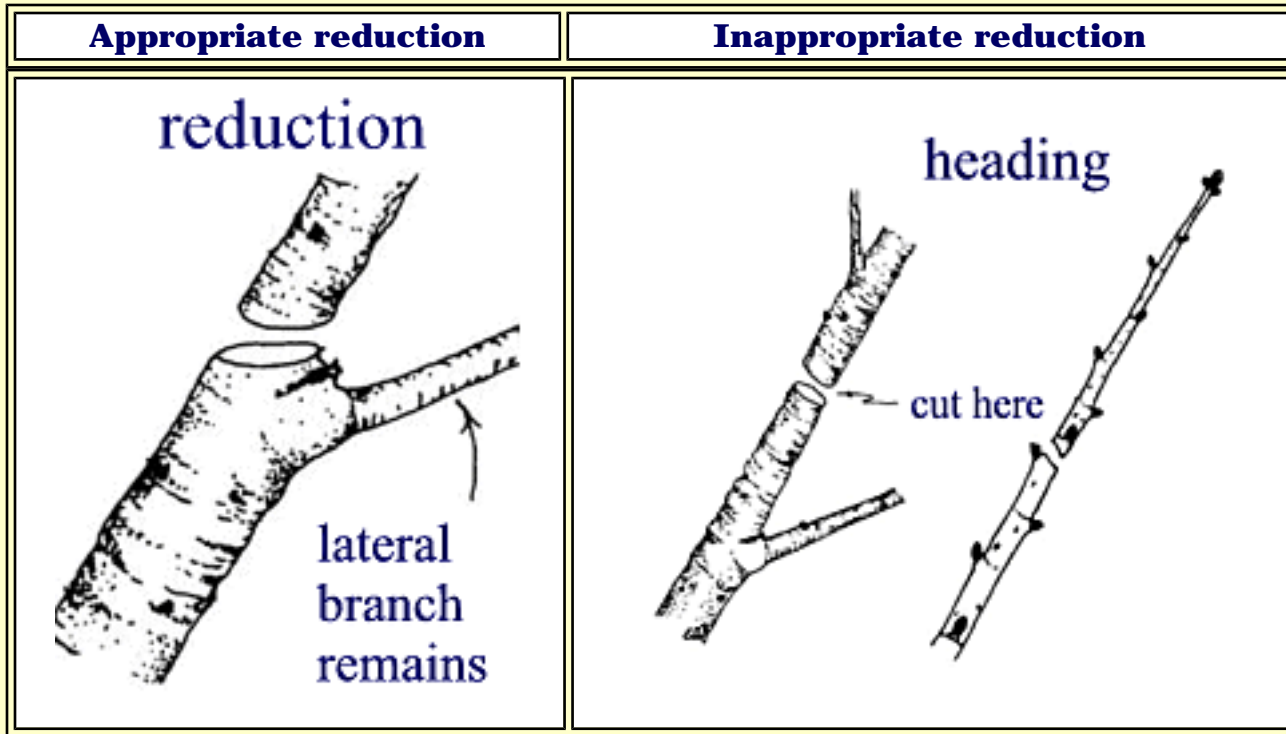
After pruning



Solution executed: Small holes were created in the canopy by removing branches from the outer portion of the canopy. These holes will fill with new branches as growth resumes. Trees can receive this light pruning treatment each year to encourage development of good structure. Regular pruning may be required for ten years or more to develop a structure that the tree can sustain. A more aggressive pruning treatment would be to make reduction cuts back to lower lateral branches than indicated above. This would leave larger holes in the canopy but would require less frequent pruning to reach the objective of developing one trunk.

Pruning cuts

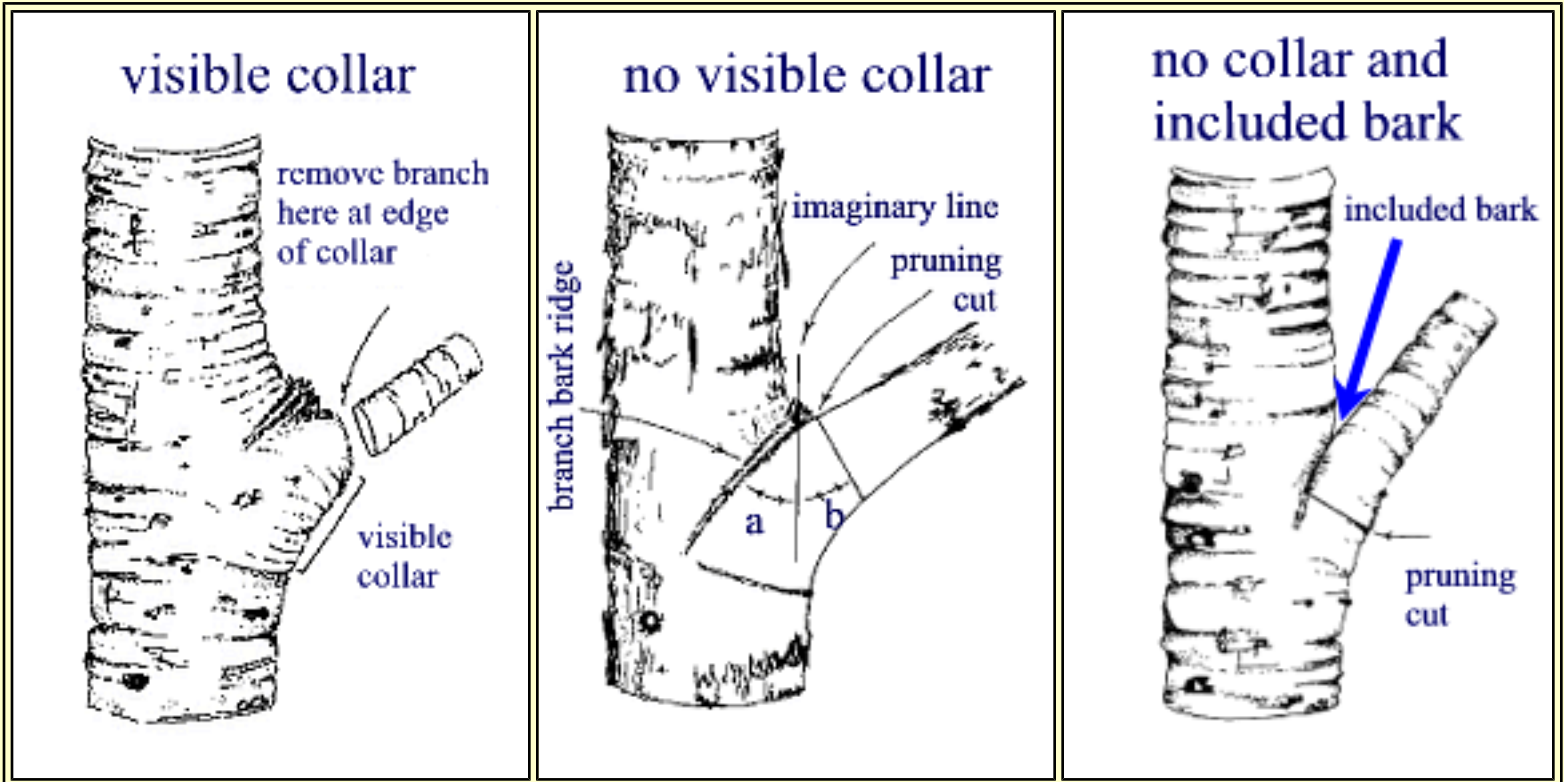
Stem reduction



A reduction cut (also referred to as a drop-crotch cut) removes a stem back to a lateral branch that is at least one-third the diameter of the cut stem. Sprouts commonly follow a reduction cut, especially if a large portion (greater than about one-quarter) of the live foliage was removed with the cut. If the branch that remains is less than one-third the diameter of the cut stem, the cut is considered a heading cut. Reduction cuts are used to reduce the length of a stem or branch. Heading cuts are not considered appropriate in most instances in the landscape.

Pruning cuts

Live branches present three possible situations to you. See illustrations below for how to remove live branches.



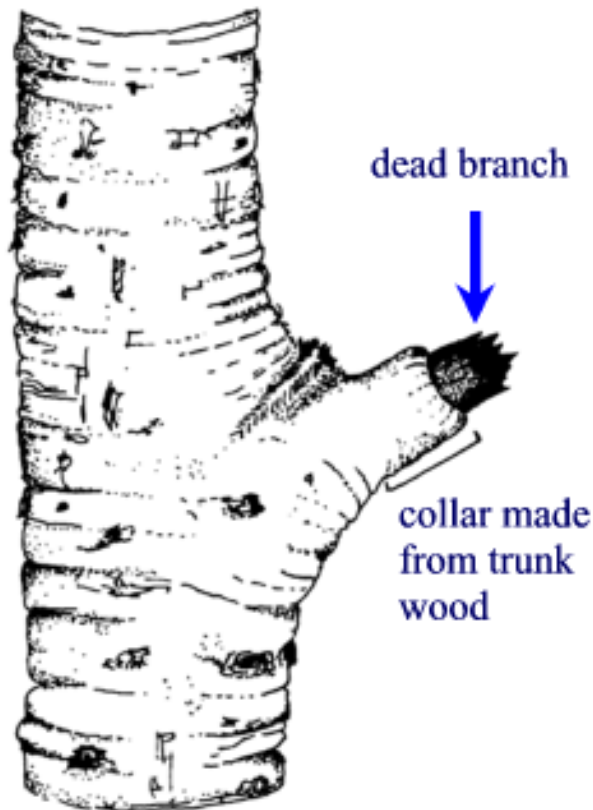
Dead branch removal

Stem reduction

Pruning cuts

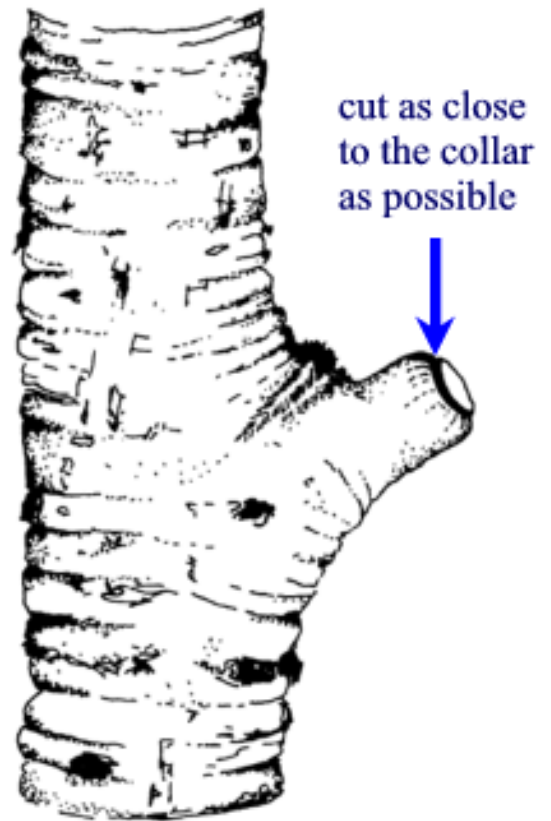
Dead branch removal

before pruning



A collar of trunk wood begins to grow out onto a dead branch that remains on the tree. Be sure not to cut into this collar. Cutting into the collar amounts to cutting into the trunk. Removing dead branches is good for the health of trees.

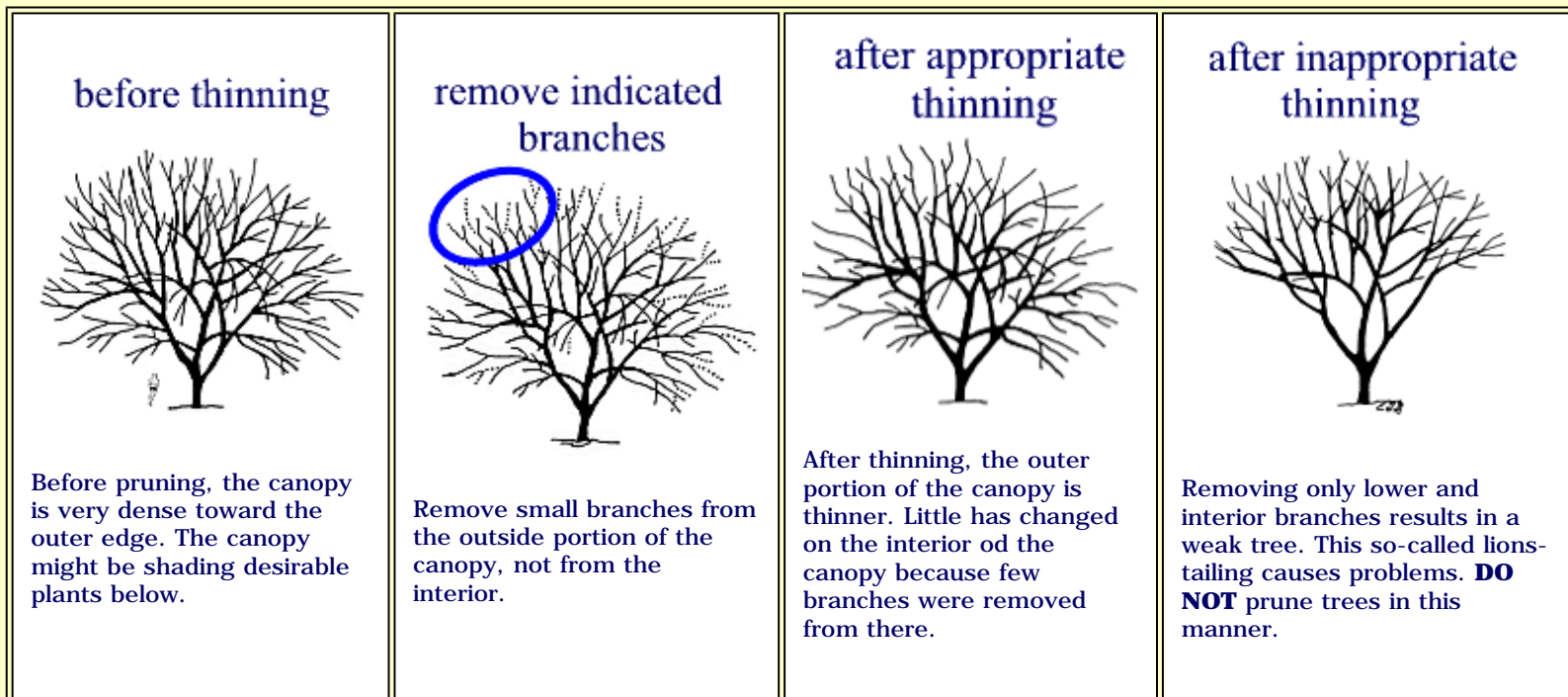
after pruning



Cut all dead branch tissue from the tree, but do not injure the collar. If the branch is small or severely decayed, you might be able to simply break the dead branch from the tree. This often allows you to remove more of the dead tissue inside the edge of the collar. Do not break the dead branch if this could injure the collar.

Thinning the canopy

Objectives: **1)** Thinning allows sunlight to penetrate to interior foliage which will help keep interior branches alive. As a result, the diameter of the main branches increases near the trunk, making the main branches stronger. **2)** Thinning also can reduce the incidence of foliage diseases by increasing air flow and allows more light to reach the ground beneath the tree. **3)** More air passes through the canopy instead of pushing against it, so trees may resist storm damage better. **4)** Thinning gives the tree a pleasing, lacy appearance that adds certain elegance to the landscape.



Introduction: Thinning reduces density of live branches in a tree. The entire canopy can be thinned or just a portion. Thinning increases light penetration and air movement through the canopy and reduces weight. Increased light and air stimulates and maintains interior foliage which can encourage taper on scaffold branches. Thinning toward the tips of a branch can reduce the wind-sail effect of foliar clumps in the crown, and relieve the weight of heavy limbs. Proper thinning should retain canopy shape. Clearing out inner foliage can have adverse effects on the tree and should be avoided. Vigorous production of watersprouts on interior limbs is often a sign of over-thinning.

Give the most consideration to performing canopy thinning in locations where the root zone is restricted by urban structures such as curbs, streets, sidewalks, and buildings. Roots are often deflected by these structures, making the trees less stable compared to trees in an area where roots can grow unimpeded. Trees in open, exposed, and windy situations also are good candidates for thinning. Thinning can be used to increase the light reaching the ground beneath a tree. Do not remove many live branches, even small ones, from the interior portion of the canopy or from the lower half of the main branches. The size range of parts to be removed, the location in the canopy, and the percentage of live foliage to be removed should be specified by the arborist.

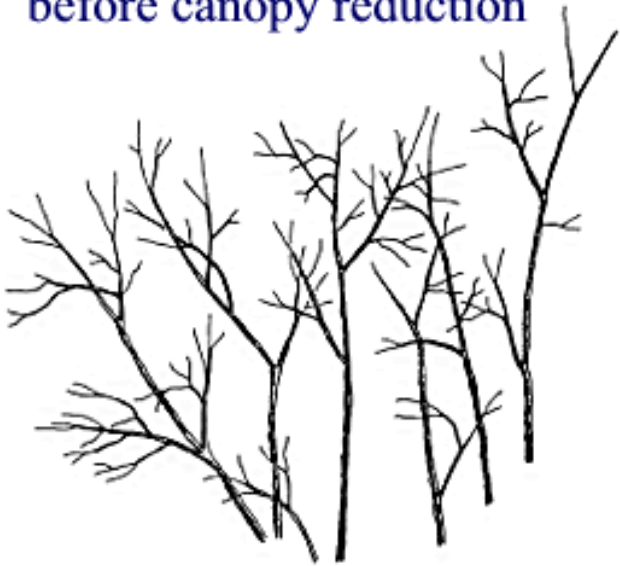
Execution: Thinning does not influence the size or shape of the tree. Thinning should result in an even distribution of branches along individual limbs, not a grouping toward the ends. Do this by removing some of the branches from the edge of the canopy, **not from the interior!** Caution must be taken not to create an effect known as lion tailing, which is caused by removing an excessive number of interior laterals and foliage. This displaces foliar weight to the ends of the branches and may result in sunburned bark tissue, watersprouts, reduced branch taper, weakened branch structure, and breakage. Before thinning, first, clean the canopy, then proceed with thinning as follows.

Do not remove more than about 15 to 20% of the live foliage on a mature tree at one time or sprouting may result. Often 5 to 10% is enough on mature trees. Excessive sprouting can be an indication that the tree was over-pruned. Up to about 25% of the live foliage can be thinned from young trees. Provided you did not remove more than this amount of live foliage while cleaning the canopy, prune small branches from the edge of the canopy. A handsaw or small chain saw is usually the appropriate tool for this job; taking a large chain saw to do this work in the tree can tempt the arborist to remove large diameter branches which would be inappropriate. Thinning is a delicate process that removes small diameter (usually 1-2 inch) branches. Remove those growing parallel and close to nearby branches or those competing for the same space in the canopy. Appropriately thinned trees may not look like they were pruned.

Reducing the canopy

Objectives: There can be several objectives of reduction pruning **1)** reduce tree size; **2)** reduce a portion of the tree to provide clearance from a structure; **3)** reduce a portion of the canopy to minimize risk of failure.

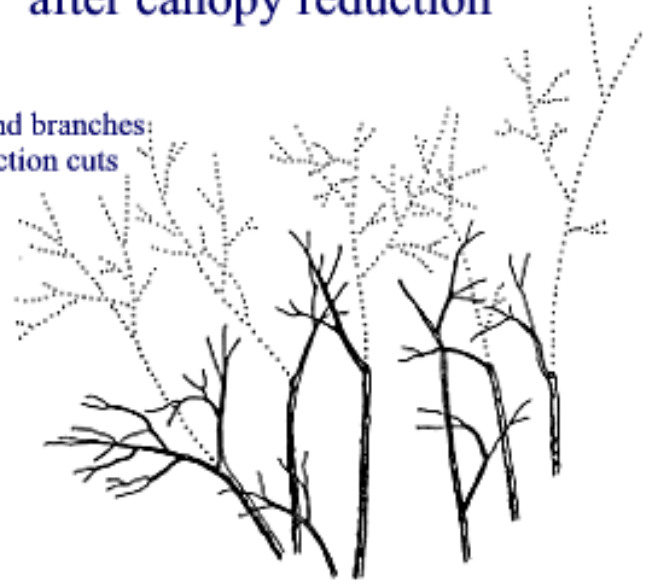
before canopy reduction



This is a portion of the top of a tree showing six main branches before canopy reduction. Appropriate canopy reduction removes branches and stems from the outer portion of the canopy back to lateral branches at least one-third the diameter of the removed stems or branches. Some people refer to this as lateral pruning because you prune back to a lateral branch.

after canopy reduction

remove end branches:
with reduction cuts



This is the same portion of the tree at left with the end section of the branches removed to reduce the size of the tree. Removed branch sections are shown as dotted lines. Note that there are live, unpruned branches left on the edge of the new, smaller canopy, and no heading cuts were used. Properly done, this provides a more pleasing, unpruned natural look to the tree compared to topping. Many people would not know a canopy was reduced in size following appropriate moderate canopy reduction.

Introduction: Trees sometimes grow larger than desired for aesthetic or safety considerations. These trees may interfere with overhead utility wires, grow into buildings or other trees, or become hazardous because of their size, length, or condition. Reduction pruning is used to reduce the size of a tree by decreasing the length of one or many stems and branches. Although this type of pruning can control tree size to a certain degree, it is no substitute for matching the correct tree species with the site when planting. Big trees planted in small places often require reduction to reduce risk of failure or reduce hardscape damage from roots. Regular pruning will be required to maintain the tree within desired limits.

Reduction pruning performed after the tree has become too large could require the removal of large diameter stems. The resulting wounds can be accompanied by decay, cracks, and sprout development. Therefore, it is preferable to perform reduction before the tree has become too large for its environment.

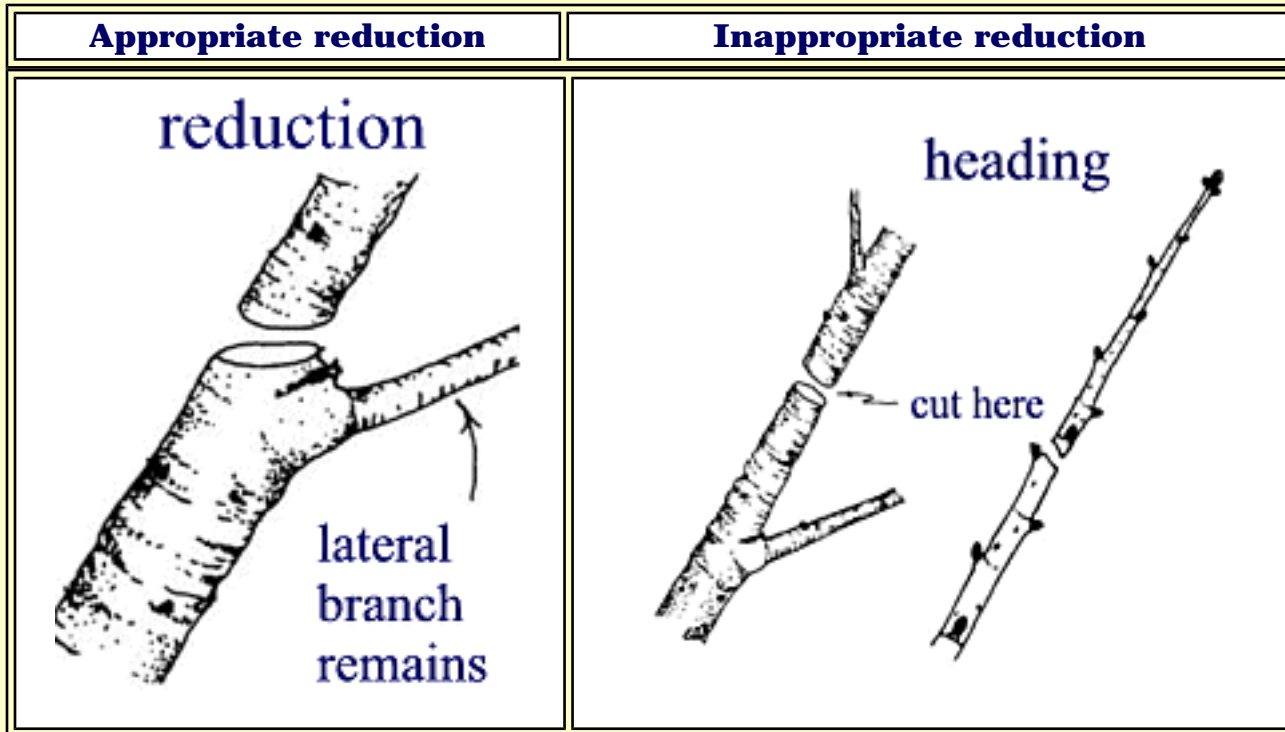
Proper reduction pruning reduces size while more-or-less maintaining a tree's form and minimizes regrowth.

Execution: Sometimes the entire canopy of a tree must be reduced in height or spread, such as for utility line clearance or to minimize risk of failure. In addition to the size of parts to be removed, be sure to specify the clearance required above or along side of the canopy when pruning near a building or for utility line clearance. That way, everyone will have the same understanding of what is to be performed. Portions of the canopy, such as individual limbs, can be reduced in order to balance the canopy or to reduce likelihood of breakage on limbs with defects such as cracks and included bark or those that have grown to become too long.

Reduction is best accomplished by cutting limbs back to their point of origin or back to a lateral branch capable of sustaining the remaining limb and assuming apical dominance of the limb. When a branch is cut back to a lateral, no more than one-fourth of its foliage should be removed. A common rule of thumb is that the remaining lateral branch must be at least one-third the diameter of the removed portion, but this rule can vary with species, age, climate, and the condition of the tree. Consideration must also be given to the ability of the species to sustain this type of pruning. Species that are known to decay quickly from these types of cuts should be reduction pruned more conservatively than more decay resistant species. Never reduce a landscape tree by topping it. Topping causes decay, numerous sprouts, cracks in limbs, root decline, bark defects, and other problems.

Pruning cuts

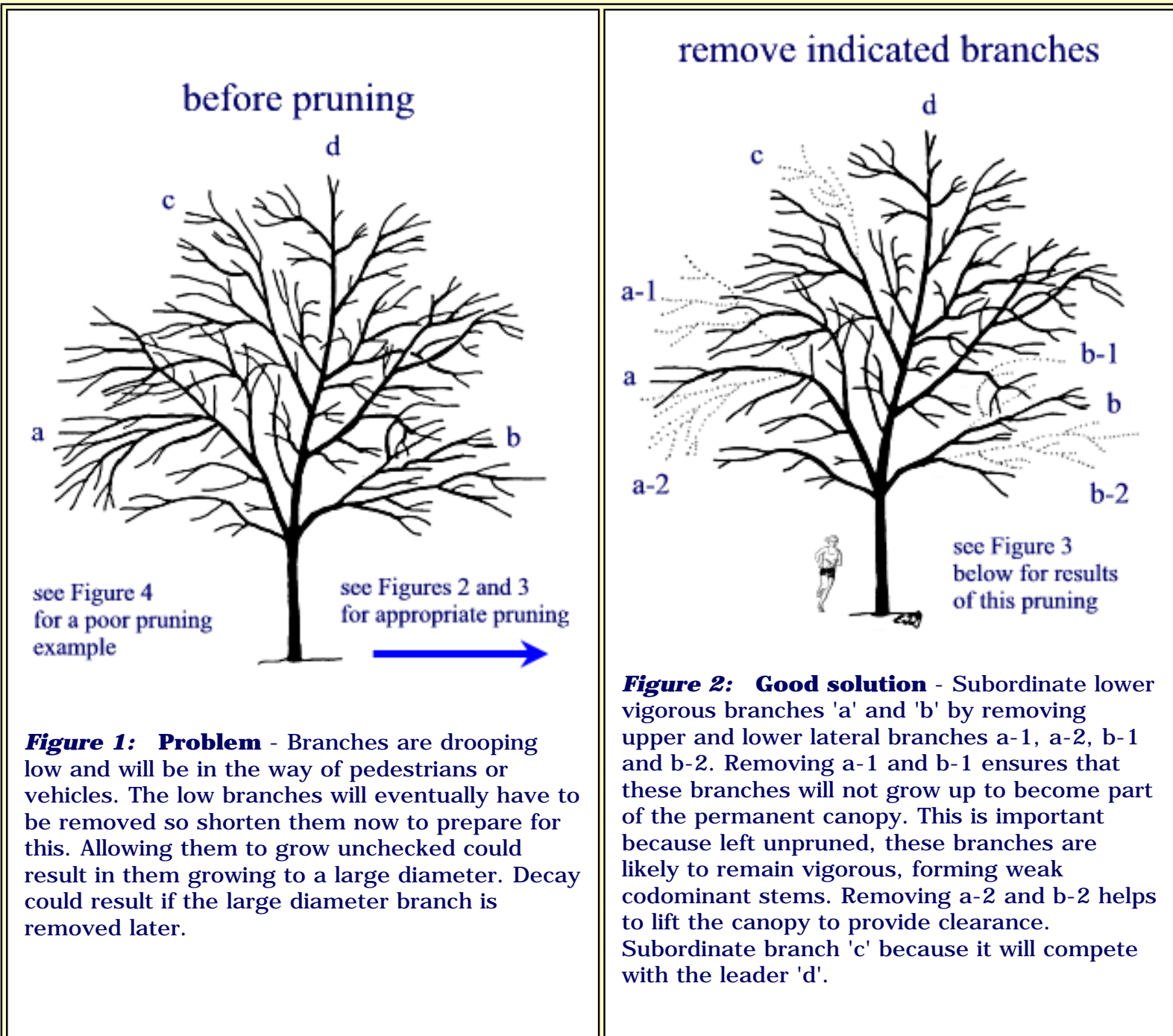
Stem reduction



A reduction cut (also referred to as a drop-crotch cut) removes a stem back to a lateral branch that is at least one-third the diameter of the cut stem. Sprouts commonly follow a reduction cut, especially if a large portion (greater than about one-quarter) of the live foliage was removed with the cut. If the branch that remains is less than one-third the diameter of the cut stem, the cut is considered a heading cut. Reduction cuts are used to reduce the length of a stem or branch. Heading cuts are not considered appropriate in most instances in the landscape.

Raising or lifting the canopy

Objectives: **1)** Keep low branches small with regular reduction cuts so that trunk wounds are small when branches are eventually removed. **2)** Prevent low branches from growing up into the canopy by reducing or removing upright-growing stems and branches.



after too much pruning

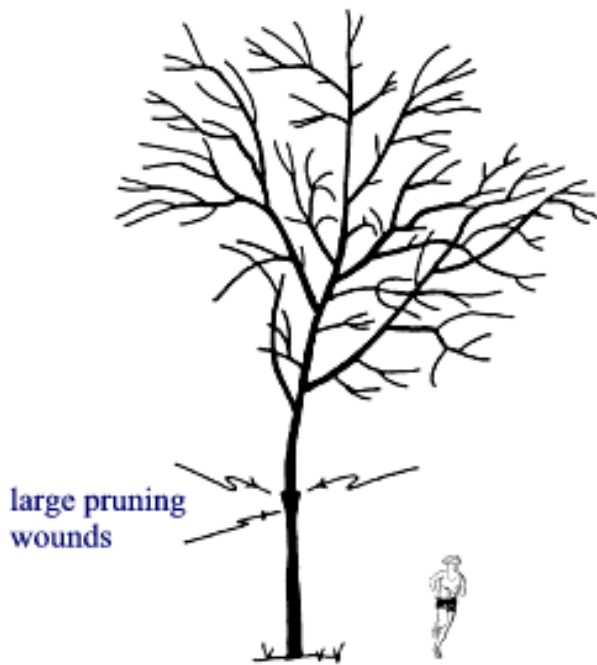


Figure 4: Poor solution - Removing the three lower branches entirely leaves large pruning wounds that could initiate trunk decay. The tree also looks as though it was pruned, a situation often associated with poor tree care carried out by untrained workers. Raising the canopy all at once could also cause tree failure by leaving too much weight at the top of the tree. To avoid lack of balance after canopy raising the distance between the bottom and top of the canopy should be at least 2/3 the height of the tree. Removing three large branches all at once from the same position on the tree could also cause trunk defects such as decay and cracks.

after appropriate pruning

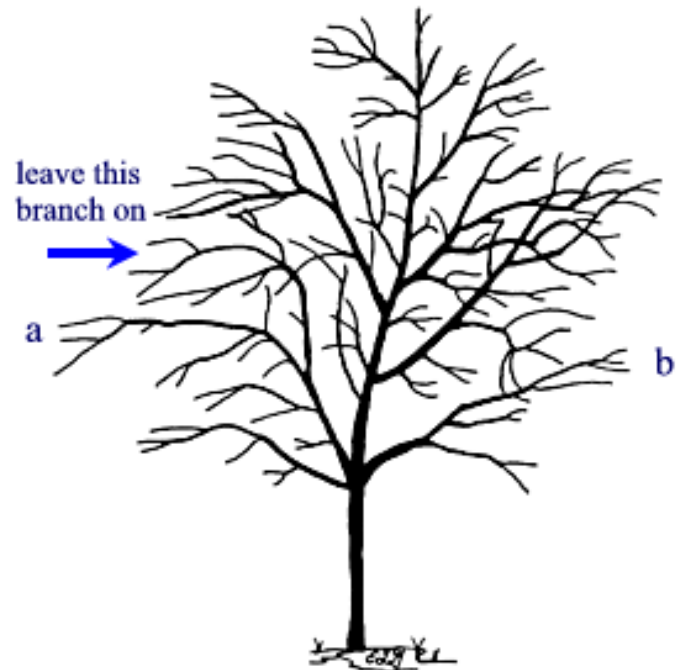


Figure 3: Good solution executed - Lower branches were subordinated (branches were removed from the ends with reduction cuts) to slow their growth so they won't droop as quickly and get in the way. Subordinating instead of removing a large branch (removing is shown in Figure 4) is more attractive and is better for the tree. The slower growth on 'a' and 'b' means these branches will eventually be small in diameter compared to the trunk. This is desirable should these branches have to be removed later because there is less chance for trunk decay. Branches 'a' and 'b' might have to be subordinated at a later date to further slow their growth. The large, inner branch was left on branch 'a' because it was not growing upright and it originates from the inner portion of the canopy. The branch 'a' could also be cut back later to this more upright oriented branch to provide more clearance.

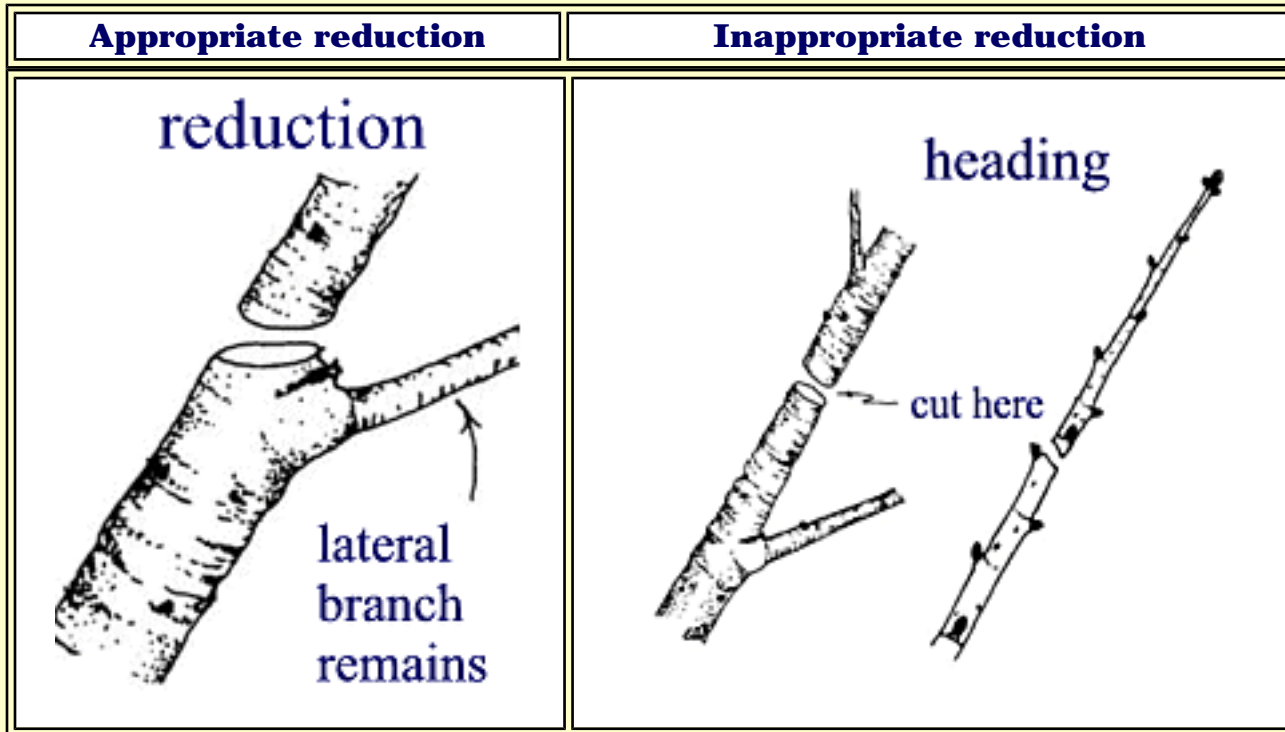
Introduction: Large, low branches are fine for trees growing in parks and other open landscapes where passage under the canopy is not needed. However, in more urban settings low branches may be undesirable on established trees because they obstruct vision and may interfere with pedestrian and vehicular traffic. A large wound and possible trunk defects could result should they have to be removed. Low branches on young trees that are allowed to develop can become more problematic with time as they droop and get in the way.

Canopy lifting or raising should be performed on young and medium-aged trees to prevent low branches from growing to a large diameter. Crown lifting shortens low branches regularly to suppress their growth. This forces more growth in the upper branches. This form is most suitable for urban landscapes. The shortened branches are later removed to raise the crown for under clearance. This sustainable technique damages the tree less than allowing low branches to grow to a large size and then deciding to remove them. Keeping low branches small will also increase the value of the lower trunk should the tree be cut into lumber when it is removed.

Execution: Instead of removing large low branches all at once, slow their growth by reducing their length if they will need to be removed later. Compared to removing the entire branch back to the trunk now, reduction of their length **1)** is more attractive, **2)** minimizes the size of the trunk wound when the low branches are eventually removed, and **3)** helps prevent decay and cracks from entering the trunk.

Pruning cuts

Stem reduction



A reduction cut (also referred to as a drop-crotch cut) removes a stem back to a lateral branch that is at least one-third the diameter of the cut stem. Sprouts commonly follow a reduction cut, especially if a large portion (greater than about one-quarter) of the live foliage was removed with the cut. If the branch that remains is less than one-third the diameter of the cut stem, the cut is considered a heading cut. Reduction cuts are used to reduce the length of a stem or branch. Heading cuts are not considered appropriate in most instances in the landscape.

Cleaning the canopy

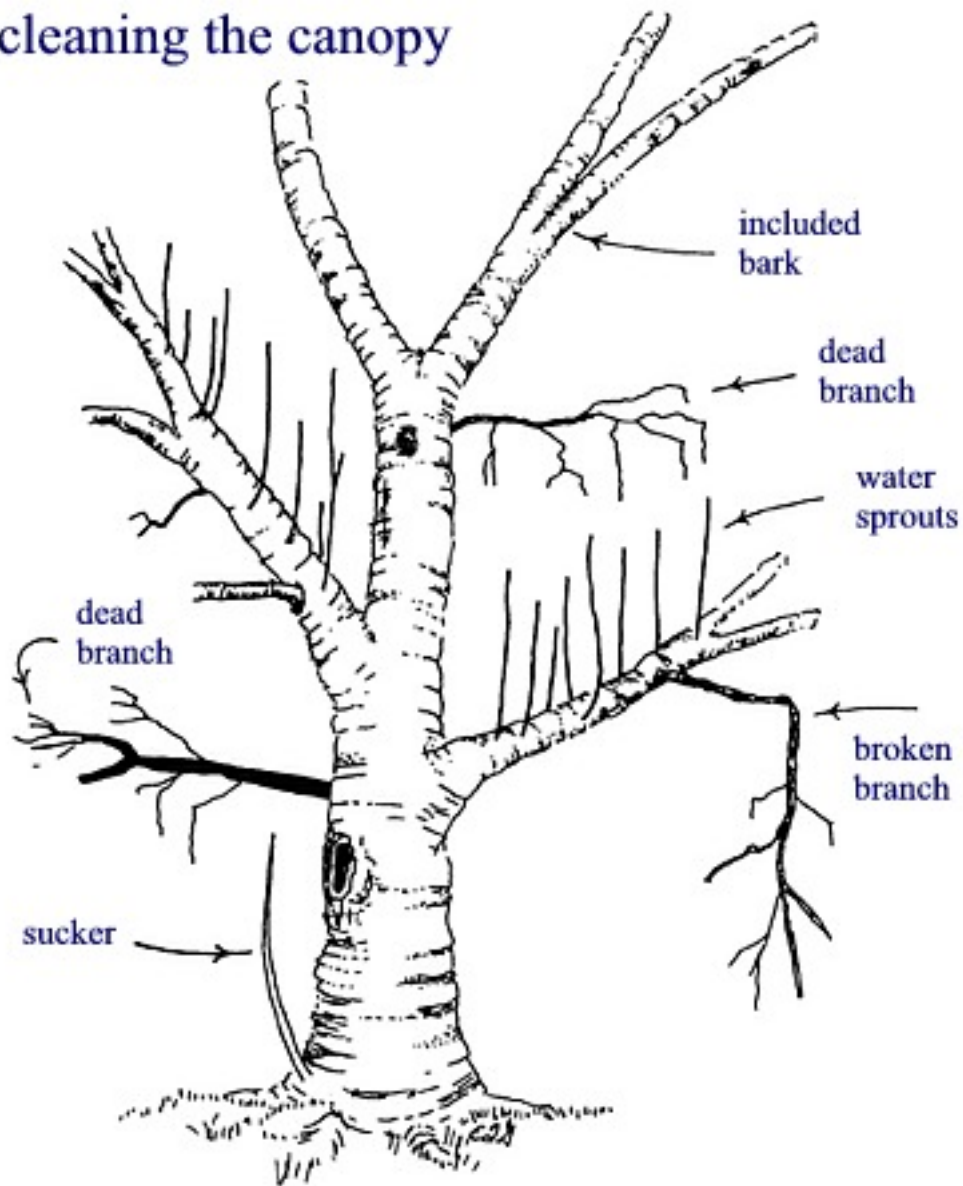
Objectives: Reduce conditions in the tree that could place people or property at risk.

Included bark: Problem - There is [included bark](#) in the branch union making the union weak. Branch 'a' is more likely to split out from the tree because of included bark.

Solution - 1) Either remove branch 'a' entirely back to the base of the included bark, 2) reduce the weight on the end of branch 'a' by removing lateral branches toward the end of the branch, 3) consider shortening branch 'a' with a reduction cut, or 4) consider installing a cable system.

Dead or touching branches: Solution - Remove detached, dead, broken, and diseased branches especially those more than one inch in diameter. Never remove the swollen expanding [collar](#) growing around the base of dead branches. Cut just to the outside of this collar. If two branches touch, remove or shorten one of them so they no longer touch.

cleaning the canopy



Water sprouts: Solution - Remove some water sprouts, if you wish. But remember that trees usually produce water sprouts due to a stress like root loss, root damage, storm damage, loss of branches, topping, disease, over-pruning, improper thinning, and other reasons. Determine the cause of sprouting and correct it. It is often best to leave many of the sprouts unless there are more than a dozen or so on a branch. Space the sprouts along the branch by removing some. If too many sprouts are removed at once, they will grow back.

Suckers: Solution - Remove suckers (sprouts from the base of the plant or from roots) as they appear. Sprays and paints containing NAA (synthetic auxin) applied to the pruning cuts can help reduce subsequent suckering on some species.

Introduction: If regular pruning is not performed, most trees develop canopies containing dead, detached, cracked, or damaged branches. If left untreated, these branches could pose a risk to the health of a tree or to people under it. Not only do dead branches serve as entry points for

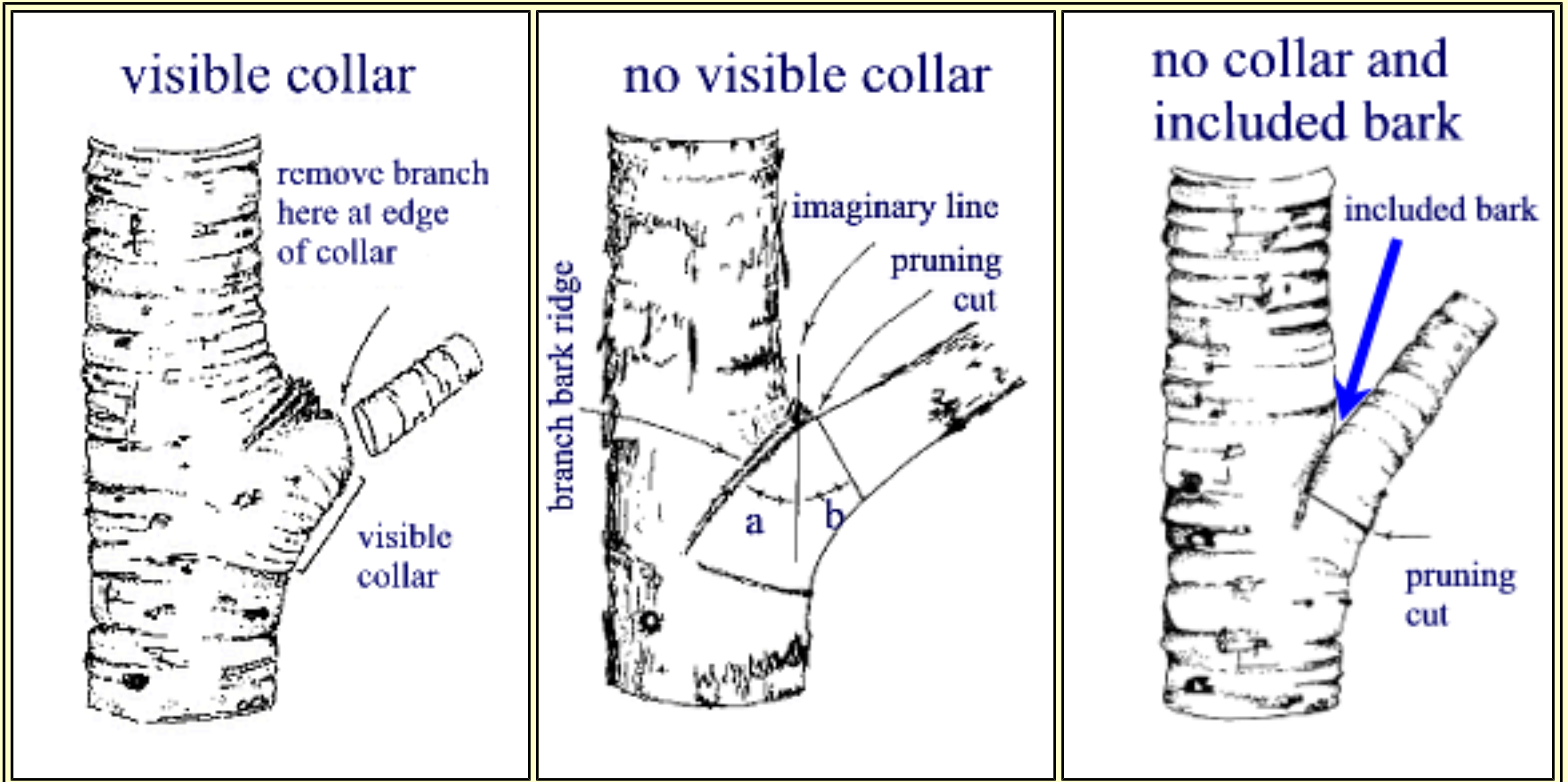
infection to the rest of the tree, but because these branches are weakly attached, they may also pose a hazard to nearby people and property.

A canopy cleaning consists of removing dead, detached, diseased, and damaged branches. It can be performed on trees of any age but is most common on medium-aged and mature trees. Removing live branches from mature trees is often unnecessary and could even be harmful. Cleaning could also shorten branches with included bark to reduce likelihood of breakage. It might include removing suckers and some water sprouts. But if the tree has many water sprouts, it may have a health problem that should be treated. The treatment for many trees with an abundance of water sprouts is to leave them alone.

Execution: Remove dead, dying, detached, diseased, and broken branches and suckers at the base of the tree. Specify that dead branches more than a certain diameter should be removed from the tree. For example, you might decide to remove dead branches that have a diameter of one inch or greater knowing that smaller ones pose less of a danger. Remove or shorten branches with cracks. Shorten or remove limbs with bark inclusions by removing lateral branches toward the end of the limb.

Pruning cuts

Live branches present three possible situations to you. See illustrations below for how to remove live branches.



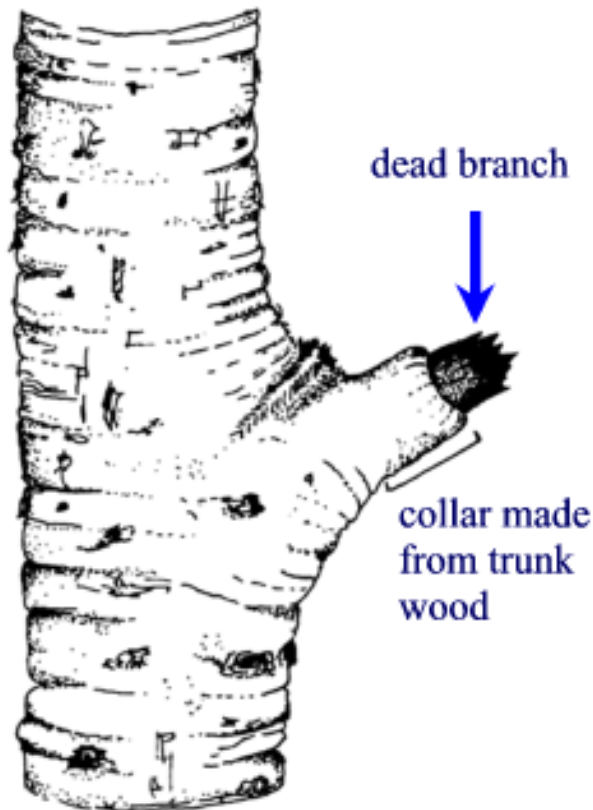
Dead branch removal

Stem reduction

Pruning cuts

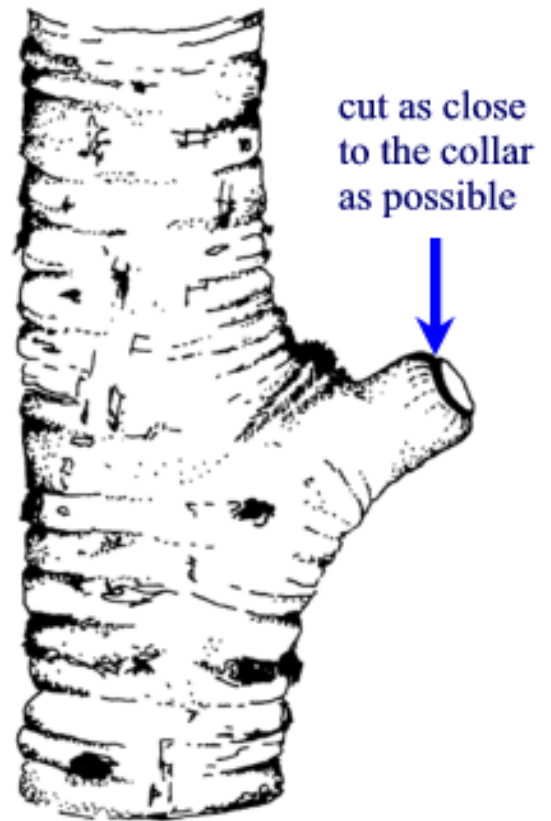
Dead branch removal

before pruning



A collar of trunk wood begins to grow out onto a dead branch that remains on the tree. Be sure not to cut into this collar. Cutting into the collar amounts to cutting into the trunk. Removing dead branches is good for the health of trees.

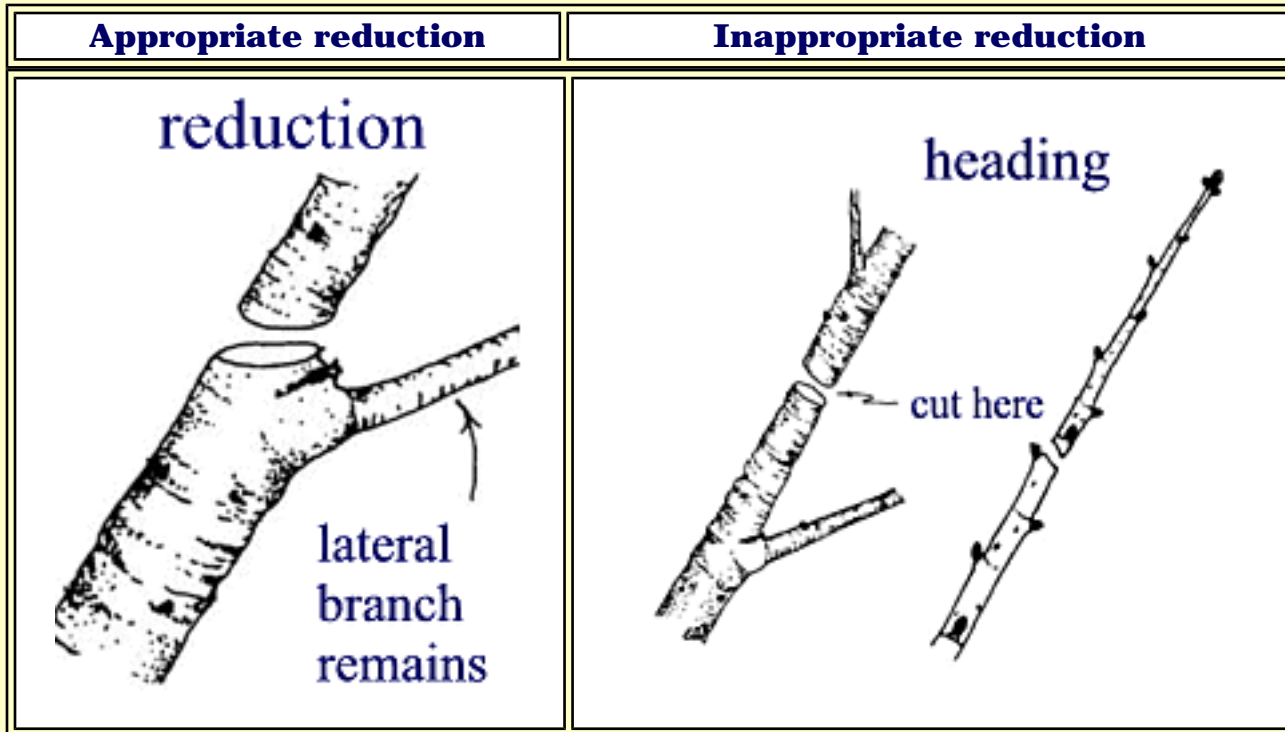
after pruning



Cut all dead branch tissue from the tree, but do not injure the collar. If the branch is small or severely decayed, you might be able to simply break the dead branch from the tree. This often allows you to remove more of the dead tissue inside the edge of the collar. Do not break the dead branch if this could injure the collar.

Pruning cuts

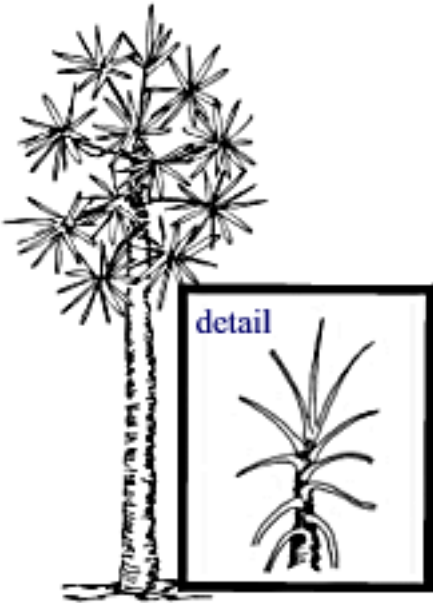
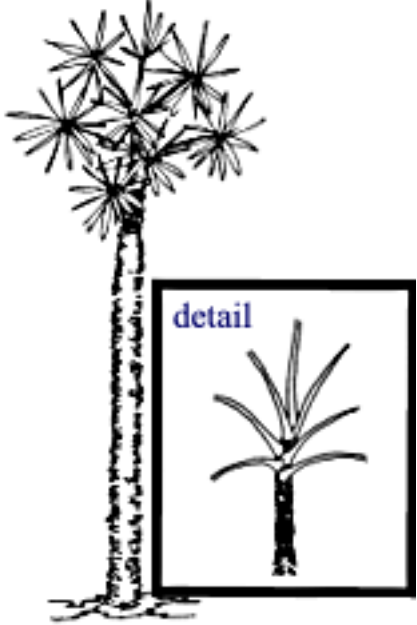
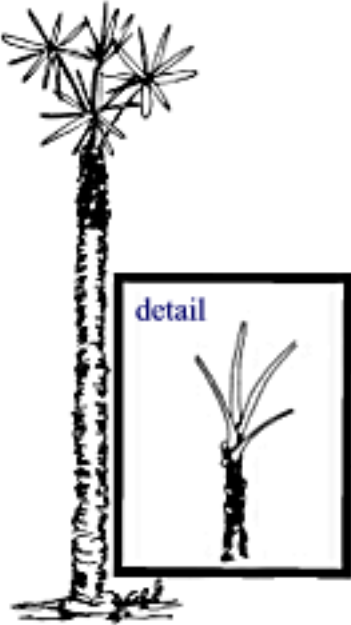
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Pruning palms

Objectives: **1)** Remove dead and dying fronds and developing flowers and fruits to reduce risk and enhance aesthetics; **2)** remove sprouts or stems to maintain one trunk.

<p>before pruning</p> 	<p>proper pruning</p> 	<p>over-pruning</p> 
<p>Consider removing lower fronds that are chlorotic or dead. There is no biological reason to remove live green fronds on palms. There is no research supporting the notion that removing live green fronds reduces future pruning requirements.</p>	<p>Remove lower fronds that are dead or more than about half chlorotic. Do not remove green fronds or the palm could become stressed. (If you decide to remove green fronds, do not remove those growing horizontally or pointed upward.)</p>	<p>Over-pruned palms look terrible and could attract pests. In the detail above you can see that many upright fronds were removed. Why remove green fronds when the palm was planted for its tropical look. That tropical look results from live green fronds.</p>

Introduction: Palms and cycads are often thought of as low maintenance plants; however, most palms require regular pruning to keep them attractive and safe. Many palms maintain a set number of live fronds. A regular turnover of foliage occurs as dying lower fronds are replaced by new ones at the apex. These dead fronds are not detrimental to the health of the tree. If there is an excessive number of older yellow fronds determine the cause before pruning. There could be a severe nutrient problem caused by a potassium or magnesium deficiency that could worsen if the palm is pruned or fertilized with high nitrogen or the wrong type of fertilizer.

There are several reasons for pruning palms **1)** Removing dead and dying lower fronds improves the appearance of a palm. **2)** Dead and dying fronds and loose petioles are weakly attached to some palms and can place people and property at risk should they fall from tall palms. People have been severely injured by falling fronds. Dead and dying palm fronds should be removed regularly to reduce this risk. **3)** Pruning can remove fruit clusters, especially in public landscapes where falling fruit and flower debris can be messy as well as hazardous. Some palms generate copious amounts of seedlings near the plant. Removing flowers or fruit reduces the number of potential seedlings. **4)** Remove sprouts from the base of the trunk.

Execution: It is preferable not to remove live, healthy fronds. If they must be removed, however, avoid removing fronds that are growing horizontally or those growing upward. Fronds removed should be severed close to the petiole base without damaging living trunk tissue. There is little reason to shave or sand the trunk smooth. The pineapple shape crafted at the base of date palms is not necessary for good health of the palm.



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