



# **Pruning of Trees and Shrubs on Guam**

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# Contents

Introduction .....	1
What to Prune in a Tree .....	3
Reasons to Prune .....	3
A. Reduce Plant Size	
B. Shape Plant	
C. Induce Branching	
D. Strengthen Tree	
E. Light Penetration and Air Circulation	
F. Control of Disease and Insects	
G. Control Fruiting	
H. Typhoon Preparation	
When To Prune .....	8
A. After the Storm	
B. When Flowers Fade	
Tools for Pruning .....	10
A. Hand Pruners	
B. Loppers	
C. Pruning Saw	
D. Pole Pruner	
Types of Pruning Cuts.....	12
A. Thinning	
B. Heading Back	
Techniques of Pruning .....	14
A. Limb Removal	
B. Branch Angle	

Aftercare .....	17
A. Wound Care	
B. Sunburn	
C. Fertilization and Watering	
Hygiene Issues .....	18
Special Situations .....	19
A. Transplanting	
B. Neglected Trees	
C. Rejuvenation	
D. Very Large Trees	
Conclusion .....	22
Summary .....	22
Glossary .....	23

## About the Cover

The picture shown is a large tree damaged by a typhoon. Most of the terminal branches are dead and there are many broken limbs. All dead and broken branches can be pruned for the tree to remain healthy.

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Originally published in 1992. Updated May 2016.

# Introduction

Pruning techniques are the same regardless of whether the plant is a tree or shrub. The difference is in the structure and size of the plant. For this reason, this publication will use the word “tree” in most explanations. The guidelines given here are, however, applicable to either trees or shrubs.

This is a guide for the pruning of typical trees and shrubs, and does not intend to make recommendations on plants such as palms, bamboos, or other grasses. These types of plants usually require only maintenance pruning and are not normally pruned on a routine basis.

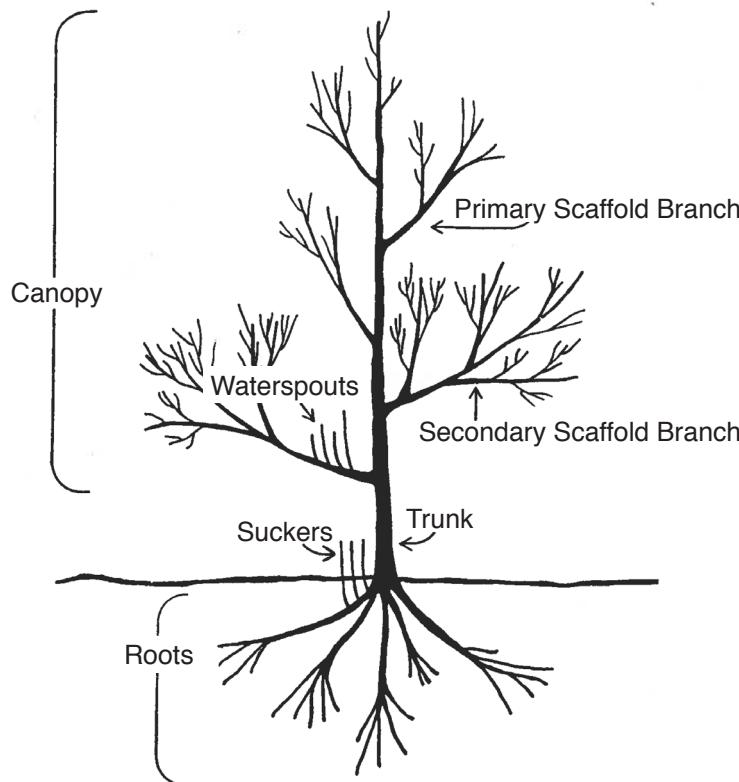


Figure 1. Structure of a tree illustrated without leaves.

Micronesia has a tropical climate with very distinct wet and dry seasons. Using Guam as an example to illustrate this, dry season “fanumnangan” is characterized by very bright, sunny days, which begin in December and last through June with a yearly average rainfall of 27 inches of rain. The rainy season “fanomnagan” is characterized by predominantly overcast conditions, which cover the remaining months with a yearly average of 68" of rain (NOAA, 2015 Report). There are advantages and disadvantages to pruning during both seasons, but they are all minimal. In a tropical region such as Micronesia, pruning can take place at any time during the year.

One aspect that should dictate time of pruning is the flowering and fruiting habits of various plants. Since the goal with flowering or fruiting trees is to obtain a prolific bloom or large crop, pruning should be performed to emphasize these processes. Trees like mango and avocado flower at the end of the wet season (approximately November-December) and fruit ripen during the dry season. In this case, one would prune immediately following harvest. The tree would then produce regrowth which would help to supply the following season's crop. Pruning during or immediately prior to flowering will interfere with the fruit production of the plant. In the case of flowering plants, pruning should commence immediately following the flowering period.

# What to Prune on a Tree

- A. Suckers that grow from the roots or base of the trunk
- B. Limbs that sag or grow close to the ground
- C. Branches that form an acute angle with the trunk
- D. Watersprouts that shoot up from main “scaffold” branches
- E. Limbs that are dead, diseased, or broken
- F. Branches that grow parallel to and too close to another
- G. Branches that cross or rub against others
- H. Limbs that compete with the tree's central leader

## Reasons to Prune

### A. Reduce Plant Size

An obvious reason for pruning established trees or shrubs is to reduce the area which they cover. As trees grow, they often hit walls, interfere with power lines, or become a hazard for falling branches. In orchard situations, trees may become too large for harvesting fruit and spraying. It is better to begin pruning plants when they reach a desirable size and not when they are so large that mature limbs must be removed, though sometimes this may be necessary. Reduction of tree size can often be done, and is best done with few cuts (Fig. 2). Large trees can be reduced in



Figure 2. Size reduction of a tree is best done with few cuts. This tree was effectively reduced in size with a few cuts which remove the whole limbs that are shaded.

size in such a way that their health is not endangered. For further discussion on large trees, see “Special Situations”.

### B. Shape Plant

Shaping of trees and shrubs can consist of anything from removing a stray branch to extreme examples such as espalier (Fig. 3). Natural tree shape can be manipulated to make low-growing, spreading plants more upright or tall trees smaller and denser. Mature trees can be shaped to some extent; however, no more than one-third of the foliage should be removed at any one time. In general, to avoid the removal of any large limbs, shaping of a plant should start when it is still young.

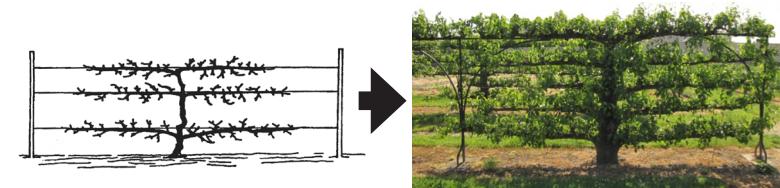


Figure 3. Espalier is one example of an extreme type of shaping a tree. Pruning procedures this extreme is best done when the plant is still young.

### C. Induce Branching

Pruning can control the amount and areas of branching. The terminal bud is the bud at the tip of a branch. Lateral buds are located below the terminal bud, along the length of the branch.



Figure 4. Removal of the terminal bud results in the growth of lateral buds. A pruning cut to remove the shaded portion of the shoot on the left will result in growth response as shown on the right.

When the terminal bud is removed, the lateral buds are then forced to grow (Fig. 4). This procedure can be used to create a denser tree canopy by forcing more lateral branches, those branches produced by lateral buds. The tree will have fewer individual, long branches and more limbs with many lateral branches.

Trees consist of a main trunk and scaffold branches, which make up the framework of the tree. Primary scaffold branches are the main branches coming off of the trunk. Secondary scaffold branches emerge from the primary scaffold branches. Pruning back both primary and secondary scaffold branches while they are young (1 to 2 years) helps to strengthen the limbs and encourages side branching.

#### D. Strengthen Tree

Pruning can also be used to strengthen trees to withstand strong winds or typhoons. If possible, the weakest branches in a canopy should be removed when pruning. For more detailed information on choosing strong branches, see the section on “Branch Angle”.

Normally, only one branch should be left at a single point on the main trunk. When two or more branches emerge from the same point, a weak spot develops on the trunk. Extra branches should be removed when pruning.

#### E. Light Penetration and Air Circulation

Light is a very important factor in plant growth. For optimal growth, sunlight should reach most of the leaf area on a plant. As trees and shrubs become excessively large, the inner parts of the canopy become more shaded. This creates a dense cover of foliage on the outer portion of the canopy while the inside becomes increasingly bare (Fig. 5). This problem is avoided by pruning to open up the tree to sunlight, thus a healthy, densely covered tree is produced. See “Thinning”.

Light penetration is aided by the removal of unnecessary branches such as dead limbs, crossing branches, or watersprouts.

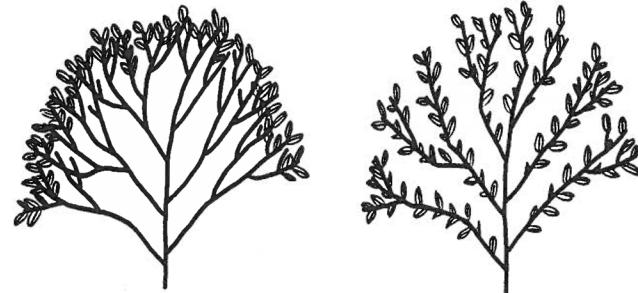


Figure 5. The plant on the left has been left to grow naturally and has very little light penetration into the interior of the canopy. The plant on the right has been pruned for light penetration and has foliage well distributed throughout the canopy.

Watersprouts are rapidly growing unbranched shoots that do not normally produce flowers or fruit until they are cut back (Fig. 6). They should always be removed unless they are to be used for the purpose of shading exposed branches (see “Sunburn”). In grafted plants, watersprouts emerging from below the graft should always be removed. Rubbing watersprouts off while



Figure 6. Water sprouts are unbranched shoots which may be found in the canopy or, commonly, on the exposed areas of the scaffold branches or trunk of a tree.

they are just emerging is the easiest and most effective means of removal.

Light interception is also important for fruit development. To efficiently produce a fruit crop, a maximum amount of the canopy should intercept light. Pruning to open up the center of the plant, which allows light to reach more leaf area, enhances fruit development. Fruit in the shaded interior of the canopy usually has poor color and quality compared with those in well-lighted areas.

#### **F. Control of Disease and Insects**

If diseased branches are detected, they should be removed as soon as possible. Small insect-infested branches may also be removed if they do not create too large of a hole in the canopy. Only those branches threatened by insects which penetrate into the wood need to be removed. Insects which are on the surface of the branch can usually be controlled with an application of insecticide. Removal of disease or insect-infested branches is a safe and effective way to control these pests in mature trees.

All cuts should be made into healthy wood. When pruning diseased branches, the tools being used should be disinfected after each cut, especially when going from diseased to non-diseased wood. A solution of one part bleach to four parts water is a safe and effective disinfecting agent. Once these branches are pruned from the tree, they should be removed from the area so that they will not become a source of reinfection of the plant.

Pruning to open up the center of the tree also helps to control disease. This allows air movement through the canopy and promotes rapid drying following rain, thereby helping to prevent disease. Branches which cross over each other should be removed since moisture accumulation and mechanical abrasions between them create a site for disease development.

#### **G. Control Fruiting**

Pruning mature fruit trees can help a plant produce a better crop in a number of ways. When a portion of the fruiting wood is removed, the fruit produced by the remaining wood is usually larger and of better quality.

When fruit trees are left to grow to a very large size they are producing a large amount of unnecessary wood and foliage. The leaf portion of the plant which contributes to fruit growth is, for the most part, located directly around the fruit. Pruning a fruit tree to a suitable size therefore does not greatly sacrifice fruit yield, but improves quality during harvest time.

Larger trees tend to produce more fruit in the upper portions of the canopy. This adds to the work and frustration of harvesting. By reducing the size of a fruit tree, one can force the tree to produce fruit at a more convenient height. Removing dead, crossing, or broken branches allows easier access into the canopy.

## **When to Prune**

Properly pruning a tree is crucial. Pruning can be done at any time of the year on Guam, but sometimes circumstances may affect decisions of when to prune.

#### **A. Before and After the Storm**

Typhoons cause a great deal of damage to plant material on Guam. Typhoons typically occur between June to November, but they can occur at any time of the year. Typhoons bring strong winds, abundant rainfall, and flooding. Preparing trees and shrubs before a typhoon is desirable, and involves pruning to allow for wind movement through the canopy. Size reduction can reduce wind drag and lower the chances of uprooting of some plants. Care should first be given to those plants which are known to be easily damaged or uprooted in typhoons. Safety

measures indicate that work should not occur during a typhoon or in any wet, windy, or dark conditions.

After a typhoon, different levels of tree damage will be found in the landscape. If tree damage is minimal, pruning may be restricted to removal of broken branches and removal of rough edges around wounds. This will aid in tree recovery. If a valuable tree is damaged, then greater after-care efforts may be needed. In addition to removing broken branches and cleaning rough edges around wounds, fertilization and irrigation may aid in recovery. If a less valuable tree is damaged, it may not be worth saving. For example, some trees may be heavily diseased or exhibit major splits in the trunk or large structural limbs.

#### B. When Flowers Fade

If the purpose of pruning is to enhance flowering or fruiting, the timing of pruning becomes more important. Major pruning in these situations should be immediately after the major flowering season for flowering trees, and after the major fruiting season for fruit-bearing trees.

## Tools for Pruning

There are many useful tools for pruning, most of which are available at hardware or home supply stores. It is advisable to buy quality, durable tools since good tools will last a long time. Larger pruning tools are not always better. Although larger tools will usually cut through thick branches, they may also be too bulky to maneuver within the canopy of a tree. Especially for large jobs, using comfortable tools is important.

Blades should be kept dry, cleaned, oiled, and sharp. A sharp blade is better than a dull one. This will not only make cutting easier, but also prevent uneven or jagged cuts which can prolong recovery of wounds. Tools should be rinsed and wiped dry before being put away. Store tools in an enclosed area when they are not being used to prevent rusting.

The machete is a popular tool in the Micronesian area. Although it is an appropriate tool for brush clearing, the machete should never be used to make the final pruning cut on trees and shrubs.

Large pruning jobs which require chainsaws and large ladders should be attempted only by experienced tree trimmers. These jobs can be dangerous for the homeowner and removal of debris can be an inconvenience. Most jobs require no more than the first three tools described in Fig. 7.

#### A. Hand Pruners

For small branches or twigs, hand pruners provide clean cuts and ease of movement. When pruning small shrubs or young plants, with  $\frac{1}{4}$ " to  $\frac{1}{2}$ " in diameter, hand pruners may be the only tool required. Do not try to cut large branches (over  $\frac{3}{4}$ " in diameter) with hand pruners since this may result in jagged, uneven cuts. Some pruners have the convenience of a replaceable blade which makes sharpening unnecessary.

#### B. Loppers

Loppers are useful for removing small branches up to  $1\frac{1}{2}$ " in diameter that are too large for hand pruners. There are many styles of loppers available, each capable of cutting branches



Figure 7. Hand pruner, pruning saw, and lopper. Many different styles of these tools are available.

of different sizes. Long handles will give more leverage with loppers, but with time, they are more susceptible to breaking if the handles are wood.

### C. Pruning Saw

Pruning saws are necessary for branches more than  $1\frac{1}{2}$ " in diameter that are too large to be cut with loppers. Figure 7 shows one of many styles of saws available. To help the tree recover quickly, always try to make straight cuts with the saw as opposed to wavy, uneven cuts.

### D. Pole Pruners

A pole pruner can be useful for branches more than 1" thick and beyond arm's reach such that it is high in the canopy which are not easily reached from the ground. Pole pruners can be purchased with either a lopper or saw attachment for various pruning jobs.

## Types of Pruning Cuts

### A. Thinning

Thinning means to cut a branch back to the trunk or the main scaffold branch from which it originates. The remaining branches are stimulated to grow longer. After thinning, trees appear more open and less dense (Fig. 8).

Thinning is a type of pruning cut which is used to open up a tree for better air circulation and light penetration. This type of cut can be used to strengthen the tree by removing the weakest branches in the canopy. Use appropriate tools when thinning based on the thickness of the branch being cut.

Since with thinning cuts the tree is opened up and exposed, it may become susceptible to sunburn damage. Care should be taken to leave shading branches and twigs, or the exposed branch should be painted with whitewash (see "Sunburn"). Increased exposure to sunlight also promotes the growth of watersprouts.

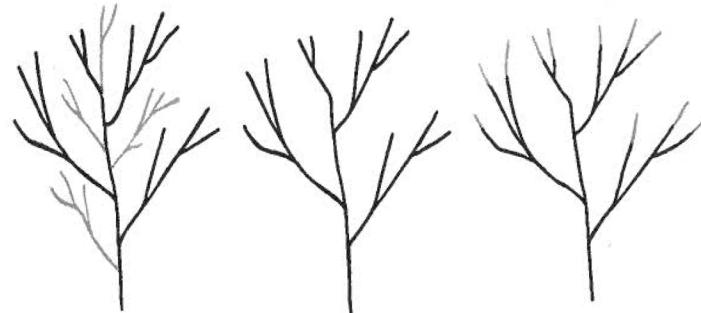


Figure 8. Thinning cuts remove branches back to a crotch. Pruning of the shaded limbs in the tree on the left would be accomplished with proper pruning cuts. The tree illustrated in the middle appears less dense immediately following these thinning cuts. A tree responds to thinning cuts with extension of the remaining branches, as shown by the shaded regrowth on the right. Future growth may include more foliage in the interior of the plant since more light is available.

Unless they are providing needed shade, watersprouts should be removed as soon as they emerge.

### B. Heading Back

Heading back cuts remove only portions of branches and promote increased growth off foliage within a tree or shrub which is normally done by the use of a hand pruner. By removing the terminal bud, the remaining lateral buds are encouraged to grow. Heading back cuts may remove different portions of the branches, depending on the severity of the pruning. Trees respond to heading back cuts with a denser growth habit (Fig. 9). Hedging of plants is an extreme example of this type of cut.

When making heading back cuts, it is important to always cut back to a desired bud. Remember that the point at which the cut is made will probably respond with growth of the first remaining bud on that branch. The direction of that bud will determine the direction of the emerging branch. Therefore, it is usually advisable to cut back to an outside bud so growth will be directed away from the center of the plant rather than toward the

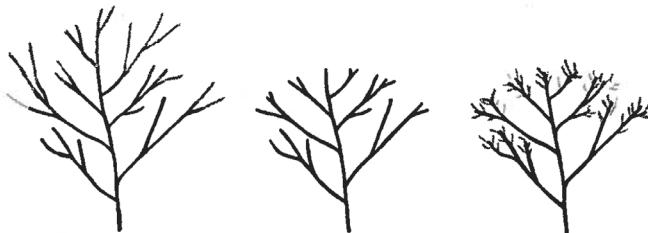


Figure 9. Heading back cuts remove only portions of branches, such as those that are shaded on the left illustration. The tree appears shorter immediately following pruning (middle). A tree responds to heading back cuts with growth of numerous lateral buds on the remaining branches, as illustrated by the shaded regrowth on the right.

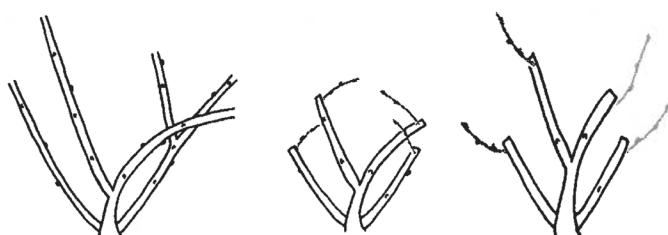


Figure 10. Direction of growth after pruning is determined by the direction of the first remaining bud. The illustration on the left shows plant shape prior to pruning. The plant in the middle has been pruned back to inward-facing buds and the plant on the right has been pruned to outward-facing buds. Future growth in both cases is illustrated by the shaded branches.

center of the plant (Fig. 10). This helps to prevent crossing-over branches and promotes an open center for better light penetration and air circulation.

## Techniques of Pruning

The most important step in pruning takes place before any cuts are made. The person pruning should step back and examine the entire plant, making mental notes of which parts will be removed or modified. This should also be done periodically throughout the pruning process, helping to eliminate mistakes such as removing

important structural branches. Before removing an entire branch, be sure to note how it fits into the canopy. Removal of the wrong branch can produce large holes in the canopy which, in turn, can expose remaining branches to sunburn or create an unsightly plant.



Figure 11. The collar is the swollen area where the branch and trunk meet.

### A. Limb Removal

Located at the base of large branches is what is known as the collar (Fig. 11). The collar is a swollen area where the branch meets the trunk or scaffold branch. It is more obvious in some plants than others. The collar contains natural chemicals which the plant uses to block off decay from the rest of the plant, and is the plant's area of natural defense.

When removing a limb, the cut surface should be as close to the collar as possible without actually cutting into it (Fig. 12). A plant will recover quickly if this practice is followed. If any or all of the collar is removed, the wound will be left open to decay.

Removing branches with flush cuts is a common practice and was once thought to be the optimal means of removing a limb. This type of cut, however, only produces a very large wound and



Figure 12. Proper cut for removing a limb (left). The cut is just outside of the collar without any of the collar removed. An improper pruning cut that is flush with the trunk (middle) removes the valuable collar and leaves a much larger wound. A pruning cut that is outside of the collar leaves a stub (right). This type of cut is also improper and leaves the tree open to infection from disease or insects.

greatly harms the tree (Fig. 12). It is just as harmful to cut at a distance from the collar, leaving a stub on the tree (Fig. 12). With this understanding, limb removal will result in the least amount of permanent injury to the plant.

### B. Branch Angle

Trees must have a strong framework to survive heavy fruit loads, strong winds or typhoons. By promoting strong branches when pruning, trees are modified to be more able to withstand such occurrences. The strongest branches are those with a crotch angle of about  $45^\circ$ . The crotch refers to the area where a primary scaffold branch and the trunk meet. The crotch angle is the angle that the scaffold limb creates when joined with the trunk.

Wide angle branches create a continuous flow of the conductive tissues within the tree. Narrow angles pinch off this tissue while bark is trapped in the crotch, creating a weaker branch which is more susceptible to breakage as it grows (Fig. 14). A crotch angle that is around  $90^\circ$  or greater is also weak because of the pressure exerted on it by the weight of the branch. When pruning young trees, always try to leave those branches with strong crotch angles, while removing any branches with undesirable crotch angles. Trees sometimes respond to severe pruning with

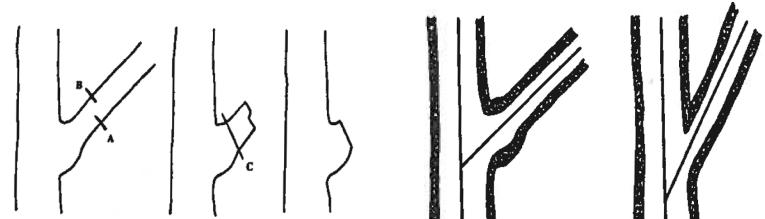


Figure 13. Proper removal of a large branch involves three cuts. Cut approximately 8" from the trunk on the underside of the branch (A), followed by a cut approximately 10" from the trunk on the top of the branch (B). This will cause the branch to break off, leaving a stub. The final cut outside of the collar (C) removes the stub.

Figure 14. Cross section of two crotch angles. The branch on the left is at a proper angle for a strong crotch. The branch on the right shows the interruption of the conductive tissues and bark inclusion from a narrow crotch causing a weak branch.

very narrow branching angles. The branches which are left to develop should be widened manually to force a stronger crotch angle to develop. This can be done by wedging a piece of wood in the crotch to create a wider angle. Rope or any other means of widening may also be used, as long as damage to the tree does not occur.

## After Care

### A. Wound Care

Generally, caring for wounds following pruning is not necessary, regardless of the size of the wood. Previous recommendations have included applying sealing paints and tars. These practices do not accelerate recovery, and may in fact inhibit it. Plants defend themselves from disease and insect invasion with natural chemicals which act to seal off exposed areas. Applying chemical sealants may only hinder this process, thereby allowing organisms to invade the exposed area of the plants.

## B. Sunburn

Wood which develops in the shade is very susceptible to sunburn damage when it is suddenly exposed to higher light levels. This commonly occurs, especially when large trees are pruned and older branches which developed in shade are suddenly exposed to full sun. Sunburn symptoms include a darkening and moderate to extreme cracking of the bark, depending on the severity (Fig. 15).

When wood is exposed to full sun after pruning, it should be protected with whitewash, commonly made by diluting white latex paint with water. To be nontoxic to the tree, the paint must be free of any oils, thinners, or turpentine. Whitewash should be applied with a brush to any large exposed branches.

Leaving enough foliage to shade the remaining large branches after pruning prevents sunburn without the use of paints. Leaving small branches will not compromise the desired shape of the tree since they can be removed once the tree starts to develop more foliage.



Figure 15. Sunburn of a limb causes a cracking of the bark on a tree.

## C. Fertilizing and Watering

Pruning reduces the amount of foliage on the tree while the root system is left unchanged. The above ground portion of the pruned plant requires fewer nutrients to carry out its normal life functions simply because its size has been reduced. For this reason, fertilization can be reduced following pruning. The degree of reduction depends on the severity of the pruning.

Just as plants require less fertilization following pruning, they often require less water, depending on weather conditions.

When a portion of the canopy is removed, the plant will use less water than it did prior to pruning. Irrigation may be adjusted accordingly.

## Hygiene Issues

Pruning tools and pruned limbs are often sources of disease agents. Following the pruning operation for each tree, the pruned wood should be removed from the site. In addition, pruning tools should be disinfected before they are used to prune a subsequent tree.

Before disinfecting tools, soil and wood debris should be wiped from the blades of the pruning tool. The two most common disinfecting agents are bleach and alcohol.

-For a bleach solution, mix about 2 cups of bleach in 1 gallon of water. Soak the tools in the bleach solution for about 10 minutes. Rinse with water before further use.

-For alcohol, use 70% ethanol or isopropyl alcohol. Soak time is about 1 minute. Do not rinse the blades after the alcohol treatment.

# Special Situations

## A. Transplanting

The root system of a plant is usually reduced in size by damage incurred during transplanting. Because of this, the root-shoot ratio of a plant should be restored by reducing canopy size. When a portion of the foliage is removed by pruning, less water is lost and the plant has a better chance of survival. Slight pruning of the roots of a transplanted plant, especially one that has been in a pot, may induce root regeneration and is sometimes beneficial.

Pruning young plants at transplanting promotes denser growth of branches and foliage. A technique called “pinching” involves the removal of only the terminal buds on the plant with your thumb and forefinger. As discussed before, removal of the terminal bud promotes more branching within the plant.

## B. Neglected Trees

Neglected trees are sometimes found in the home landscape or orchard (Fig. 16). Trees that have been neglected for a number of years are often excessively tall. If there are several tall limbs, it is better to remove them over a number of years. Remember to protect against sunburn damage.

If tall limbs are not a problem, and the tree or shrub is just overgrown and messy, certain branches should be removed first. These include broken, diseased, insect-infested, dead or dying, and crossing branches. Removal of these branches ill structure, hence, allowing for proper removal of other unnecessary branches.

After these branches have been removed, lateral branches on the tree can be headed back to a desired length. This will decrease the size of the tree as well as promote interior foliage growth. Always thin branches that are higher in the canopy more severely than those that are lower.

Finally, the rest of the branches in the tree may be thinned. Remove all watersprouts which are of no value. Those that are left for shading exposed areas may be removed in later years or headed back to produce lateral branches. When thinning, remember to leave a maximum amount of foliage in the interior of the canopy so, in the case of fruiting trees, the fruit-bearing surface will not be restricted to the outer portion of the canopy. Also, interior foliage will not be produced as quickly as exterior foliage if the center of the tree is shaded, so exterior foliage should be thinned sufficiently to allow for light penetration.

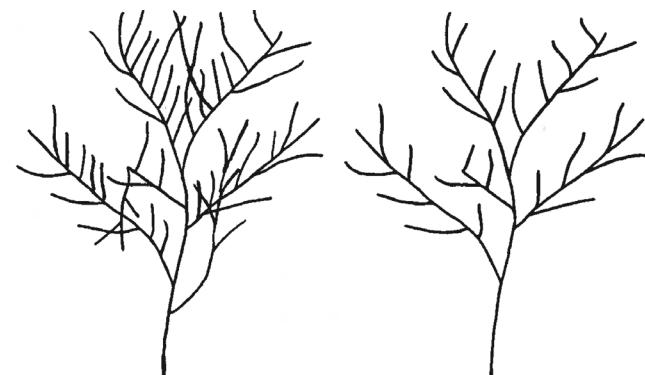


Figure 16. Neglected tree showing broken and crossing branches (left), and after pruning (right).

## C. Rejuvenation

Trees and shrubs are often left in very poor condition following typhoons (Fig. 17). Pruning to rejuvenate mature trees following a typhoon will keep trees attractive and healthy. Pruning of broken or obviously dead branches should be done as soon as possible following a typhoon. However, major limbs should not be removed until it is clear that no new growth will appear on them.

Dead limbs can be identified sometimes by a shriveled, brittle appearance. The wood below the bark of a dead limb will appear brown or black when scratched with a fingernail. Healthy wood will be green when scratched.

There are different degrees to rejuvenation pruning, depending on the extent of the damage and the purpose of the plant.

Rejuvenation pruning may involve only selective pruning other unwanted or damaged limbs are thinned out, similar to a neglected tree. This would follow a typhoon which has caused only slight damage. Severe pruning should only follow cases of extreme damage.



Figure 17. Typhoon damaged tree showing bare branches on the top of the canopy. All dead or damaged limbs can be removed.

#### D. Very Large Trees

Large trees should be handled differently than young, actively growing trees. Mature trees do not respond as quickly to pruning injuries and are slower to re-grow than young trees. It is important, therefore, not to remove an excessive amount of foliage from older trees.

When older trees become too large for the area they occupy, their size should be reduced over a number of years rather than all at once. Tall branches should be completely removed all the way back to the main trunk or scaffold branch if possible (see "Limb Removal"). Protect for sunburn damage since it is more of a problem with older, established trees than with young trees.

## Conclusion

Pruning has a dramatic effect not only on the current form of a tree or shrub, but also on future growth. If done properly, successful pruning can be accomplished with no harm to the plant from disease or insects. Specific questions about pruning should be directed to the nearest agricultural extension agent.

## Summary

1. Use sharp tools for clean cuts at all times.
2. Have proper tools for each pruning job.
3. Keep tools clean.
4. Never use paints or tars over wounds after pruning.
5. Bark at edges of all pruning cuts should be firmly attached.
6. Always promote wide-angled rather than narrow-angled crotches.
7. Prune young trees less severely than mature trees.
8. Prune the upper portion of the tree more heavily than the lower portion.
9. Thin out the outer portion of a branch more severely than the inside portion.
10. Equipment that will damage the bark (such as climbing spurs or hooks) should not be used.
11. Hire professionals for large jobs.

## Glossary

**Branch** - woody structural member connected to but not part of the central trunk of a tree (or sometimes a shrub).

**Central Leader** - the central axis of a tree, growing as a continuation of the trunk and off which grow scaffold limbs. Not all trees have a single central leader.

**Crown** - consists of the mass of foliage and branches growing outward from the trunk of the tree. The average crown spread is the average horizontal width of the crown, taken from dripline to dripline as one moves around the crown.

**Espalier** - horticultural and ancient agricultural practice of controlling woody plant growth for the production of fruit, by pruning and tying branches to a frame, frequently in formal patterns, flat against a structure such as a wall, fence, or trellis, and also plants which have been shaped in this way.

**Pruning** - a horticultural and silvicultural practice involving the selective removal of parts of a plant, such as branches, buds, or roots.

**Shrub** - small-to-medium-sized woody plant. It is distinguished from a tree by its multiple stems and shorter height, usually less than 6 meters (20 feet) tall.

**Tree** - perennial plant with an elongated stem, or trunk, supporting branches and leaves in most species. In some usages, the definition of a tree may be narrower, including only woody plants with secondary growth, plants that are usable as lumber or plants above a specified height.

**Water sprout** - shoots that arise from the trunk of a tree or from branches that are several years old, from latent buds.

Many thanks to Bart Lawrence of USDA Natural Resources Conservation Service, Guam, and Joe Tuquero of CNAS Cooperative Extension and Outreach for their helpful suggestions.

Published by the College of Natural & Applied Sciences (CNAS), University of Guam, in cooperation with the U.S. Department of Agriculture, under Dr. Lee S. Yudin, Director/Dean. University of Guam, CNAS, UOG Station, Mangilao, Guam 96923. Copyright 2016. For reproduction and use permission, contact [CNAS-Media.events@gmail.com](mailto:CNAS-Media.events@gmail.com), (671) 735-2000. The University of Guam is an equal opportunity/affirmative action institution providing programs and services to the people of Guam without regard to race, sex, gender identity and expression, age, religion, color, national origin, ancestry, disability, marital status, arrest and court record, sexual orientation, or status as a covered veteran.

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Special thanks to the CNAS Media Office for layout and design.

Original printing 1992.

Revised layout by Emily Shipp, May 2016.

