

Pruning

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Pruning is simply a method of modifying plant growth to enhance health, vigor and/or performance for a given purpose. Pruning can be defined by both artistic and scientific principles however, the methods used and techniques applied are governed by the purpose that the plant serves. For example, pruning practice at a production nursery depends on the stock type, size, and market. Seedling and propagation nurseries focus on structural framework with development for retail or landscape use occurring at a container or field nursery. Managing plants in the landscape is guided by the design intent and function each plant or plant mass serves in contributing to the overall aesthetic appeal of the landscape. Commercial horticulture operations may be focused on production of food, fiber, flowers, and foliage where pruning is performed to enhance the development of a specific plant part. Whatever the purpose or intended use, pruning is a management technique to aid in achieving our certain objectives.

Reasons For Pruning

The reasons for pruning generally relate to plant biology and plant responses to environmental and cultural stimuli. Some specific reasons for pruning or managing plant growth and development include:

Maintenance Of Plant Health:

Plants will benefit from periodic thinning and opening the interior canopies to light penetration and air circulation. Thinning of the canopy will reduce humidity, speed evaporation, and decrease the incidence of disease during susceptible periods. Light penetration will stimulate bud formation and increase productivity of otherwise unproductive branches. Increased leaf area will enhance carbohydrate production and contribute to overall plant health and vigor. Thinning of plant crowns also reduces wind resistance and the potential for damage during storms. Removal of dead, diseased, and insect damaged branches can eliminate the problem and reduce the spread of problems to other plant parts or adjacent plants.

Influence On Plant Size And Vigor

Pruning has both a dwarfing and invigorating influence on plant growth. Dwarfing occurs both

by the removal of branches and the reduction of leaf area. The decrease in leaf area results in fewer carbohydrates for overall growth and storage for the following season. Pruning invigorates plants by stimulating bud break in the vicinity of the pruning cuts. This increase in shoot development may extend further into the season and, depending on the type of cut, may increase the overall size of the plant.

Influence On Flowering And Fruiting

Pruning influences the balance between vegetative growth and flower bud formation. Plants have a juvenile phase, which is characterized by vigorous vegetative growth. A plant is said to reach maturity when it has the ability to flower. Plants vary in the age it takes to reach maturity; for example, shade trees may take up to 15 years before they produce flowers, and shrub seedlings may flower the second year after germination. Pruning aids flowering by maintaining conditions, which promote flower bud formation such as adequate light, stimulation of new wood, and a control of vegetative growth. Excessive pruning can promote vegetative growth at the expense of flowering. Root pruning may also encourage early flowering.

Develop Plant Architecture

The development of plant architecture is the primary objective of pruning and training of young plants. The position and attachment of scaffold branches provide the framework for future development. Eliminating poor branch angles, interior branches, watersprouts, and suckers contributes to the long-term stability of the plant. Narrow crotch angles tend to be weak in attachment. Vertical, vigorous shoots tend to have poor wood strength. Rubbing and conflicting interior branches can lead to mechanical injury and wounds susceptible to entry by disease organisms and insects. The same is true for mature plants; corrective measures may be necessary to eliminate problems and direct new growth. Watersprouts and suckers are vigorous vegetative shoots that compete for water, nutrients, and light within the plant. Watersprouts arise from the trunk and upper portion of the plant. Suckers are shoots that grow from a root, underground stem, or from an under-stock below a bud or graft union. Pruning to improve plant

form may also be necessary to correct someone's bad judgment. Plant selection without allowing for ultimate size, rate of growth, or mature physical characteristics may require drastic means to bring the plant back to some semblance of natural form.

Minimize Transplant Shock

Transplant shock results from root loss during harvesting or handling of plants. Generally, this applies to field grown plants, however, disrupting or cutting the root system of a pot bound container plant can also result in root loss. The degree of shock varies with the type and size of plant, the remaining root mass, and the season. Pruning helps lessen the transpiration demand on the root system and reduces the overall negative effect on the remaining growing points. Keep in mind that active growing tips produce auxin, which is important in new root initiation. Pruning should be directed at weak stems, internal branches, and otherwise unproductive wood, and not the indiscriminate removal of half to two-thirds of the crown as once was thought.

Root Pruning

Root pruning can be performed for a number of different reasons: it reduces plant vigor by limiting uptake of water and nutrients; it can encourage flowering at a younger age; and it can stimulate root initiation similar to the way heading stimulates shoot growth.

How To Prune

In order to understand basic pruning techniques and to make the necessary decisions on what to prune, we must first have a basic understanding of plant growth. A quick review of the stem (Fig. 1) will aid in our understanding of the basic principles of plant growth. Terminals are a bud or cluster of buds formed at the end of shoot elongation. Lateral buds are formed at the base of the leaf petiole on current year's growth. The node refers to the point where the leaf and lateral bud are attached to the stem. Internode is the distance between leaves or buds. Terminal bud scars mark the beginning of growth, and the distance between bud scars indicates the growth of a given season. Lateral buds that do not break during a season are often referred to as dormant buds and will not break until conditions stimulate their growth. Latent refers to a bud that remains dormant for more than one season, or to buds that lie under the surface of the bark and do not develop until receiving a stimulus. Shoots arising from latent buds may be weakly attached to the main stem, which could be

a problem in the future. While some plants have distinct differences between vegetative and flower buds, others may have the buds combined. Being able to distinguish between the bud type is important when flowering is a consideration. Flowering dogwood is a good example of differing vegetative and flowering bud types. Knowing whether a plant flowers on first or second year wood is also a major consideration.

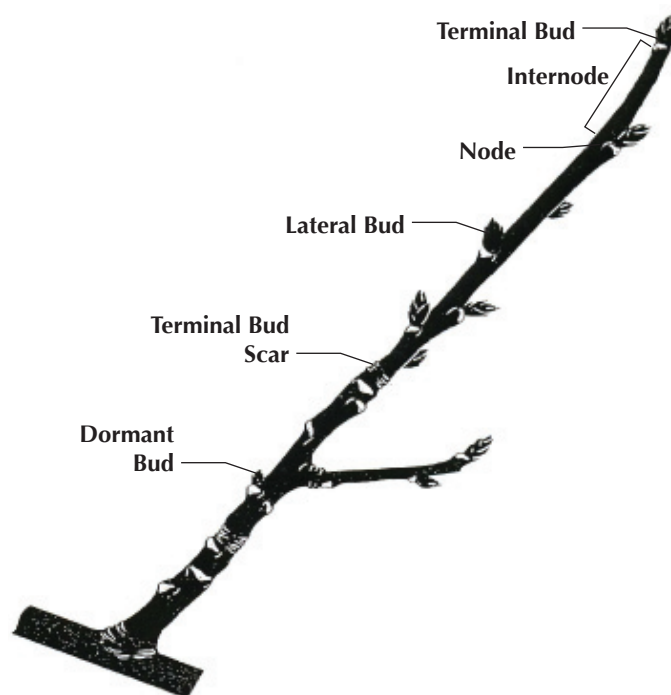


Figure 1 - Stem Terminology

Apical dominance is the physiological control that an active terminal bud has on lateral buds of the current year's growth. Auxin is synthesized in the active growing tip of shoots. Auxin concentration suppresses lateral bud development on the current season's shoots. The influence of auxin decreases in second year old wood, and normal lateral bud development usually occurs. Pruning or pinching of an active shoot tip eliminates the site of auxin synthesis and allows for lateral bud break and shoot development. Tip pruning may stimulate 2-4 buds behind the cut. Each successive shoot tip will synthesize auxin and exert its own apical control. Whereas auxin inhibits the growth of lateral buds, it stimulates root formation. Active shoot tips can be a benefit in stimulating root development in transplants or plants with root damage. Understanding the principles of plant growth and development will result in a more informed evaluation of pruning needs, an educated approach to the methods employed, and allows us to predict the plant response.

Basically all pruning styles utilize two types of cuts, heading and thinning. Heading (Fig. 2) cuts reduce the overall size of the plant. Branches or stems are cut directly above a bud without regard to location of lateral branches. Regrowth is vigorous from the buds behind the prune stub, and forms a compact head and broom-like terminals. Usually, this is undesirable since it results in stubs of varying lengths and produces a mass of vigorous growth near the cut. However, this method can be used effectively to fill voids in the canopy or for hedges and other forms requiring dense uniform shapes. Heading cuts should be made at a 45-degree angle $\frac{1}{4}$ " above the bud (Fig. 3). The slope allows the cut to dry out quickly after a rain and also facilitates wound closure. If the cut is too close to the bud, the wound will dry and damage the vascular connections to the bud, resulting in loss of the bud. Too steep of an angle will expose an excessive amount of wood, delaying wound closure and causing possible decay. An excessive stub will not receive water and carbohydrates above the bud connection, also resulting in decay. The decayed stub is unsightly, may affect future wood strength, and is an avenue for disease or insect entry. Flat-topped cuts will not dry effectively and will cause decay. If the objective is to remove dead wood, the cut should be made into live tissue to facilitate wound closure.

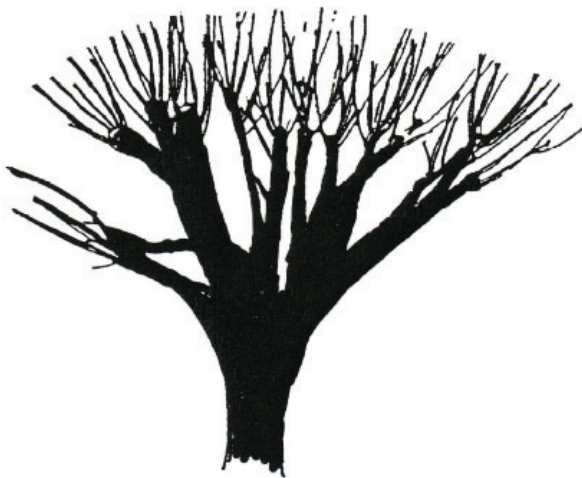


Figure 2 - Heading Cuts

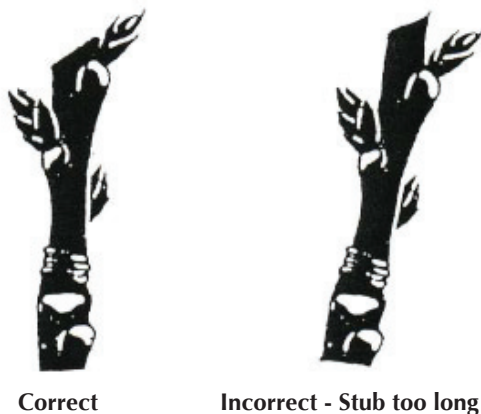


Figure 3 - Pruning Cuts



Figure 4 - Thinning Cuts

“Thinning” or “thinning out” (Fig. 4) refers to cutting a branch back to its point of origin. This is the least conspicuous type of pruning because the overall shape of the plant is not altered. New growth is uniformly distributed throughout the plant rather than in the vicinity of the cut. Drop-crotching is a form of thinning where thinning terminal branches to laterals reduces tree height. Thinning increases light penetration and air circulation. It stimulates growth and increases the depth of foliage in areas that may have been restricted because of the density of the outer crown. The location of the thinning cuts at the base of the branch is as important as heading cuts are in relation to a bud. Thinning cuts should be made in the stem collar (Fig. 5). The collar is the buttressed area at the base of the stem and has characteristic shoulder rings at the top and bottom of the branch. Cuts should be made into the center of the rings. When the collar or shoulder rings are not visible, cut on an imaginary line bisecting the upper angle of the crotch. A key point to remember is that all pruning techniques are based on heading, thinning and/or a combination of the two.

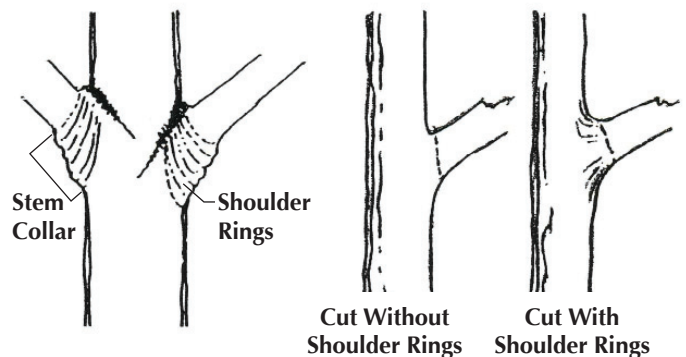


Figure 5 - Stem Collar and Shoulder Rings

Different Pruning Techniques

Shearing is the indiscriminate use of heading to develop a formal appearance. It does not identify individual buds, and is known to leave a varying degree of stubs. Regrowth is dense, and often limits the depth of foliage. Shearing is most effective when done early in the growth cycle. This will encourage new growth and mask pruning cuts and stubs.

Pinching refers to the removal of growing tips by hand at an early stage of shoot development, when they are tender and easily removed. Pinching invigorates bud break, increases shoot numbers, adds potential new flowering points, and/or removes unwanted buds or growth.

Disbudding is the removal of excess flower buds. Generally, it is performed to reduce competition within the plant and stimulates the development of larger flowers. It also can be done to eliminate overcrowding of shoots.

Basal pruning is the removal of branches at the base of the plant. Quite often this refers to trees, but shrubs may require basal pruning. Basal pruning is performed for functional reasons, such as aesthetics, ease of maintenance around the base of a plant, allowing views under a canopy or, in the case of trees, eliminating low branches in pedestrian areas.

Rejuvenation, renovation, and renewal refer to the practice of reviving and invigorating old plants (Fig. 6). Typically, this applies to but is not limited to shrubs. This technique uses a combination of heading and thinning. Plants are pruned by cutting out the oldest branches at the ground, leaving only younger stems. If younger stems are limited, the older stems can be removed over a 2-3 year period. New shoots can be headed and thinned to develop a full crown and strong branches.



Figure 6 - Deciduous Shrub Renovation

The three-cut procedure is used on larger branches to minimize bark tearing and injury to the plant (Fig. 7). This tends to be used on the removal of large branches, however, it can be used in any situation where bark tearing is a concern. The first cut is made on the underside of the branch approximately one foot from the main stem. The undercut should be made approximately $\frac{1}{3}$ - $\frac{1}{2}$ the diameter of the stem. Care must be taken not to cut to the point where the saw binds. The second cut is made on the upper side of the branch a few inches beyond the undercut. As the upper cut approaches the undercut, the branch should split cleanly between the two cuts. The third cut is made in the stem collar and removes the stub from the main branch.

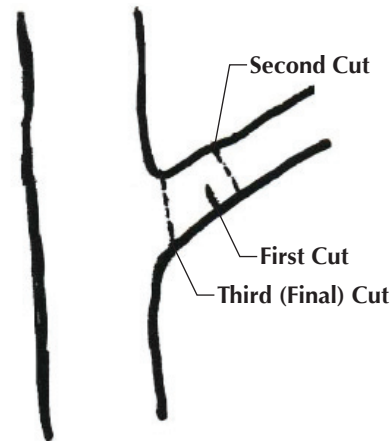


Figure 7 - Three-cut Procedure

Treatment Of Pruning Wounds

Wound dressings do little to enhance or stimulate wound closure. In many cases their use was purely cosmetic and the arborist was not finished until the client saw evidences of tree paint. Wound dressing was intended to protect the cut surface from wood decaying organisms and to reduce checking. However, moisture from rain can enter cracks in the coverings and cause conditions favorable to decay organisms between the wood and covering. There are some dressings that contain additives that prevent watersprouts and minimize the spread of known pathogenic organisms. In this case, the added benefits may justify their use.

What To Prune

Pruning should be performed with a specific purpose in mind and be somewhat consistent with the growth habit and overall form of the plant. Pruning usually begins with the problematic areas and progresses into more aesthetic considerations. It is important to assess the appearance of the plant as you prune to avoid altering its visual appeal or ability to serve its function. In some severe cases it may be necessary to

extend the pruning over a few seasons. The starting points are as follows:

- Remove all dead, diseased, insect infested and broken branches.
- Remove old stubs.
- Remove crossing, conflicting, and rubbing branches.
- Remove branches growing toward the interior of the plant.
- Remove branches that detract from the overall appearance of the plant.
- Remove suckers and waterspouts. (However, waterspouts may be trained to fill gaps in the canopy left by the loss of branches).

Once the problem areas are addressed, the next step in pruning is to perform the fine details work.

When To Prune

There are a few guidelines to follow when planning to prune. The appropriate time to prune will depend on the plant type, its condition, and the desired outcome. Light pruning can be done anytime. Unwanted growth is easily removed while it is small. Broken, dead or weak branches can be removed with little or no effect on a plant. Late winter or early spring before growth begins is probably the best time to prune the majority of woody ornamental plants. With deciduous plants, leaves are off and the framework of the plants is in better view. With some species, such as maple and birch, loss of sap or bleeding will occur from late winter through mid spring. Bleeding is not harmful to the plant; however, to some it is considered unsightly. To eliminate bleeding on these species, pruning should occur in late spring or early summer. Rapid growth response can best be achieved when pruning occurs before a period of active growth. Growth control can be achieved when pruning occurs immediately after a period of active growth. Callus formation and wound closure are hastened when the cuts are made before or during active growth. Pruning in late summer or early fall could stimulate growth and delay dormancy. This may result in a lack of cold tolerance and cause shoot tip injury later in the fall.

When pruning flowering plants it is important to consider flowering time. Spring flowering plants should be pruned soon after flowering. These plants form flower buds on previous season's wood. Any pruning after bud development in late summer will remove flower buds and potentially limit the flower display during the following spring. Summer

flowering plants flower on current season's wood, and are best pruned after flowering or until growth starts in the spring. Many fruit plants produce flower buds on short, lateral shoots referred to as spurs. Timing remains the same but pruning practice will be modified to retain the spur growth.

Timing is also a consideration with pines. Pines initiate new buds on the terminals of shoots and for the most part do not have the ability to generate lateral buds. Pines are pruned during the candle stage of growth, which occurs from bud break through the period when the needles start to unfold and the shoot hardens. A general rule is to remove up to half of the candle, and to stagger the heights of the pruned shoots.

Pruning Specific Plant Groups

Young Trees

The primary focus in pruning young trees is to establish the structural framework of the tree. The central leader is usually retained and potentially competing shoots are removed. Branches with wide angle of attachment to the trunk are selected as the scaffold branches. Scaffold branches are also selected for both their vertical and radial positions. Vertical spacing depends on the species, but generally 12-24 inches apart is preferred. Radial spacing should resemble the spokes on a wheel, filling the circular outline of the crown. Heading is used to increase shoot numbers, and thinning is used to support scaffold branches and avoid competition between individual shoots.

Mature Trees

The objectives in pruning mature trees may include crown thinning and reduction of size, correcting narrow crotches, storm proofing and storm or environmental repair. Crown thinning is performed periodically to increase light penetration and air circulation through the crown. Light penetration may also improve conditions for understory plants and turf.

Deciduous Shrubs

When approaching deciduous shrubs you need to analyze the form, age, vigor, and plant features such as stem color and texture, foliage and flowering. In most cases, shrubs are pruned to control size, maintain natural form, and promote flowering and fruiting. Thinning is a common method used on deciduous shrubs. It removes excessive branches and maintains overall form. Successive seasons of

thinning also can recycle older wood and keep plants vigorous. Old or overgrown shrubs may benefit from rejuvenation to stimulate young vigorous shoots that can be managed appropriately. Flowering time is also a major consideration in pruning shrubs.

Narrowleaf Evergreens

Narrowleaf evergreens produce terminals and laterals quite like deciduous plants (with the exception of pines), and can be pruned accordingly. Branches are headed to lateral buds or thinned to side shoots. Pruning enhances crown density, directs growth, enhances foliage development, and maintains the desired form. A common problem with many narrowleaf evergreens is interior foliage loss due to shading by a dense outer canopy. Thinning allows light to penetrate deeper into the canopy, resulting in stimulated growth and an increase depth of foliage. Reducing the height of overgrown junipers and *Taxus* can be a chore, and result in an unsightly situation. When trying to reduce the height after years of neglect, it may be necessary to extend the pruning over two seasons. Thinning will open the center, exposing unsightly cuts and stubs until new growth masks the stubs and fills in the crown.

Broadleaved Evergreens

Prune broadleaved evergreens during late spring to remove desiccated foliage and broken branches caused by winter injury and snow load. Flowering habit is important to consider when pruning rhododendrons and azaleas. Rhododendrons only produce flowers on the terminals of shoots. Azaleas form both terminal and lateral flower buds. Deadheading and pinching of faded flowers on rhododendrons will maximize shoot develop and allow flower bud development. Azaleas can be pruned similarly to other spring flowering plants.

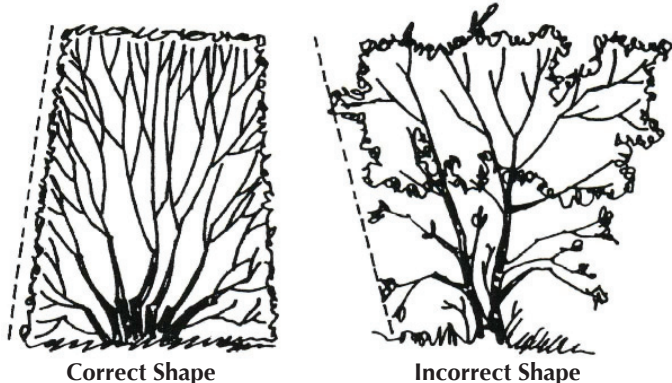


Figure 8 - Hedges

Hedges

It is important to begin shaping a hedge at an early age. Hedges require regular and often repeated

pruning in a season to control growth and maintain the desired shape. In general, hedges are pruned so that the base is wider than the top (Fig. 8). The resultant angle of exterior foliage allows better light interception. Hedges that are wider at the top eventually lose lower foliage and branches due to shading. Some hedge species can tolerate drastic renewal, while others require a systematic approach extended over several years.

Roses

With the exception of climbers, roses pruned in late winter or early spring will produce more flowers than those pruned in the fall. The most appropriate time to prune climbers is immediately after flowering to allow flower bud formation for the following year. Roses usually require a general clean up of dead, damaged, and diseased wood. Weak, spindly canes and root suckers should also be removed to reduce competition within the crown. After cleanup, hybrid teas, floribundas, and grandifloras should be cut to approximately 18-24 inches. Later in the season, roses are typically pruned above the second, 5-leaflet leaf (count from the tip down). For longer flower stems, cut to above the third or fourth 5-leaflet leaf.

Vines

Vines are usually pruned to control size and remove excessive, entangled growth. Some aggressive vines demand regular pruning, while others require little attention. Vines climb by twining around a support, clinging to a surface with root-like holdfasts, and by sending tendrils to encircle a support. Climbing methods will aid in determining pruning technique. Typically, vines are examined for dead, diseased, damaged, interfering and weak wood. Flowering time will also be a consideration. Some specific, summer flowering clematis should be pruned in early spring before new growth begins. Silverlace vines can be pruned to the ground in early spring to encourage new growth. Wisteria can be pruned in early July to control growth and increase flower development.

Ground Covers

Ground covers may require light pruning to remove straggling branches or control their spread. Ground covers in decline or deteriorating plant quality are often renovated to stimulate growth, which consists of mowing or cutting back the canopy to 5-6 inches.

Herbaceous Perennials

Deadheading, disbudding, and pinching can be used to increase plant growth and develop plant crowns.

Chemical Control Of Growth

There are two groups of growth regulating chemicals used to restrict growth, general inhibitors and subapical inhibitors. General inhibitors may either kill terminal buds or severely inhibit apical meristematic activity. Subapical inhibitors retard internode elongation without disrupting the meristematic activity. Subapical inhibitors make plants more compact and enhance flowering. Effectiveness of growth regulators is influenced by plant species, chemical formulation, timing of application, method, frequency and weather.

Speciality Pruning And Training Techniques

Many of the specialized training systems were developed in the Old World and are used in productions systems, architectural designs, and aesthetic displays. Plants take on geometric shapes, resemble animate objects, and are woven in ways contrary to natural form or growth habits. The following training systems are used to direct plant growth for specialized purposes.

Bonzai is an ancient Asian art form. Pruning is principally used as a dwarfing technique to produce miniature replicas of mature plants. Plants are developed for their individual character or combined into micro-landscapes. Frequent pruning and training are employed to manage plant growth. This pruning technique is also used on landscape specimens of many plant species to enhance their character without drastically influencing plant size.

Topiary is another pruning system having its foundations in the Old World. It is a combination of pruning and training plants into geometric shapes or animate objects. Wires or frames are often used to maintain formality or accuracy of the shapes.

Pleach means to weave or intertwine. Plants are grown in rows, headed when they reach a desired height and horizontal branches of adjacent plants are woven together. Common examples are Alleys of trees and arched walkways in European gardens.

Pollarding is a training system where one to two year old branches are pruned to their point of origin on a regular schedule. The pruning schedule depends on the desired form and the given plant characteristics. Pollarding is often used to restrict growth of large, fast growing trees as well as to develop a formal appearance. The frequency and severity of the cutting

causes a knob of callus and stubs at the end of each branch. London Plane trees in urban spaces are sometimes pollarded to maintain size.

Espalier refers to a two dimensional system trained along a vertical plane. Plants are usually trained on a wire, trellis, fence, or wall. Espalier training needs to start at a young age to stimulate lateral growth and develop the desired form. There are four basic forms used as guides to espalier: palmette, cordon, fan, and informal. Palmette supports a vertical trunk with parallel lateral branches equally distant along the trunk. Cordon is a straight trunk terminating at two lateral branches trained to a single wire. Fan training is as it implies; plants are pruned close to the ground, and multiple shoots are encouraged and subsequently supported in a fan shaped pattern. Informal tends to be abstract in form.

“Central leader”, “modified leader” and “open center” are training systems used on young fruit trees. The objective is to promote fruit production with quality, size, and quantity as the governing factors. Central leader promotes a pyramidal tree with a strong central leader and a horizontal branching scaffold. This system is not widely used because it doesn't control plant size as well as the others. Open center is primarily used for peaches, nectarines, and apricots. Scaffold branches are selected early in the life of the tree. Trees are pruned to a desired scaffold height and a number of lateral branches are trained, leaving the center of the tree open and free of branches. Modified leader is a combination of central leader and open center. The central leader is encouraged until it reaches the desired height, at which point the leader is held in check and laterals are encouraged. This system is used for semi-dwarf and dwarf fruit trees.

Pruning Tools

Choosing the right pruning tool can be as important as understanding the basic principles. It is important to select the appropriate tool for the branch or stem size. Inappropriate use of pruning tools can result in unnecessary damage to the plant and tools, along with wasted effort and frustration by the operator. Common pruning tools are hand shears, lopping shears, hedge shears, knives, saws, pole saws, and pole pruners. Pneumatic, gas operated and electric pruners come in a number of different models.

There are two basic types of hand and lopping shears, hook and blade (bypass) and anvil. The hook and blade cuts by the curved blade passing close to the

curved/hooked anvil. The anvil type cuts by the flat blade pressing against a flat anvil. The anvil type is best used with small stems and branches. Misuse of the anvil shears may cause crushing of stem tissue. Hand shears are usually recommended for use on stems up to 3/4" in diameter. Lopping shears can cut branches up to 1 1/2" in diameter. Ratchet models of both hand and lopping shears are available, making cutting easier and/or extending the range of stem diameter efficiently cut.

Hedge shears are designed to cut softer tissue and small branches usually less than 1/4" in diameter. Hedge shears perform "heading" cuts with the intent of developing a managed or formal appearance. Power equipment models contribute to ease of operation and are also available in a variety of blade lengths.

Pruning knives usually have a curved blade and cut into the shoot as the knife is pulled toward the operator. Knives are used on succulent shoots, small branches, and for smoothing edges of frayed bark.

Pruning saws are used to cut branches beyond the scope of lopping shears. Characteristics of a pruning saw include length and curve of the blade, teeth per inch, kerf, and shape of the handle. Teeth on a pruning saw are designed differently than those on a carpenter's saw. Most pruning saws are designed to cut on the pull stroke; however, bow and Swedish blade saws cut both on the push and pull strokes. Teeth per inch may range from 4 to 7, with fewer teeth resulting in a coarser cut. "Kerf" refers to the deviation of the teeth from vertical. Kerf contributes to a wider cutting surface than the top of the blade, resulting in less friction and pinching of the blade. The combination of teeth per inch and kerf contribute to the ease and efficiency of the cut. Straight blades similar to carpenter's saws are designed to cut on the push. Curved blades usually cut on the pull. Saw handles basically come in four styles: bow, D handle, pistol grip, and banana. Each is designed to contribute to the ease and efficiency of cutting. Folding saws are designed to protect the blade when not in use. Other saws should be stored in a scabbard (sheath) to protect the blade and provide safe transport. Chain saws offer versatility, especially in the diameter and speed of cuts. Proper and safe use of chain saws is always a prime concern in any operation. Pole saws/pruners are used to extend our reach. These units usually have a combination saw and pruner similar to a large pair of loppers. A rope or lever operates the pruners. Poles can be wood,

plastic, fiberglass, and aluminum in one piece or collapsible sections.

Pruning tools should be clean, in good working order, and by all means sharp. Keep tools out of the soil, remove sap or other materials from the blade, lubricate the blade and moving parts with the appropriate lubricant, and sharpen blades according to manufacturer's recommendations. When pruning plants with diseases known to spread, disinfect tools with an alcohol or bleach solution between cuts.

Pruning Safety

The following are a few safety tips when pruning:

- Always wear appropriate safety gear including gloves, eye protection, and safety shoes.
- Avoid baggy clothing.
- Keep both feet on the ground; if you must climb or use a ladder, use approved equipment, take the necessary safety precautions, and use a ground assistant.
- Work close to your body, at bent arm's length. Do not force a cut or use power equipment with your arms fully extended.
- Do not cut over your head.
- Avoid work near power lines.
- Be familiar with the safe handling, storage, and transport of all equipment.

When using electric powered equipment:

- Secure the cord away from the operation to avoid cutting it with the blades.
- Disconnect the power before cleaning and making adjustments.
- Never use during or immediately after rain.
- Follow necessary safety precautions when using gas operated equipment.
- Know your limitations. Do not over estimate your stamina.

Summary

Pruning is simply a method of modifying plant growth to enhance health, vigor and/or performance for a given purpose. Some specific reasons for pruning or managing plant growth and development include: Maintenance of plant health; Influence on plant size and vigor; Influence on Flowering and Fruiting; Develop Plant Architecture; Minimize transplant shock; Root Pruning; and Specialized training systems.

Basically all pruning styles utilize two types of cuts, heading and thinning. Heading cuts reduce the

overall size of the plant. Branches or stems are cut directly above a bud without regard to location of lateral branches. Heading cuts should be made at a 45-degree angle, 1/4" above the bud. "Thinning" or "thinning out" refers to cutting a branch back to its point of origin. This is the least conspicuous type of pruning because the overall shape of the plant is not altered. Thinning cuts should be made in the stem collar.

The appropriate time to prune will depend on the plant type, its condition, and the desired outcome. When pruning flowering plants it is important to consider flowering time. Timing is also a consideration with pines. It is important to select the appropriate tool for the branch or stem size. Inappropriate use of pruning tools can result in unnecessary damage to the plant and tools, along with wasted effort and frustration by the operator. Pruning tools should be clean, in good working order, and by all means sharp.

Be sure to always follow safe operating procedures.

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Study Questions

True/False

1. ____ Pruning is simply a method of modifying plant growth to enhance health, vigor and/or performance for a given purpose.
 2. ____ Thinning interior canopies to increase light penetration and air circulation will inhibit bud formation and decrease productivity of otherwise unproductive branches.
 3. ____ Pruning aids flowering by maintaining conditions, which promote flower bud formation such as adequate light, stimulation of new wood, and a control of vegetative growth.
 4. ____ Excessive pruning can promote flowering at the expense of vegetative growth.
 5. ____ Pruning or pinching of an active shoot tip eliminates the site of auxin synthesis and allows for lateral bud break and shoot development.
 6. ____ Basically all pruning styles utilize two types of cuts, heading and thinning.
 7. ____ Hedges are pruned so that the base is wider than the top. The resultant angle of exterior foliage allows better light interception.
 8. ____ There are two basic types of hand and lopping shears, hook and blade (bypass) and anvil.
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Multiple Choice

9. _____ is the physiological control that an active terminal bud has on lateral buds of the current year's growth.
- Apical dominance
 - Juvenility
 - Dwarfing
 - Disbudding
10. _____ is synthesized in the active growing tip of shoots and suppresses lateral bud development on the current season's shoots.
- Carbohydrate
 - Ethylene
 - Auxin
 - Palmette
11. _____ are vigorous vegetative shoots that arise from the trunk and upper portion of the plant and compete for water, nutrients, and light within the plant.
- Suckers
 - Watersprouts
 - Scaffold branches
 - Central leaders
12. _____ are vigorous vegetative shoots that grow from a root, underground stem and compete for water, nutrients, and light within the plant.
- Suckers
 - Watersprouts
 - Scaffold branches
 - Central leaders
13. _____ cuts are made directly above a bud without regard to location of lateral branches. Regrowth is vigorous from the buds behind the prune stub, and forms a compact head and broom-like terminals.
- Heading
 - Thinning
 - Disbudding
 - Pleaching
14. _____ refers to cutting a branch back to its point of origin. New growth is uniformly distributed throughout the plant rather than in the vicinity of the cut.
- Heading
 - Thinning
 - Disbudding
 - Pleaching
15. _____ is the indiscriminate use of heading to develop a formal appearance. It does not identify individual buds, and is known to leave a varying degree of stubs. Regrowth is dense, and often limits the depth of foliage.
- Pinching
 - Heading
 - Disbudding
 - Shearing
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