Pruning

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Revised for New York State
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Learning Objectives

1. Choose the proper tool for each pruning job.
2. Understand how branches and trees grow in order to know where to prune.
3. Learn the natural target pruning technique.
4. Learn pruning methods for shrubs and specialty plants, i.e. roses.
Pruning

Basics

Pruning is the removal of plant parts for the purpose of increasing the value of the remaining plant. Plants are pruned to maintain health and vigor, modify form and size, maintain an attractive plant, and modify flowering or fruiting. (Figure 1.)

![Figure 1]

Reasons for Pruning

Trees, shrubs and vines are pruned for a variety of reasons. The removal of diseased, injured, dying or head wood is crucial to the maintenance of health and vigor. Dead wood can harbor or provide an entry point for insects and disease organisms. Crossing or rubbing branches create abrasions that also provide entry points. Branches with weak crotch angles should be removed while young before splitting and irreparable damage occurs. Some shrubs are pruned to encourage new branch growth providing more brilliant hues (i.e. red twig dogwood) and others are pruned to rejuvenate old overgrown plants. Pruning to remove dead flowers and seedpods encourages plants to redirect energy to new flower production or shoot growth.

Plants are most easily maintained in their natural form. The removal of watersprouts, suckers or a branch that extends beyond the desired shape may be all that is necessary. To reduce plant size while maintaining a natural form, simply remove the longest branches. Severe pruning is usually required for plants maintained in a formal shape (see hedges). To avoid utility lines, improve visibility or clear walks, it may be necessary to change the shape...
of a tree or shrub.

Pruning of some plants such as apples is required to produce annual fruiting.

**Timing**

There is no single "best time of the year" to prune. The timing of pruning is determined by the type of plant, plant species, reason for pruning and effect desired. Dead or diseased limbs can generally be pruned at anytime. It is easiest to identify these limbs when plants are in full leaf, while the crowded branching that may exist on a deciduous tree or shrub is best thinned when it is devoid of leaves. Most trees can be pruned at anytime except when they are leafing out in the spring or when they are losing their leaves in the fall. Some trees such as maple, birch, dogwood, beech, flowering plum, willow, and flowering cherry bleed excessively when pruned in the spring. This causes no harm to the tree.

A tree has a lot of potential energy during period 5. The energy begins to deplete during period 2 as stored energy is used to expand new leaves in spring. The new leaves produce energy during period 4 (late spring through early fall) and potential energy reaches a high again during dormancy (period 5).

Rather than using a time of the year for pruning instructions, USDA Forest Researcher, Alex Shigo has graphed general yearly phenological changes of plants and determined pruning recommendations based on these periods. (Figure 2.)

![Diagram showing the energy cycle of a tree](image)

**Figure 2**

To promote growth in a new tree or shrub, prune during period 1. Never prune during period 2 when the new leaves are expanding. Shaping a plant without promoting new growth is best accomplished in period 3. Prune in period 4 to minimize sprouting and during period 5 to increase sprouting (desirable for shrubs grown for showy bark).

Rate of healing is also an important consideration. Responses to wounding--callusing on the surface compartmentalization internally, occur most rapidly just before the onset of new growth in spring or just after maximum leaf expansion in mid June.

**Pruning**
When flowering is a primary concern, flower bud formation determines the season of pruning. Flower buds of spring-flowering plants are formed during late summer or early fall of the previous year and flowering occurs on last season’s wood. These plants should be pruned after they finish flowering. Flower buds on summer or fall flowering shrubs are formed during the early part of the growing season in which they flower (on this season's wood) and should be pruned in late winter to early spring to encourage new growth and abundant flowering.

Major rejuvenative pruning, however, is a different story. If its an overgrown broad-leaved evergreen or deciduous shrub that will respond to a hard pruning, this must be done in late winter/early spring (before bloom). This allows for greatest amount of regrowth to be induced and a long growing season ahead for it to fully mature.

**Seasonal Guide**

Here is a seasonal guide to help you determine when to prune your trees and shrubs.

**Late winter into early spring:**

- remove old canes from mature shrubs
- rejuvenate overgrown broad-leaved evergreen (as well as Taxus) and deciduous shrubs
- train young trees that were planted the prior year
- prune dormant fruit trees, grape vines, blueberries and brambles
- prune inconvenient low branches and crossing branches from flowering ornamental and shade trees

**Late spring into early summer:**

- remove old non-productive canes and those growing out-of-scale
- trim evergreens with new growth
- pinch new growth on flowering shrubs, as well as pines, spruces, and firs to encourage branching and more compact growth
- remove dead flowers of azaleas and rhododendrons

**Throughout summer:**

- shear hedges
- remove lower branches from young shade trees
- thin flowering or shade trees that at other times of the year are susceptible to trunk cankers
- prune evergreen shrubs
- pinch tips to control growth
Fall into winter:

- ease off evergreen pruning or any other type of pruning that will result in large wound scars
- prune shade trees that are not prone to canker diseases

**Pruning Tools**

Pruning shears, loppers, a good saw, and a pole pruner are tools used for the correct and safe removal of branches and limbs. Use only sharp tools. When pruning diseased wood, disinfect tools in between each cut with denatured alcohol or bleach. (Figure 3.)

Limbs not much thicker than a pencil can be pruned easily with a pair of hand shears. There are two basic types of hand pruners. Scissor action pruners have one sharpened, beveled blade that cuts by gliding against a thicker, sharp blade. Anvil-action pruners have a sharp blade that cuts against a broad, flattened, grooved blade. Better cuts can be made with scissor-action pruners. It is possible to purchase left-or right-handed pruners. Anvil-action pruners do not make close cuts and some crushing of the stem will occur against the flattened blade.

Limbs up to 3/4 inch thick can be cut with a pair of lopping shears, sometimes called loppers. Loppers are like scissor-action hand pruners except they have larger blades and long handles to increase leverage.

Branches thicker than 3/4 inch should be cut with a pruning saw. A pruning saw has a narrower blade (for easier maneuvering) and coarser teeth than a common carpentry saw. Most pruning saws also have curved blades that cut on the draw stroke (pulling the blade toward you). A bow saw, makes large rough cuts but may be awkward to maneuver in tight areas.

For out-of-reach limbs, pole pruners may be necessary. Most pole pruners have both a cutting blade and a saw. However, one can often get in the way of each other. The cutting blade is operated from the ground by a long rope or lanyard that is pulled downward. Care must be exercised when using pole pruners especially around overhead utility wires. Pole pruners will conduct electricity if they come in contact with energized wires.

Hedge shears (manual, gasoline-powered, or electric) are used to shear or clip hedges or other plants into a uniform or formal shape.

Power tools including chain saws, hydraulic pruners and cherry pickers require special training for use and should never go up in a tree.
Trees

In the past 10 years, USDA forest researcher, Alex Shigo, has discovered much about how branches on trees develop and grow. Most importantly, branch tissue is distinct from trunk tissue and develops in layers in provide strength. (Figure 4.)

Shigo also discovered that trees have the ability to seal or compartmentalize wounds rather than "heal" damaged tissue. When a tree is pruned, a wound is created and some decay will occur. But if the cut is made through only branch tissue (outside of the branch bark ridge), the decay will be confined to that tissue. If the cut is made into trunk tissue, the entire trunk is open to decay and it is much more difficult for the tree to compartmentalize the wound.
Natural Target Pruning

Natural target pruning is a pruning procedure developed by Shigo based on our new knowledge of tree and branch growth. The branch collar or swelling at the base of the branch is identified and a pruning cut is made outside that collar. If the collar is hard to find, the branch bark ridge (BBR) can be used to determine the proper position for the pruning cut. The cut is made at an angle equal to the angle between the BBR and a plumb line dropped straight from the top of the BBR. The pruning cut should begin outside the BBR. (Figure 5.)

Most limbs should be pruned using three cuts. The first cut is a small undercut to prevent the tree bark from stripping down the trunk. The next cut is made beyond the first cut to remove most of the weight of the limb. The third cut is made just outside the branch collar. There is no need to apply wound dressing or tree paint to the cut surface. However, make sure no ragged edges or twigs remain attached to the tree. When trees are pruned using the natural target pruning method, cuts are not flush against the trunk.

Pruning Sequence

Tree pruning should be approached systematically. First, remove diseased and dead wood. Next remove interfering branches that rub together. Remove branches that grow back into the center of the tree. Some trees are prone to narrow-angled or v-shaped branch junctions. These branches should be pruned before they become heavy enough to split the trunk below the crotch. Next remove suckers, water sprouts and any branches that disrupt the natural shape of the tree. Some trees may be pruned for a specific purpose such as use as a street tree. In the case, lower limbs should be removed gradually until the tree is pruned up to 8'.

A common misconception is that trees should be pruned at planting to compensate for root loss. In fact, new roots are generated with food manufactured by leaves through photosynthesis. The most leaves, the greater the ability to photosynthesize and ultimately grow new roots. It is, however, important to prune a young tree to enhance it's natural growth habit, remove narrow branch crotches, co-dominant terminal leaders, etc., but this should always wait one or two years following planting.

Pruning
Over the course of a tree’s life, there will be a need (benefit) to having it periodically (every 10-20 years) crown thinned by a professional arborist. This opens up the tree to greater light penetration and air circulation.

**Shrubs**

To understand where to make pruning cuts, it helps to learn how the plant growth regulator, auxin, impacts plant growth. The terminal bud produces auxin that directs the growth of lateral buds. As long as the terminal bud is intact, auxin suppresses the growth of lateral buds and shoots behind the terminal. However, when you prune out the terminal bud, lateral buds and shoots below the pruning cut grow vigorously. The most vigorous new growth occurs within six or eight inches of the pruning cut. (Figure 6.)

![Diagram of shrub pruning](image)

Pruning stimulates lateral shoot growth close to the cut.

**Figure 6**

When shrubs are sheared routinely, all the terminal buds are removed and a lot of dense, thick new growth is produced near the upper portions of the canopy. As a result, less light reaches the interior of the plant, foliage within the canopy becomes sparse, the basal portion has little leaf and flower production, and the plant appears stemmy or hollow. Cutting selected branches back to a lateral branch, a lateral bud, the main trunk, or the crown at base, is called thinning and preferable to shearing. Thinning encourages new growth within the interior portions of a shrub, reduces size, and provides a fuller, more natural-looking plant. (Figures 7-8.)
Heading: Indiscriminate shearing or cutting back of terminals results in thick dense growth in the upper, outer canopy.

Figure 7
Thinning: Complete removal of branches back to a lateral or the main trunk or to the ground.

Figure 8
Proper pruning angle: A - is cut correctly.
B - is too slanting. C - is too far from
the bud. D - is too close to the bud.

Figure 9

When pruning twigs and small branches, always cut back to a vigorous bud or intersecting
branch. When cutting back to a bud, choose a bud that is pointing in the direction you wish
the new growth to take. Be sure not to leave a stub over the bud or cut too close to the bud.
(Figure 9.)

Flowering Deciduous Shrubs

All deciduous flowering shrubs benefit from occasional thinning to keep it in scale with its
surroundings and productive. Frequency depends upon the plant i.e. forsythia require
selective maintenance pruning yearly, most spiraeas every 2 - 3 years, viburnums even less
frequently. Maintenance pruning is the removal of a few of the oldest, innermost crossing,
and or out-of-scale branches above a lateral or at ground level. If begun when a shrub is
young, maintenance pruning, may be all that is needed. To rejuvenate an old overgrown
shrub, however, one must remove major portions or all of the shrub at or slightly above
ground level before new growth starts in spring. Since this type of pruning is excessive,
good follow-up care such as fertilization, watering and pest control (when necessary) and
mulching are essential. Some shrubs, such as red twig dogwoods grown for their twigs, can
be pruned to the ground and allowed to regrow on the regular basis.

As discussed earlier, the timing of flowering shrub pruning is dependent upon flower
initiation.

1. Examples of shrubs that bloom on last season’s growth:

   Cercis chinensis  Chinese redbud
   Chaenomeles japonica  Japanese quince
   Chaenomeles virginicus  Fringe tree
   Deutzia spp.  Spring flowering deutzias
Exochorda racemosa
Forsythia spp.
Kerria japonica
Lonicera spp.
Magnolia stellata
Philadelphus spp.
Pieris spp.
Rhododendron spp.
Rosa spp.
Spiraea spp.
Syringa spp.
Tamarix parviflora
Viburnum spp.
Weigela florida

2. Examples of shrubs that bloom on current season’s growth - prune in late winter to early spring:

Abelia x grandiflora
Buddleia davidii
Callicarpa japonica
Caryopteris x clandonensis
Clethra alnifolia
Hibiscus syriacus
Hydrangea arborescens
Hydrangea paniculata
Hypericum spp.
Lagerstroemia indica
Rosa spp.
Spiraea bumalda
Spiraea japonica
Symphoricarpos spp.
Vitex agnus-castus

Glossy abelia
Butterfly bush
Japanese beauty bush
Bluebeard
Summersweet
Shrub althea
Hills of Snow hydrangea
Peegee hydrangea
St. Johnswort
Crape myrtle
Bush rose
Anthony Waterer spirea
Mikado spirea
Coralberry and Snowberry
Chaste tree

**Evergreens**

Broad-leaf evergreens require little pruning except removal of wayward branches, and these can be pruned nearly any time. In general, narrow-leaved evergreens, except Taxus (Yew), do not respond well to severe pruning because the old wood loses its ability to resprout. When an evergreen outgrows its location or develops an unsightly form due to shearing or lack of maintenance, it is best to remove the shrub. Large, but healthy broad-leaf evergreens, however, will generally respond to heavy rejuvenative pruning. Rhododendron, pieris, holly, boxwood, etc., when cut back into leafless wood in late winter/early spring, will induce new growth. Similar procedures and requirements should be followed, as described under "flowering deciduous shrubs". Sometimes a large evergreen shrub can be rescued by removing the lower branches and creating a tree form.
Needle evergreens are often maintained as hedges by shearing (see hedges). To maintain the natural shape of a needle evergreen but keep its size in control, prune newly emerging shoots back to a lateral branch or candles back one-third before the needles expand. Pruning a needled evergreen into leafless wood is not recommended, as new growth will not fill in.

**Hedges**

Hedges consist of plants set in a row that merge into a solid linear mass. They serve as screens, fences, walls and edging. For most uses, hedges should be dense, so pruning must be done properly from an early age. Head back newly planted hedge plants to within 12 inches of ground level and prune new shoot tips during the growing season to encourage branching.

Hedges can be maintained in an informal or formal style. Informal hedges are better for low-maintenance landscaping. Informally-pruned hedges assume a natural growth habit. Prune only as needed to remove dead or diseased wood, to thin branches or to tip prune selected branches where dense, compact growth is needed. Formally-pruned hedges require frequent shearing, sometimes two to three times during the growing season. The base of any hedge should always be wider than the top. This allows light to reach the lower portion of the canopy so the hedge remains dense all the way to the ground. (Figures 10-11.)
Pruning hedges

A
Year 1

B
Year 2

C
Year 3

Figure 10

Hedge pruning

Correct

Gets sun, rain

Incorrect

Weak growth

Figure 11
Specialty Pruning

Roses

The basic technique for rose pruning as with other plants is to cut 1/4 inch above the nearest outward-facing bud with the cut at a 45-degree angle (the higher point above the bud).

Floribundas are usually not pruned as severely as hybrid teas. Even so, be sure to remove any dead, broken, damaged, or blotched branches back to where the pitch, or center of the cane, is white and healthy looking. Next, remove weak, spindly canes, canes growing toward the center of the bush, the weaker of two canes that crisscross, canes that grow out, then up, and suckers. Finally, trim all remaining canes back to one-half their former height.

To prune hybrid tea and grandiflora roses, follow the same principles as described for floribundas, including: (1) high pruning for more flowers earlier or low pruning for stockier fuller plants with fewer but bigger flowers later; (2) pruning to remove weak and crisscrossing canes; (3) removing growth an inch below a canker; (4) removal of damaged, dead or broken canes back to healthy growth; and (5) removing sucker growth as close as possible to the main root.

Espalier

An espalier is a plant that has been forced to grow in one plane. Fruit trees are sometimes espaliered as novelties. Ornamentals are grown as espaliers in courtyard gardens where space is limited or if a dramatic effect is desired. Special knowledge is necessary to maintain espaliers. Before installing, be sure to consider this fact.

Choose plants with forms appropriate for the espalier shape desired and start with young supple plants. Plants must be trained gradually by tying branches to stiff wires and benching the branches periodically. Branches are tied to a wire frame, wooden lattice or hook attached to the wall. Tie branches loosely and check regularly to prevent girdling as branches expand. Be sure to space branches far enough apart to maintain the integrity of the design.
Review Questions:

1. When should you prune trees to promote new growth? To reduce suckering?
2. What tool should be used for a 3/4" thick limb?
3. What is thinning?
4. Describe natural target pruning?
5. Why are large limbs undercut first?
6. Should trees be pruned at planting to compensate for root loss?
7. How should you prune a pine tree?
8. Should formal hedges be wider at the base or the top?
9. What is disbudding?
10. When should you prune forsythia?
## Related Resources

### Pruning

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These titles are also usually available through your local Cooperative Extension association office.
Cornell Website information on **Pruning**

All Cornell website information on gardening is accessible through the Cornell Gardening Resources Website [www.gardening.cornell.edu](http://www.gardening.cornell.edu)

The following are specific sections of the Cornell Gardening Resources Website as of Dec.15, 2004. New web pages are added regularly. Please check [www.gardening.cornell.edu](http://www.gardening.cornell.edu) periodically for updates and new information.


[http://www.hort.cornell.edu/department/facilities/orchards/pruning.html](http://www.hort.cornell.edu/department/facilities/orchards/pruning.html)

**Cornell Visual Presentation Resources in Pruning**

Master Gardeners may borrow resources from the Department of Horticulture’s Home Grounds and Community Horticulture Resource Library in Ithaca, NY. MG’s should discuss it with their county MG Coordinator and reserve a resource through that staff person. Resources in this library are slides, powerpoint CD-ROM’s and videos. They are generally used by Master Gardeners to make presentations to community groups as part of the county CCE’s educational mission. The number preceding each resource is its library code number in Ithaca.

- **Pruning**
  - 97. *Pruning & Training Grapevines* Slide Set (74 slides & script) D. Himlerick

- **V-3. Pruning Your Own Shrubs and Small Trees** Video, (51 min.) Ag. Communications Center, University of Idaho

- **V-11. Elements of Landscape Pruning; an Employee-training Video** (30 min., script) Dr. Alex Shigo, U.S. Forest Service
  - Trees & Shrubs

- **105. Suggested Practices for Planting and Maintaining Trees and Shrubs** Slide Set (13 slides & IB#24) A.S. Lieberman & R. Weir III, Cornell & CCE/Nassau Co