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Pruning, the removal of live and dead side branches from standing trees, can be either natural or artificial.

Natural pruning occurs on all trees. As the diameter of the bottom stem and height of the tree increases, low branches are shaded and, eventually, die. In some species, dead branches may fall quickly. In other species, they may persist for many years. Then the result is a "loose knot," live wood growing around dead wood, which you only find in low quality lumber and veneer. You can regulate the rate of natural pruning by controlling stand density. The denser the stand, the more rapidly low limbs die.

Artificial pruning assures the earliest production of quality wood material. By artificially pruning, you can speed production of knot-free wood products and eliminate the uncertainty and delay of natural pruning. But artificial pruning costs money. To get the greatest return for your investment, consult your local forester about how and when to prune.

#### SPECIES TO PRUNE

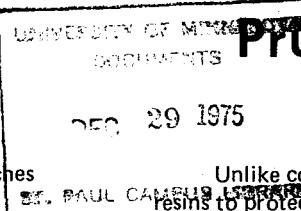
Conifers. In Minnesota, only red (Norway) and white pine are pruned to produce quality logs, poles, and piling. All other conifers are cut for pulp or chip wood markets or are unsuited economically or physiologically for pruning. These other conifers include jack and Scotch pine, balsam fir, tamarack, eastern red and northern white cedar, and all spruces.

The quality problem is most evident in plantations where quality is determined mainly by stem diameter and size and number of knots. Dead branches usually persist for many years on red and white pine. Without pruning, few trees in plantations are marketable for valuable logs, poles, and piling.

To improve quality in pine plantations rapidly, both thin and prune. With hand pruning methods, you can earn an 8 percent compound interest rate on your pruning investment over a 60-year growing period. With power equipment, greater returns may be possible. Pruning conifers also may reduce risk of fire and retard insect and disease infestations.

Hardwoods. Pruning hardwood stands is an involved problem because they usually contain several species of varying ages. Also, since some species have characteristics that suit them for high value products, they are worth more than other species. Individual species differ in growth characteristics and responses to cultural practices. In general, black walnut, sugar maple, elm, and yellow birch respond well to pruning and are valuable for veneer and lumber.

Some species of trees do not respond well to pruning. For example, the oaks produce epicormic sprouts around the wound. Instead of one branch, many are formed.



## Pruning Forest Trees

Unlike conifers, hardwood trees do not produce sealing resins to protect wounded areas. Therefore, some species are susceptible to rapid invasion by wood-rotting fungi through the pruning wound. Before pruning in your hardwood stands, obtain the advice of your local forester.

#### WHEN TO PRUNE

Prune all species in winter, preferably after the first few days of freezing temperatures in fall and until the first noticeable bud swelling in spring. Summer pruning invites disease and insect infestations. Other advantages of winter pruning in comparison to summer pruning are:

- \* Winter is a less busy period for the woodland owner.
- \* Branches break off cleaner with less risk of tearing bark.
- \* Leaves are down, allowing better vision.
- \* There are no insects or excessive heat.

#### HOW MANY TREES TO PRUNE

Except in special cases, prune only trees left for final harvest. Because of the variety and complexity of Minnesota's hardwood stands, no specific number for pruning can be recommended. Select hardwoods on the basis of species, form, and vigor.

An acre of red or white pine can support only a limited number of mature quality trees. So prune no more than 100-150 trees per acre. Select well distributed trees with good form, vigorous growth, and freedom from obvious defects. In stands that are very dense or subject to high fire risk, or where markets exist for evergreen boughs, more pruning (or pruning all trees to a height of 6 feet) may be justified. This increased pruning facilitates further cultural work and reduces fire hazard.

#### WHAT HEIGHT TO PRUNE

In pine or hardwood stands, prune trees first when they are 20-25 feet tall or 3-5 inches in diameter at breast height. Prune no more than the lower one-third of the total tree height, or to a height of no more than 8 feet. As the tree grows, increase pruning height to 12 feet and then to a one-log length of 17 feet. Pruning above this height is not practical.

This tree-step method is usually economical. If you delay until trees are 40-50 feet tall and then make one pruning, knotty cores in branches are undesirably large.

Remember that pruning injures the tree and generally causes a 1-3 year "shock" period with reduction in diameter growth. For this reason, and because it is not economically feasible, annual pruning is not recommended.

## METHODS AND EQUIPMENT IN PRUNING

A sharp pruning saw is the best tool for removing both dead and live branches (figure 1). Prune limbs flush with the trunk without damaging bark adjacent to the branch collar. If the branch is large or has extensive foliage, cut it about a foot from the trunk to reduce weight. First make an undercut on the underside of the limb to prevent the bark from tearing as the limb breaks and falls (see figure 2). Then cut the remaining stub flush with the tree trunk. It is impractical to treat exposed pruning wounds.

Most satisfactory saw models have the following specifications: single edge, pull stroke, 5-7 point regular teeth, and slightly curved 17-gage blade. For pruning below 7 feet, blade length is not important. For pruning above 7 feet, and when using the saw on a pole, the blade should not exceed 16 inches in length. When pruning from 8 to 12 feet, use an 8-foot pole; from 13 to 17 feet, a 12-foot pole.

Pruning above 7 feet is difficult. Pruning from a ladder is slow, cumbersome, and risky. Use the ladder method only for pruning scattered, high quality trees in mixed hardwood stands. But don't use this method for pruning pine stands; the pole saw is by far the best tool. Always take care to avoid sawdust falling in your eyes. Wear goggles and a hard hat.

The pole-type powersaw, a recent innovation, does a rapid job but increases the possibility of trunk damage. This machine should be handled only by experienced operators.

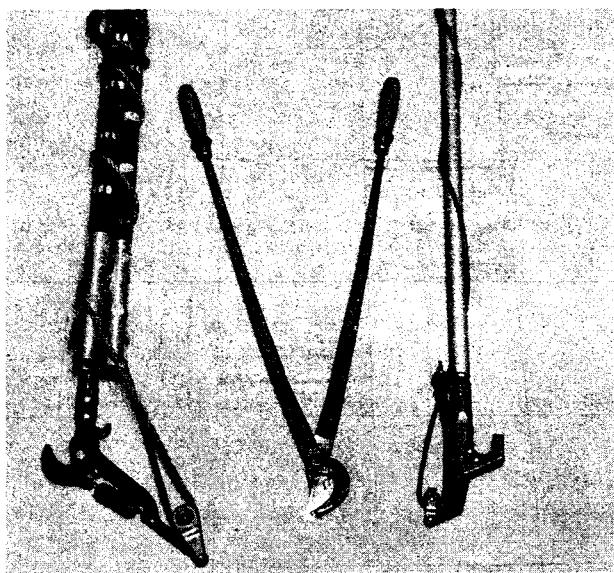


Figure 1. Recommended Styles of Pruning Shears

You can use pruning shears; the most satisfactory type is the Porter Pointcut. But don't cut the limb flush with the trunk. Pruning shears are heavy and inefficient for heights above 8 feet. However, shears work faster on limbs under 1 inch in diameter and do not gum up as does the saw. Axes and clubs are not recommended because of the possibility of trunk damage or injury to the operator.

To speed up healing of pruning scars, thin the stand to optimum spacing for rapid diameter growth. This practice also accelerates the rate at which valuable knot-free wood is laid down on pruned trunks.

Investment in pruning is too high to be regained without maintaining fast diameter growth on pruned trees by thinning out low quality trees. Keep cost-accounting figures on pruning. Also investigate current Agricultural Stabilization and Conservation Programs for cost-sharing payments. Finally, contact your local forester for advice on forest-management practices and programs to assist you in realizing the full potential of your forest.

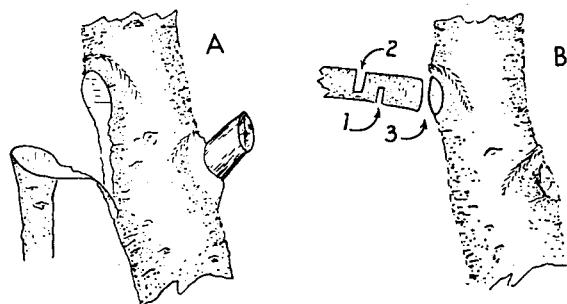


Figure 2. (A) Wrong way to remove limb (note bark tearing). (B) Right way. Cut number 1: the undercut. Cut number 2 severs main part of the branch. Cut number 3 removes the stub flush with trunk.

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