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The Wisconsin Christmas tree industry has come a long way from the days of wild balsam fir and spruce cut by rural landowners and farmers to be delivered unlabeled to city customers. Today, this sophisticated forestry business requires considerable knowledge in areas such as finances, land management, soils, seed sources, pest management, cultural practices and marketing. Most trees marketed come from established plantations producing quality trees in 6 to 15 years, depending on species. Pines, for example, grow to salable form twice as fast as do short-needled balsam and spruce.

Wisconsin has an estimated 38,000 acres of Christmas tree plantations, most located in the central counties. Christmas tree growers currently harvest about 3.5 million trees of all species in Wisconsin each year. The national harvest in 1982 was more than 28 million.

This fact sheet is prepared to assist growers in mastering the art of shearing to produce quality salable trees. Shearing increases the number of buds and therefore the future density and shapeliness of trees. Depending on location, most Wisconsin growers shear between June 15 and July 15. This is when new shoots complete growth and new buds begin to form. When sheared, pines will set a cluster of adventitious buds (see list of terms on p. 4) near the angle cut and the tree will produce more branches the next year. Spruce and fir do not set new buds. (see p. 2).

## **Shearing Tools**

### Hand Shears and Clippers

You need to use different tools to trim and shape trees of different sizes. Small hand clippers work well to cut out a double stem, dead branch, or extra long leader. However, when you shape trees, usually for the first time when they're knee-high or taller, use a hedge clipper operated with both hands. In the long run, it pays to buy quality tools that you can easily sharpen and clean of dirt and debris.

#### Knives

Hedge clippers work well for shaping first and secondyear trees. For later shearing, many growers prefer to use knives. Knives can shape trees nicely when workers know how to use them properly and use good equipment, wear protective gear, and are carefully supervised.

You can buy knives in all sizes, but most operators prefer an 18 to 24-inch wooden-handled knife with an 18-inch blade. When using this shaping tool, wear leg guards. Some growers also require workers to wear a chain mail glove on the hand not holding the knife. Knives need periodically to be sharpened and cleaned of accumulating pitch.

#### **Mechanical Trimmers**

Larger operations usually need mechanized trimming. Growers now use several types of mechanical devices to shear trees.

Gas-Powered Trimmers. The first gas-powered trimmer for tree shearing was created by Howard Beneke, Sylvan Beach, NY. Beneke designed a long tubular "wand" which encloses a flexible shaft connected to a commercial mini-gas engine. The shaft turns a 10-inch circular saw with four teeth. The extended saw is balanced with an elastic cord and can cut on the up and down stroke when swung. Aluminum finger guards prevent the saw from gouging the soil.

Many older tree growers find the 10-pound unit easier to handle than swinging a knife or using hedge clippers all day. The long tubular arm lets growers easily shear 8 to 10-foot trees. Mini-engines, however, require constant care to maintain high production rates.

Battery-Powered Trimmers. The power trimmer Beneke developed has recently been modified to use a wet-cell, battery-powered motor. This trimmer operates quietly. You can run a fully-charged, motorcycle-type battery two to three hours before recharging it.

Other battery-powered units on the market are powered with nickle-cadmium batteries. The length of operation depends on battery charge and durability.

**Electric-Powered Trimmers.** Many growers have tried to bring a portable generator into the field. They have plugged clippers into long flexible outlet poles attached to the generator. Then the operators have moved down the rows parallel to the direction of the mounted generator.

Few large-scale producers favor using these trimmers because of high initial investment and because they can't be used on all terrain. **Automated Shearing Machines.** A new development is a tractor-mounted shearing unit that uses a series of whirling knives to shear after the operator selects the tree's angle of taper. It was designed for the Deep South where growers must shear twice a year and avoid snakes and alligators which endanger shearing crews.

It's not known whether any Wisconsin growers use this trimmer, but demonstrations using it on Scotch Pine have been successful. The trimmer's initial cost and maintenance is high.

Each tree grower must decide how many and what kind of shearing tools to use. A small tree plantation run by one or two people can use hand clippers, hedge shears and perhaps a power trimmer to shape taller, bushier trees. Operations run by five to 10 people can use hedge clippers on 3 to 5-foot trees and then switch to knives for trees over 5 feet tall. Some of the largest tree operators in Wisconsin use a combination of clippers for smaller trees and knives for the rest.

You can get advice on production of Christmas trees from the Wisconsin Christmas Tree Producers Association, Extension foresters or professional foresters.



Nicely shaped white spruce ready for tagging and marketing.

# How to Shear the Short-Needled Species

Short-needled trees typically include white spruce, Black Hill spruce, Norway spruce, Colorado blue spruce, balsam fir, Fraser fir, and Douglas fir. Unlike pines, which must be sheared when new growth is succulent, you can shear short-needled trees any time of the year. These trees normally have buds all along the stem and don't produce extra buds at the point they are sheared.

The main objective in shearing short-needled trees is to develop a full, symmetrically shaped tree with a 40 to 70 percent taper.

#### **Native Species**

Trees native to Wisconsin or closely related trees include white spruce, Black Hill spruce, Norway spruce, and balsam fir. Here is a suggested shearing schedule:

**Pre-shearing.** Remove double leaders and correct deformities. Prune the base for the handle.

First Shearing. Trees should be 3 to 4 feet high.

- 1. Cut back terminals to 8 to 10 inches in length; cut slightly longer after the first frost.
- 2. Cut top laterals 4 to 5 inches shorter than leader.
- 3. Shape sides to a 40 to 70 percent taper Try to shear new growth only.

#### Subsequent Annual Shearings.

- Cut back leaders to 8 to 10 inches, depending on individual tree. Do not let leaders get too tall because spruce and fir will need more time than pines to develop lateral fullness.
- 2. Proportion laterals to desired taper.
- 3. Shear to maintain full symmetry.

#### Marketing Shearing.

- 1. Generally, shear balsam fir trees lightly but shear spruce fairly tightly.
- 2. Terminals can be 10 to 12 inches long.

#### **Exotic Species**

Use the same shearing guidelines for exotic species as for native species, but also consider these points:

**Colorado blue spruce** is especially slow growing, so take great care not to over-shear the laterals. Try to maintain 8 to 10-inch leaders, but shear laterals lightly to maintain desired taper.

**Fraser fir** lateral branches must be sheared lightly. Keep lateral shearing to a minimum until trees are 4 to 5 feet tall. Maintain terminals at 8 to 10-inch lengths.

**Douglas fir** is very susceptible to frost, in low-lying or frost-pocket areas. Terminals close to the ground may be left slightly longer to bring lower branches above frost danger.

For most growers, the short-needled trees can provide great flexibility in shearing schedules. Growers with both pine and combinations of spruce and balsam fir can shear pine first during the growing season and short-needled trees later. Although short-needled trees can be sheared any season, growth doesn't seem to be as vigorous after shearing in the dormant season or early spring.

Remember that spruce and balsam fir typically grow slower than pine, so keep the terminals within the 8 to 10-inch guideline to give laterals ample time to develop a dense foliage by mature Christmas tree height.



Two shearing tools: hand shears (large clippers) and a battery-powered trimmer.

# Shearing the Long-Needled Species

The objective of shearing or shaping long-needled trees, such as Scotch pine, white pine and red pine, is to produce:

- · One main stem or trunk and a single leader
- · A symmetrical, well-balanced form
- · Compact growth or full tree
- · A handle, by pruning the base

**Pre-shearing.** Correct multiple tops and deformities. Leave only one leader.

**First Shearing.** In the third or fourth year after planting when trees are 3 to 4 feet high or when terminal leaders grow more than 10 inches:

- 1. Cut back central leaders to 10 inches at 45° angle.
- 2. Cut top laterals 4 inches shorter than leader or in proportion.
- 3. Cut side terminals to desired shape or taper. Cut only in new growth.

#### Subsequent Annual Shearings.

- 1. Cut back central leader to about 8 to 10 inches, depending on individual tree.
- Cut top laterals in proportion to central leader preferably 4 inches shorter than leader.
- 3. Cut side terminals and other branches as needed to get proper taper.

Marketing Shearing. Same as previous shearings, except leave terminals longer (about 12 to 14 inches), and cut side branches lightly to allow less vigorous laterals to fill in during the final growing season.

In general, cut the top leader at a 45° angle, and 10 inches long. Do not shear too close on young trees, because they should be allowed to grow. Remember, 3 years of live needles is all that can be expected at harvest with normal tree growth.

Slant the shears or knive angle to establish the proper taper. Remember to cut out double leaders, especially on Scotch pine. You don't need to shear branches growing toward the center of a tree. Red and Scotch pine can be sheared more tightly than other pines to establish proper form.

### Terms

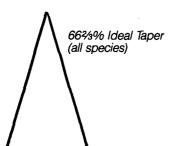
**Adventitious Bud.** A bud which develops at the base of a needle cluster, or on woody tissue on a branch or leader, when the end of the branch or leader is injured or cut off.

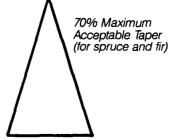
**Axil.** The point on a branch where two or more smaller branches form a fork.

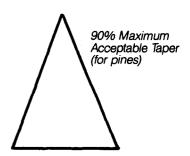
**Candle.** The new bright green and tender growth all conifers grow in the spring.

**Dominant.** The tallest, fastest growing trees in a plantation or natural stand.









**Handle.** The base of the stem below the bottom whorl, cleared of branches for placement in tree stand. Internodal. The stem between annual whorls of branches.

Internodal Buds. Single buds occuring irregularly on spruces and firs between annual whorls of branches. internodal branches develop from these buds.

Laterals (Lateral Branches). All side branches of a tree growing from the stem.

Lateral Leaders. The terminals of a coniferous tree's side branches.

Leader Holder. A tool, usually made from a slick with a wire hook, that growers use to hold back the terminal leader when shearing laterals.

**Node.** The point where a terminal bud and some whorl buds form when new growth stops. You can figure an unsheared coniferous tree's age by counting the nodes on the main stem. (The number of whorls is commonly counted to determine age).

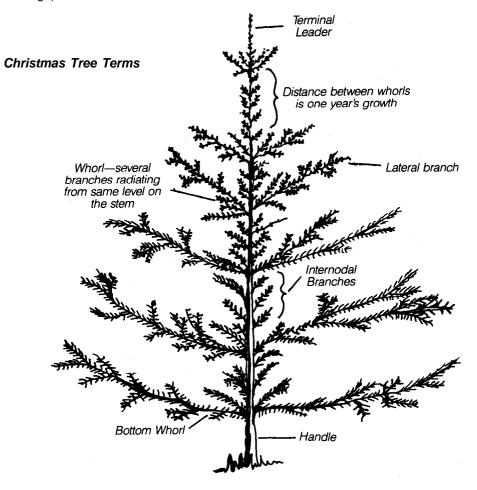
Succulent (also Succulence). The condition of new growth (candle) characterized in spring by high moisture content, light green color, and relative brit-

Symmetry. Shape or balance; how uniform the entire tree is.

**Taper.** How width is related to height. For grading, pines must have 40 to 90 percent taper; spruce and fir need 40 to 70 percent taper.

**Terminal Bud.** The bud which grows into an extension of the main stem of the tree or main stem of a branch. Terminals (Terminal Leaders). The new growth produced by the terminal bud.

Whorl. Two to 10 or more branches growing in a ring at a node, surrounding the central leader or stem. Whorl Buds. The rosette of buds forming a ring around the terminal bud at a node. (The lateral whorl branches form from these buds).



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**SHEARING** 

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