

Shearing Christmas Trees

Introduction and General Principles

The process of shaping and trimming Christmas trees is known in the industry as shearing. Almost all Christmas trees presently are sheared; very few trees are grown naturally without some degree of trimming. Shearing increases tree density and creates a uniform conical shape that improves the overall appearance of the trees increasing customer satisfaction and allowing growers to receive a higher price for their Christmas trees. Shearing, in addition to increasing density, is also used to remove defects which may occur because of injury or pest damage. Shearing is the most important process that affects the quality and value of Christmas trees.

Wholesale producers in the industry apply a grading system, using shape, height, and density as determining factors in setting their prices. High quality trees have no more than 20% of the main stem visible with no major defects. Choose-and-cut growers have more informal standards based on customer response that usually relates to size, shape, fullness, and taper.

Different species require different shearing techniques and timing which is based on tree age and when the needles mature for the year.

For the safety and comfort of workers, the ground cover or weedy growth in the plantation should be minimized. Rocks and uneven ground make it more difficult to work and can create safety issues.

This manual will only discuss varieties grown on the Canadian prairies. Numerous articles on shearing other varieties of trees can be found on the internet or in other growing manuals.

Shearing Guidelines

In addition to directions below, see the species-specific sections that follow for the unique processes for each type of tree.

Step 1 – Assessing the tree

Step back and look at the tree from a couple of directions. Get a general impression of the unshorn tree and decide a strategy for shaping it. Check the butt to be sure it is straight and in line with the leader. It is more effective to assess a tree by looking through it towards the sunlight; it backlights the tree providing a better internal view.

Step 2 – Topping the tree

Topping involves shaping the leader and laterals of the top whorl. Leaders are the uppermost central stems, and laterals are the side branches. A natural budset consists of one central bud surrounded by a ring of buds. The central bud becomes next year's leader unless damaged or removed in the shearing process.

Christmas Tree Terminology



Balsam fir terminal bud.
Photo courtesy Bob Mason

Shearing changes the normal growth of trees by removing the dominant buds and consequently the following years' growth can result in numerous leaders as bud growth competes for dominance. Select the most central viable leader. With a good quality hand pruners, cut the leader about 25 - 30 cm (10 - 12 in) long. Cut the top whorl of laterals to 1/2 to 2/3 the length of the leader, depending on their angle to the main stem. This is about 22° from vertical.

Pruners (secateurs) for Christmas trees should be sharp and of high quality because they are used a lot. Among others, the standard is Felco brand, with several variations and sizes. By far the most common are Felco #2s. Others can be swivel handled for wrist ease, and smaller size for smaller hands. Pruners should be carried in the non-shearing hand to prevent the shearer from the temptation to pull branches with that hand. At the start of each season, pruners should be taken apart, cleaned, repaired and oiled.

Clean pruners daily (or more often if they gum up from tree sap) and lubricate frequently. They will not cut needles well unless kept sharp.



*Sheared pine missed for 2 years.
Photo courtesy Bob Mason*

Step 3 - Shearing the Body

The first time a tree is sheared, the shear-line (taper) is set for the future year's growth. The taper can vary from tree to tree but generally, the tree base should be one half to two thirds of its height. A shearing knife is used to set the shape. Generally, trees have a 60 – 70% taper. A 6-foot tree would be about 4 feet wide; an 8-foot tree would be up to 5 feet wide. This is about 22° from vertical. Cutting branch tips less than 2 inches long will produce fewer, weaker buds and will narrow a tree. Begin shearing with the smallest trees first and work up to the older, more difficult trees.

Shearing knives are specifically manufactured for the Christmas tree industry. They vary in size according to handle length; the blades are narrow and about 40 cm (16 in) long and made of high quality steel. A good quality knife can be used to shear up to a thousand trees before needing to be sharpened. Handles vary in length from 15 cm to 50 cm, commonly 25 cm (10 in). Long-handled knives can be used by taller people to shear taller trees. One of the best quality knives available is Brushking made in Germany. Hedge clippers can also be used but knives are preferred in order to give swift, long, straight cuts. Knives should be sharpened at the start of each season and checked often during shearing. Clean knives often during the shearing day with a 10% solution of ammonia to remove sap buildup to allow the knife to cut more easily through the tree.

The shearer stands directly facing the tree and close to it so the tree acts as a shield to protect the body. Begin the stroke with the right arm above and in front of the head. Swing the knife on an angle of the desired shear-line. As the stroke continues, the tip of the knife blade passes along the edge of the tree to the base. The knife should pass the leg on the side that holds the knife. Use long straight strokes with follow-through and a steady rhythm which will develop as experience increases. In progressing around the tree, a right-handed worker moves in a counter-clockwise direction. Beginners should pause between strokes. The goal is to only trim the lateral tips to the same taper as the top whorl. Excessive shearing stunts the trees growth. Trimming the terminal leader, top whorl tips and lateral tips has the effect of promoting lateral bud growth increasing density. Shoulders and hips on trees devalue them in most customers' eyes.

Shearing changes the normal growth of trees by removing the dominant tips and buds. The remaining buds on the branches do not have the same apical dominance. The shearing process removes this dominance and consequently the following year's growth can result in numerous leaders. The most central dominant leader should be selected, trimmed to 30 cm and others that are competing removed or at a minimum cut back to the desired taper. If a tree has no clear central leader, the most central lateral must be selected and another directly across is selected as a crutch. Using flagging tape, loosely tie the two laterals together pulling the selected leader into a central position, cut the crutch lateral off at half-length. This process will create a central leader.

In addition to multiple leaders, shearing has another negative effect. By cutting off the dominant buds, lateral growth is promoted and some lateral buds will now grow abnormally in the wrong direction – upwards or to the inside of the tree. These abnormal shoots are called horns and should be cut out. Horns normally grow in the upper portions of the trees. If not removed they can become large unsightly branches.

For safety, never shear across the body. Right handed shearers only shear from top left to bottom right; lefties do the corresponding opposite. Wear a protective leg guard on the leg on the side wielding the knife. While uncommon, the knife may bounce off the tree and hit the operator's leg. Never shear a tree while others are near the tree. Work with at least one row between each shearer and be conscious where others are at all times. Never horseplay with pruners or shearing knives. Keep knives and pruners sharp to make clean cuts and avoid accidents.

Step 4 - Finishing Details

Inspect trees for missed branches, oblique cuts, or damaged buds. Correct problems with pruners. Take a last look at the tree to ensure it is balanced over the handle, especially north to south, has the consistent taper around the tree, and that the leader is in line with the body of the tree.

Step 5 - Subsequent Years

Once a tree has been sheared, it must be sheared every year until harvest. The result is denser trees with good shape. The shearing process in following years is the same except for a few changes.

The same process is followed each year until the year of harvest. In the final year, trees are only lightly sheared to remove very long branches. This is a bit difficult for choose-and-cut operations because it is impossible to know ahead of time what trees customers will select. In this case, the amount sheared may be a compromise based on experience and customer comments

While shearing, quickly check for pest problems. This is probably the last time during the growing season when each tree will be closely observed.

Butt pruning (Basal pruning)

One further process, butt pruning, is required in pruning Christmas trees. Not all producers butt prune the trees but it is generally considered beneficial. It establishes a strong bottom whorl and a handle up to 30 cm in length. During the first or second year of shearing start the process of removing a few bottom branches with hand pruners. Branches are cut off close to the main stem. Butt pruning also helps reduce foliage diseases such as needle casts. Plantations with strong ground vegetative competition should definitely be butt pruned. Butt pruning is usually done in slacker times of the year. Remember annual pruning and shearing should remove no more than 1/4 to 1/3 of the tree's total growth.



Butt pruning. Photo courtesy Bob Mason

Butt pruning is usually done in slacker times of the year. It must continue, a bit each year until there is an acceptable handle and a strong bottom whorl.

Topping and shearing Balsam fir. Photo courtesy Bob Mason

BALSAM FIR

Balsam fir is the most popular Christmas tree grown on the Canadian prairies and across Canada. Balsam fir responds very well to shearing. It grows naturally in the form of a cone and shearing can effectively increase density and quality.

The process of shearing is started when trees are approximately 90 cm (3 feet) in height, except for a small percentage that are thin and are first sheared between 60 cm to 90 cm to fill out the tree. Starting the shearing process earlier will delay time to harvest and may affect

the vigour of young trees.



Topping and shearing Balsam fir. Photo courtesy Bob Mason

Until trees are ready to be sheared, corrective pruning will be required, starting the year after planting. Defects that are left can have long-term detrimental effects on tree development and form.

Bud failure can result in a tree having no leader. Fir trees have strong apical dominance so the top lateral branches compete and turn upward. The most central, strongest leader should be selected and all others removed. In very young trees, the two or three strongest most central branches may be left to maximize green growth to build a stronger root system. Next year the best leader must be selected and the extra leaders removed or cut back to let the tree to grow uniformly.

When Balsam fir leaders grow in excess of 30cm in length the shearing process should begin.

Balsam fir is a great tree to self-correct, so minimal trimming of side growth is usually needed. If a tree has excessive growth on one side, hand pruning may be required to give the tree a balanced form.

Shearing Process

Step 1 - Assessing the tree (see 'Shearing Guidelines' above)

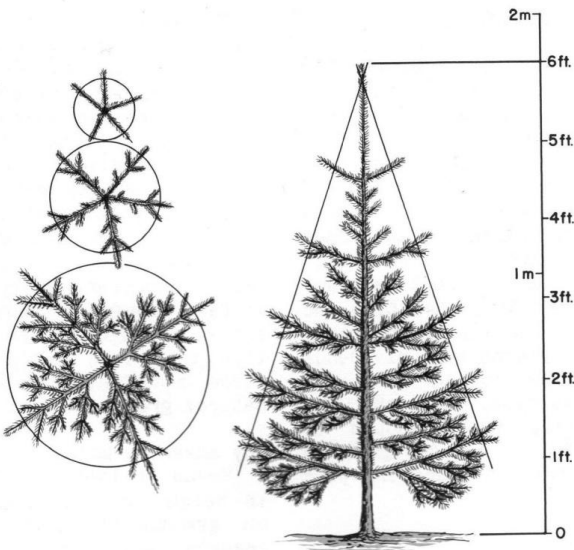
Step 2 – Topping the tree (see 'Shearing Guidelines' above)

A natural budset consists of a central bud with a whorl of buds surrounding it. Cutting the leader removes the natural budset. Internodal buds along the leader remain to become next year's branches. Choose a large internodal bud about 30 cm (1 foot) high as the new leader bud. Ideally, it has several smaller buds just below it. Cut the leader 2 cm above the chosen bud at a slight angle to allow moisture to drain from the cut. Cut the top whorl of laterals to 1/2 to 2/3 the length of the leader (already trimmed to 30 cm).



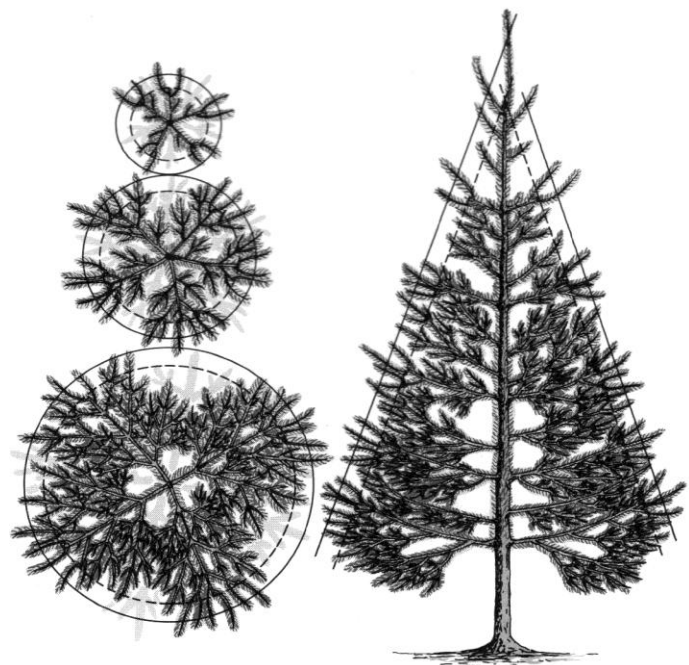
Shortening Balsam fir leader.
Photo courtesy Bob Mason

Step 3 - Shearing the Body (see 'Shearing Guidelines' above)



This figure (Estabrooks, 1986) shows the first shearing of a fir that sets the shape as seen from above. The left diagrams show the individual whorls, one (top), two and four.

This figure (Estabrooks, 1986) shows the shoot growth and internodal "catch-up" one year after the first shearing. It shows two possible shear-lines. The inside lines show the annual shear-line to be used to thicken the tree. The outside lines indicate the final harvest shape, just removing longer tips to produce a natural looking tree.



Step 4 - Finishing Details (see 'Shearing Guidelines' above)

Step 5 - Subsequent Years

The same process is followed each year until the year of harvest. In the final year, trees are only lightly sheared to remove very long branches. This is a bit difficult for choose-and-cut operations because it is impossible to know ahead of time what trees customers will select. In this case, the amount sheared may be a compromise based on experience and customer comments.

Step 6 - Butt-Pruning (see 'Shearing Guidelines' above)

White Spruce and Black Hills White Spruce

The shearing process for white spruce is the same as Balsam fir. The only difference is that for most parts of the Canadian prairies, spruce grows a little slower and thus are naturally a little denser, especially the Black Hills variety and less shearing is required. Generally shearing is not started until trees are 120 cm (4 feet) in height. Only corrective pruning is required until then.



Black Hills spruce. Photo courtesy Bob Mason

Colorado Spruce

Colorado spruce is not widely grown as Christmas trees but is desired by a few for its strong branches and more open form for large heavy Christmas decorations. Colorado spruce does not have the same apical dominance as Balsam fir so generally should only be lightly pruned. Pruning and shearing should be started in June before leader growth hardens off. More leaders will need to be tied up with flagging tape if pruning of leaders is undertaken the previous year.



Meyers Spruce. Photo courtesy Bob Mason

Meyers Spruce

Meyers spruce, native of China, is now being grown on the Canadian prairies with varying degrees of success. It naturally grows densely requiring very little pruning and shearing. It also has a very nice upward branch growth resulting in naturally full trees. Unfortunately, it is subject to aborted buds after some severe winters. This will require corrective pruning.

Scots Pine

Scots pines are much faster growing trees and naturally grow more openly. Shaping them is a completely different process that requires aggressive shearing to achieve high quality trees.

Buds only grow on the tips of branches and will be cut off in the shearing process. There are no internodal buds. New buds will form on the cut branches in the axils of the terminal needles remaining on new growth so long as the shearing is not done too soon or too late.

When the needle length of the new growth is half the length of the previous years' needles, it is time to begin shearing them (late June through the first three weeks of July). Early shearing may result in profuse bud formation which may produce a second (Lammas) growth that will not be hardy. If shearing is started too late in the season, new growth will have begun hardening off and fewer or poor buds will form, especially on lower branches. Shearing on time also gives the new buds time to mature before fall frost.



Scots pine. Photo courtesy Bob Mason

Step 1 - Assessing the Tree (see 'Shearing Guidelines' above)

Corrective pruning for the first few years is the same as other varieties. Inspect the young trees to ensure they have a straight central leader that is in line with the butt. Some Scots pines tend to grow a crooked trunk and basal pruning makes it easier to see if the leader and butt are in line. Looking through the tree into the sun makes it easier to assess the straightness of the trunk, especially when they are dense.

Step 2 - Topping (see 'Shearing Guidelines' above)

The shearing process usually starts 2 to 3 years after planting, when leaders exceed 30 cm in length. Cut the central leader to 25 - 30 cm (10 - 12 in) depending upon the shape of the tree and prevailing moisture conditions. Cut the leader at a 45° angle to encourage the formation of a dominant bud from the axils of the needles left near the top of the cut. Scots pines have pairs of needles all along the branches. A cluster of new buds will grow at the end of the cut branches with the largest buds at the tip. One bud will grow at each pair of needles. The leader will usually have 6 to 12 buds or more. This will result in a straight dominant leader growing the following season. All lower cut branches will create much fewer buds.



Cut pine leader & resulting bud set 3 months later. Photos courtesy Bob Mason

If the leader is shorter than 8 inches, it can be left uncut only if it has at least five subterminal buds around a strong terminal bud. Otherwise all leaders should be cut to promote thickening of the top area, particularly if a leader has a poor budset.

Leaders may have to be tied in place using flagging tape to achieve a central leader. Scots pines do not have the same self-straightening growth tendency as fir and spruce so a central straight leader will be a must with each shearing process.

With pruners, cut the top whorl of laterals to 1/2 to 2/3 the length of the leader to follow the taper of the tree. They do not need to be cut on a 45 degree angle.

Step 3 - Shearing the Body (see 'Shearing Guidelines' above)

Do not cut into old wood. Hardened year-old wood will produce very few buds; mature two-year-old wood will produce none. Consequently, that area of the tree will become bare.

Pines respond to sunlight energy and produce more growth on the south half of the tree. The result is an unbalanced tree unless the south side is sheared tighter and in some cases whole branches removed where there is thick growth.

Step 4 - Finishing Details (see 'Shearing Guidelines' above)

Stand back and assess the sheared tree, look for missed buds that were not sheared. It is important to remove these missed buds in the top 1/3 of the tree so they do not become competitors. Missed buds can grow to become dominant buds (competitors) since they are larger than the new buds forming from the needle axils.



These unsheared lateral buds were small when the tree was topped, but 2 months later they are bigger than the new terminal bud. They will be competitors next year. Photo courtesy Bob Mason

Ideally, for every 12 inches that a tree gains in height, it should grow 4 inches on the sides (giving an increase of 8 inches in width) to maintain the desired 2/3 taper. As trees get taller, it will be observed that the tops grow more vigorously than the sides, especially in pines. If the sides do not put on their 4 inches, cut the top shorter than 12 inches to try to keep the desired taper.

A real problem can occur when pines grow more slowly on the north, shady side than the south. It can be very difficult to balance such trees so that the growth is equally distributed over the handle.

Step 5 - Subsequent Years (see 'Shearing Guidelines' above)

Cutting the leader budset allows remaining buds in the top two whorls to develop into competitors resulting in very robust branches growing upwards in the top whorls and outward in lower whorls. They must be removed, or, if there is a hole to fill, drastically trimmed shorter than other normal branches around them. If the branch is left the same length as those around it, it will dominate as another competitor next year.

Butt-Pruning (see 'Shearing Guidelines' above)

Pines are more vigorous than fir, so butt-pruning can start when the trees are younger, taking a couple of branches each year before the branches get too large. Because some pines tend to grow crookedly, particular attention should be paid to getting a plumb handle. Soaking rains, followed by strong winds can tilt pines readily, especially if planted with a tree planter so that their roots are tending to follow the groove. They will grow up plumb from the point of tilting, resulting in unsalable trees. Straighten such trees before new growth forms.

Eastern White Pine and Red Pine

Although not commonly grown on the Canadian prairies as Christmas Trees, they can be grown in some prairie locations. The process of shearing is the same as Scots pine except it must be started earlier in June when the length of new needles is 1/3 the length of the previous year's needles.

Shearing is a major annual job for Christmas tree growers. Understanding how trees grow and shearing guidelines are helpful, but shearing Christmas trees is both a science and an art. The science can be taught, but the art requires experience and practice.