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Christmas Tree Growing in Canada

by
W. M. Stiell

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by

W. M. STIELL [2]

INTRODUCTION

There are a number of publications which deal with growing and selling Christmas trees. Unfortunately, they cover only certain phases of the industry or else apply to only one part of the country. The aim in this publication is to consolidate, briefly, information on all aspects of the industry for the benefit of growers throughout Canada. Material published elsewhere has been used freely, and the prospective grower is advised to consult the bibliography on page 22. Cited are some detailed discussions of growing and marketing Christmas trees in different regions.

ECONOMIC ASPECTS

The Industry

Christmas tree production in Canada is a minor yet vigorous forest industry. In 1962 an estimated 15 million trees were cut, of which only 4.7 were sold on the domestic market. Over two thirds of production, valued at $6.9 million, were exported.

The United States is the main purchaser of Canadian Christmas trees, absorbing more than 99 per cent of exports. In 1962 nearly one quarter of the Christmas trees distributed in the U.S. came from Canada. In 1957 (the most recent year for which detailed figures are available) Nova Scotia accounted for about 31 per cent of all trees exported, Quebec 25 per cent, British Columbia 19 per cent, and New Brunswick 17 per cent.

In 1957 balsam fir made up 72 per cent of all exports, selling for an average of 47 cents per tree. Douglas fir at 44 cents per tree accounted for 18 per cent of exports, and spruce 6 per cent at 50 cents per tree. Scots pine, entirely a plantation-grown species, made up only 4 per cent of exported trees but returned an average price of $1.11.

The Christmas tree industry has passed through a phase of rapid expansion, exports increasing from 7.4 million trees in 1949 to 12.8 million in 1956. Since then numbers of trees exported have declined slightly, although the total value

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has been maintained reasonably well owing to rising prices. The average tree exported in 1962 was valued at 66 cents compared to 48 cents in 1956. Domestic consumption has changed much less than the export picture, increasing by only about 1 million trees from 1949 to 1962. The over-all market seems relatively stable at present, and levelling off in demand has led to rigorous competition which will become keener yet. Sales are now restricted to first-rate products, and only skilful management and energetic selling can ensure profitable business.

What the Business Entails

Growing Christmas trees involves the production of a relatively valuable crop in a short time, usually on low-value land, without expensive equipment or a large cash outlay. Such an enterprise often allows the profitable utilization of otherwise unproductive land, and much of the work can be carried out without interfering with the owner's regular employment.

These are inducements, but the prospective grower should not overlook other less attractive aspects of the business. Competition already has become intense in many areas, overproduction is common, and merchandizing methods are becoming highly developed in the large markets. Under these conditions, only graded high-quality trees can be sold. To produce such trees, much more is required than simply purchasing a stand of young trees or planting a field, and then harvesting the crop when the trees are large enough to sell. The grower must be prepared to expend time and effort in tending and protecting his trees if the venture is to be profitable. Falling prices are an inevitable business risk, and fire, theft, animals, insects, disease, and adverse weather are possible hazards to his crop. However, the fact that the grower's livelihood does not depend entirely on this crop will make such risks more acceptable. If he does accept them, and applies the principles of management intelligently, he will be in a position to make an excellent and early return on his investment.

Types of Enterprise

There are a number of ways in which the individual may take part in the production of Christmas trees. The simplest venture, as a rule, is the acquisition of cutting rights to privately owned natural stands. The outlay is small, since the cutter is not responsible for protection or regeneration of the stand. He pays the owner a straight stumpage fee, and is concerned only with harvesting the trees.

A similar arrangement may be made in some provinces for cutting Christmas trees on Crown lands. If the lands are already leased, the cutter pays stumpage to the lessee. If they are not leased, he must obtain a permit and pay a royalty. However, the policy regarding disposal of Christmas trees on Crown lands is not the same in all provinces. For example, in British Columbia the terms of a permit require definite cultural practices on the part of the cutter, designed to perpetuate production from the stand. In return, he can expect continuity of tenure on the same area. On the other hand, New Brunswick does not allow any Christmas tree cutting whatsoever on Crown lands.

Growing Christmas trees on one's own property is usually an undertaking of greater responsibility. In its simplest form, the owner takes advantage of a local demand by cutting trees from his woodlot. If the demand falls off, he simply allows his trees to grow into pulpwood or sawtimber. On the other hand, maximum production involves intensive management and regular cropping of the stand.

Planting an area for the specific purpose of growing Christmas trees is the most ambitious and expensive undertaking. However, it allows the grower to choose the species he wants, and gives him the opportunity of producing better formed trees than can usually be obtained from natural stands.

Factors to Consider

The decision to enter the Christmas tree business, and to what extent, should be made only after careful inquiry. The individual must satisfy himself that it will be a sound investment for him, and the most profitable use of his time and property. Points he should investigate are the availability of markets, the demand for the tree species growing or capable of growing on his property, the suitability of the soil or the availability of suitable land, and the availability of planting stock and of transportation. Costs which he may have to meet are those for land purchase or rent, planting stock, planting operations, cultural practices, protection, taxes, interest, and harvesting. Against these he must balance probable prices. Experienced local growers and extension foresters of government services should be consulted at length for opinions and advice on these matters.

CHRISTMAS TREES

Desirable Characteristics

Species which yield good Christmas trees are evergreens with dense foliage of a deep green or blue-green. They must be capable of developing a compact, symmetrical, tapering form. The ability to retain their needles for considerable periods after cutting, particularly indoors, is important. The branches should be strong enough to support ornaments. Less important assets are a fragrant odour, and the production of cones at a young age.

From the grower's standpoint, the species should be easy to propagate and raise, and should be relatively free from pests. It should have sufficiently pliable branches to allow easy baling for shipment.

Probably no species meets all these requirements, and in any case there are definite regional preferences, often resulting from the natural occurrence of a species in an area. The favourites in Canada are balsam fir, Douglas fir, black and white spruce, and Scots pine. Other species sold for Christmas trees are Norway and red spruce, and lodgepole and red pine. The small quantity of Austrian pine recently exported from Ontario has commanded high prices. Some characteristics of these species are given below.

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Species Description

Balsam fir is the most popular Christmas tree in eastern Canada, and is the most favoured for export to the United States. It has most of the characteristics required to produce a desirable tree. Balsam fir occurs naturally from the Atlantic Coast to northeastern Alberta. It is adapted to a wide range of sites, but grows best on well-drained to moist acid loams. In Eastern Canada it may seed-in on pastures and abandoned farms. The main pests are the balsam woolly aphid and the spruce budworm.

Balsam fir may take from 7 to 12 years to reach a height of 6 feet. This is a difficult tree to grow in plantations, and nursery stock is not always available. The best possibilities for Christmas tree production with this species lie in managing natural stands. In some cases it may be feasible to transplant natural seedlings to increase stand density.

Douglas fir is the preferred Christmas tree in Western Canada, and ranks second in importance for export. This species has many of the desirable Christmas tree qualifications. It occurs under a wide variety of conditions in British Columbia and western Alberta. However, poor quality forest land, in areas of low precipitation and short growing seasons such as are found in parts of the interior of British Columbia, are considered best for growing Christmas trees. Under these conditions, symmetrical, bushy trees develop, and the crop can be renewed on an area in about 20 years.

Douglas fir is easily grown from nursery stock, and on moister sites will produce merchantable trees in 9 or 10 years. It is thus well suited for plantation production within its natural range. Attempts to grow Douglas fir in Eastern Canada have generally been unsuccessful. Pests which affect the value of this species for Christmas tree purposes are the Cooley spruce gall aphid, Douglas fir tussock moth, and Douglas fir needle cast.

White spruce is popular in Eastern Canada and the Northeastern and New England States. This species has good form and colour, but, like all spruces, does not hold its needles well after cutting. Sharp needles, and the odour from crushed foliage, are sometimes considered a disadvantage. White spruce is distributed from the Atlantic Coast to Alaska, and occurs on a wide range of soils, often in mixture with balsam fir. Young trees are commonly found invading old pasture land and abandoned fields.

White spruce is easily raised in plantations, taking from 8 to 12 years to reach 6 feet. Well-drained to moist soil is preferred. White spruce is sometimes disfigured by the eastern spruce gall aphid, and by defoliating insects, particularly the spruce budworm and European spruce sawfly.

Black spruce Christmas trees are marketable in parts of Eastern Canada, and in the Lake States. The range of this species is similar to that of white spruce. It is commonly found in swamps and sphagnum bogs, and on these sites it is very slow growing. Old trees are small, but develop compact, bushy foliage, and the tops are

sometimes sold for table trees. Stands developed under these conditions probably offer the best opportunity for the production of black spruce Christmas trees.

Nevertheless, black spruce can be planted successfully, and might be used to take advantage of sites which are too wet for other species. On drier, better sites, it may make growth comparable to white spruce, at least up to Christmas tree size, but is likely to develop unattractive foliage. Difficulties may be experienced in obtaining black spruce planting stock. The spruce needle miner and spruce leaf rust are pests which may render the trees unfit for Christmas use.

Scots pine is in considerable demand in the Northeastern and Lake States, and to some extent in southern Ontario. This is the leading plantation species exported from Canada. Its Christmas tree characteristics can be good, but its stiff branches make it more difficult to pack for rail or truck transportation than the firs. Scots pine is native to Europe, but has usually grown well when planted in Eastern Canada, and appears suited to a wide range of soils. The species includes a number of distinct geographic races which are believed to show variations in form and colour. It has not been determined which races are the most suitable for Christmas tree production in Eastern Canada. Information on parental types is seldom available, but the grower should, if he has any choice, avoid planting stock derived from types with crooked stems or yellowish needles.

Scots pine grows rapidly and will produce a 6-foot tree in 5 to 7 years. More shearing is usually required for this species than for the spruces or firs in order to develop a well-shaped tree. The usefulness of Scots pine is often limited to Christmas trees, and trees not used for this purpose cannot be counted on to provide useful pulpwood or lumber at a later date. Some common enemies are the European pine shoot moth (in southern Ontario), *Lophodermium* needle cast, the red-headed pine sawfly, the white pine weevil, and the root collar weevil. Scots pine is a preferred forage of both deer and porcupines.

Norway spruce is acceptable where spruces are commonly used as Christmas trees. However, its foliage tends to be a dark yellow-green, and it is said to lose its needles more quickly than other spruces. This is another introduced species which has grown well in plantations in Eastern Canada, particularly on moist and well-drained sites. Its early growth rate is somewhat faster than white spruce, and a 6-foot tree is produced in 6 to 10 years.

Common pests are the eastern spruce gall aphid, European spruce sawfly, and *Cytospora* canker. More serious is the white pine weevil which often attacks Norway spruce, and can destroy their value as Christmas trees. For this reason, together with a habit of rapid and uneven growth, Norway spruce needs more shearing and tending than white spruce to produce a good tree. Norway spruce is valuable as a pulpwood species, as well as for Christmas trees.

Red spruce is sold to some extent in the Maritimes and in the New England and the Northeastern States. The Christmas tree characteristics of this tree resemble those of the other spruces, although the foliage is a rather yellowish

green. In Canada, red spruce occurs naturally in the Maritimes, in southern Quebec, and to a limited extent in eastern Ontario. It requires moist to wet soil.

Red spruce has not been planted to any great extent, and there does not seem to be any advantage to planting it instead of the faster growing white spruce. Natural stands seem to offer the best opportunities for producing red spruce Christmas trees. Some common pests are the white pine weevil, European spruce sawfly, spruce budworm, and eastern spruce gall aphid.

Red pine is used for Christmas trees on a small scale in Ontario and the Northeastern States, and to a greater extent in the Lake States. Very little is exported for this purpose. It lacks the dense, compact form usually desired, and considerable shearing is required to produce a well-formed tree. Red pine is found from the Atlantic to southeastern Manitoba. A valuable timber species, it has been widely and successfully planted, growing well on quite dry sandy soils. Early growth is rapid, and the tree should reach 6 feet in 6 to 9 years.

Some successful thinnings have been made in dense young red pine plantations, whereby planting costs were recovered and a profit was made from the Christmas trees removed. The remainder of the stand was then left for ultimate production of poles or lumber. This may be the best utilization of red pine so far as Christmas trees are concerned. Branches pruned from larger trees are sometimes salable as greens. Some common pests of red pine are the redheaded pine sawfly and, in southern Ontario, the European pine shoot moth.

Lodgepole pine is a popular Christmas tree in Alberta, although not widely used elsewhere as such. The tree is naturally symmetrical and the dark green needles are retained well after cutting. Lodgepole pine is found throughout most of British Columbia, the southern Yukon, and western Alberta, occurring under a variety of growing conditions but making best growth on deep well-drained soils.

In Alberta natural stands are the principal source of Christmas trees, with stump culture and shearing important treatment measures. Ten to 15 years are required for this species to reach a height of 6 feet on most areas suitable for Christmas tree production. Some damaging agents are needle miners, pitch nodule moths, pine needle scale, dwarf mistletoe, and needle cast.

Austrian pine is a European species which has been planted on a small scale in Ontario, and has shown good growth on sandy soil. It has dark green, sharp, and stiff needles. This can be considered a promising species, but it is too soon to say that it will become generally popular, and large-scale plantings are not recommended. Little planting stock is presently available in any case.

Size and Quality

The very large majority of Christmas trees are 5 to 8 feet tall, and most are 6 or 7 feet. The grower will probably aim at this size range for the bulk of his crop.

There is a market for small trees 1 to 3 feet tall, used for table or store decorations. This size is said to be gaining in popularity, but the demand is still

limited. The short growing period, ease of handling and transporting, and earlier returns make raising smaller trees an attractive proposition, despite the lower unit price.

Large trees of the type used for decorating streets and public buildings bring the highest price, but this market also is quite restricted. Growers might perhaps build up a small retail trade in unusual sizes, from personal contact.

It is not possible, of course, to utilize the full length of a tree. Allowance must always be made for stump height, and sometimes it is necessary to sacrifice part of the stem if the lower branches are short or ragged. Thus a usable Christmas tree is at least 6 inches shorter than the standing tree from which it was cut, and if taken from an unmanaged stand may be only half the original height.

The method of measuring the height of a cut tree is not standardized. Depending on the region, the "height" may refer to the distance from the base of the lowest whorl of branches to the tip of the tree, from the lowest whorl to the top whorl, or from the butt to the end of an upturned branch in the top whorl. Regardless of the system used, however, the length of the butt below the lowest whorl should be 6 to 10 inches.

A number of grades and grading rules, based on quality, have been proposed. Trees of the best grade would be bushy, symmetrical, and tapering, without excessive distances between branch whorls; foliage would be dense and dark green or blue-green; the stem would be relatively straight; the leader would be undamaged. One or two blemishes which would be concealed if the tree stood against a wall or in a corner might reduce the tree to a lower grade. Trees with serious defects would be culled.

A recognized grading system would benefit the grower, providing him with a concrete and rational basis for bargaining with buyers. A Canada-wide system would seem the best solution, but attempts to set one up have not been successful. To date only New Brunswick has adopted an official grading system. Elsewhere attempts are sometimes made to grade in conformity with United States standards. Pending the establishment of official grades in his region, the inexperienced grower should familiarize himself with local practices of measuring and grading trees, and be quite sure that he and his buyer have the same understanding of these specifications.

MANAGEMENT

Aims

Both natural and planted stands must be managed if the best results are to be obtained. The methods employed should aim at increasing the total yield, increasing the average quality, and producing a crop in a shorter period. The number of trees established each year should balance the number cut. These aims are accomplished by various silvicultural operations, and by protecting the stand from theft and damage.

Thinning and Cleaning

If a tree is to develop desirable form and colour, it must have plenty of light on all sides, from the ground to the top, throughout its life. An average distance of 5 to 6 feet between trees is recommended to give adequate light. In plantations, trees can be spaced as required at planting, but in natural stands, the proper spacing must be achieved by thinning.

Thinning should be started when the trees are quite small, and should favour the best formed and most promising individuals, particularly those nearing Christmas tree size. As a rule, misshapen and spindly trees, and those with dead branches, should be removed. All but one tree in a clump or double should be cut. In very dense thickets it is probably best not to achieve final spacing in one operation, and in such cases only 30 to 40 per cent of crown density should be removed at one time. Care should be taken to kill the stump by removing all live branches from it—otherwise these may turn up and develop into trees.

Trees that are too large for Christmas use and are taking up space should be removed. If they are very large but not salable, they can be girdled instead. However, a few mature trees should be retained to provide seed for the new crop, and four to six vigorous, full-crowned, well-formed trees per acre have been recommended for this purpose.

Hardwood trees and shrubs in the stand are likely to be a special problem, since they often sprout from the stumps or send up root suckers after they have been cut. Sprouting is much reduced if hardwoods are cut in midsummer, before about August 15th, rather than at other seasons. Hardwood seedlings are best eradicated by pulling up by the roots. Larger growth should be cut, and the stumps sprayed with a mixture of one quart of 2,4,5-T concentrate (having an acid equivalent of 76.8 ounces per gallon) and 5 gallons of waste oil. The mixture should be applied to the cut surface of the stumps, to the bark down to the ground, and to any exposed roots. Best results are obtained if spraying is carried out within 24 hours of cutting. Care should be taken to avoid spraying potential Christmas trees.

Shearing

A young tree grows slowly until its roots are well established. After several years, growth usually speeds up, and the tree develops a long, thin leader. Continued rapid growth produces an open spindly tree, with sparse foliage which does not adequately conceal the stem and branches. The better the soil, the greater the likelihood of this type of growth which results in a very poorly formed Christmas tree. Shearing is an operation which cuts back the leader to a desirable length—12 to 14 inches for pines, and 6 to 12 inches for spruce and fir. The side branches of the top whorl are sheared back in proportion, and any extra long branches are trimmed, to give the tree a regular and approximately conical shape. The next year growth is resumed at or near the cut surfaces. In addition, new buds form and send out clusters of shoots, resulting in extra bushiness.

Shearing, as a means of encouraging bushy, full foliage, as well as trimming trees to a desirable shape, is an important operation. In stands which have not been

sheared, the number of high quality or even salable Christmas trees is often very small. With Scots pine, for example, shearing is estimated to increase the proportion of merchantable trees from about 30 per cent to 85 per cent.

The season at which shearing is carried out is important for pines. These should be sheared shortly before height growth is completed for the year, and before the new shoots harden and become woody. In Ontario the period is usually between June 7 and July 15. Too early shearing results in many buds, which start to grow the same year. If it is too late, no buds form. Sheared trees produce a large terminal cluster of buds, several of which may turn up to give new leaders. In the following year only laterals and one leader should be retained in the top whorl, and the remaining turn-ups sheared off.

Spruce and fir may be sheared at any season, but late summer, autumn, or early winter perhaps give the best results. In these species, buds are already present between branch whorls, and growth will start from the bud nearest the cut surface.

Very slow growing trees may never need shearing, but for most trees it should be a yearly operation during the period of rapid growth. This period will vary between the last year or two before cutting and half the life of the tree, depending on the growth pattern. A tree may be sheared in the same year that it is to be cut.

Shearing time is approximately one minute per tree. Hedging shears are appropriate tools for this work.

Pruning

Fast-grown spruce and fir that have not been sheared can sometimes be treated to produce merchantable Christmas trees. Pruning the lower branches, i.e., cutting them off flush with the stem, will reduce height growth and stimulate the remaining crown to give a bushier tree. The pruning should be quite heavy to have this effect; it should remove all branches from the lower one-half to two-thirds of the tree. Pruning thus offers a means of utilizing trees which are normally too tall for Christmas use. Thicket-grown trees with short, irregular, or partially dead lower branches are suited to this treatment. Remedial pruning, i.e., removing extra stems or long branches of earlier years' growth, is often necessary to reclaim malformed trees of all species.

Pruning can be carried out at any season, although late autumn and early winter are best if there is any chance of utilizing the prunings for Christmas greens. A curved pruning saw or secateurs are suitable tools. Blazing two sides of the stem has been suggested as another means of checking too rapid height growth.

Stump Culture

As has been mentioned, live branches remaining on the stump after the tree has been cut often turn up and grow into trees. If these branches are thinned and sheared they can develop into useful Christmas trees. A large root system is already present, and as a result the "limb trees" as they are called grow much more quickly than young seedlings.

The selection of potential limb trees is made at harvesting, thinning, or pruning. Vigorous trees, usually growing in a clearing or on the edge of one, and where a limb tree will not interfere with an established seedling, should be chosen. The tree should be cut or pruned above a healthy whorl. This may be one or two whorls from the bottom of the tree. In about two or three years the most promising limb should be selected, and sheared as required. The remaining branches in the whorl should be removed, as more than one limb tree per stump results in crowding. It may be possible to grow several successive trees from the same stump.

Stump culture can be a valuable method of renewing the crop. It is probably most useful in natural stands, particularly where seeding-in and early growth are slow. It will tend to give trees of all ages within the stand. In plantations, stump culture may not be so important. Less time is saved, since planted trees make quicker early growth. Further, the grower is more likely to be organized to remove the whole crop from one area within 2 or 3 consecutive years, and then to replant. Trees of all ages and sizes make this impossible and complicate planting. Limb trees require more shearing to produce good form. Scots pine, at least, tend to be flat-sided when grown from stumps.

Planting

Soil

Coniferous trees are not particularly exacting in their soil requirements. The soil need not be especially fertile, since slow or moderate growth will reduce the amount of shearing required. Farms commonly contain small tracts which are unsuitable for other crops, but which the farmer might profitably utilize for growing Christmas trees. Very thin soil over bedrock, coarse sands and gravels, heavy clays, and excessively wet or alkaline soils should be avoided.

The prospective grower wishing to purchase land should look for a fairly level tract, preferably of well-drained sand or sandy loam, depending on the species he wishes to grow. Unless it is relatively free of large stones, any planting will be difficult and machine planting will be impossible. Too rich soil is generally to be avoided, since it encourages a heavy growth of weeds and grass which shade and hinder planted seedlings. It is better not to purchase land on which much brush clearing will be necessary before planting, since clearing is very costly. On the other hand, a grass sod or cover of low herbs is acceptable.

The amount of land will, of course, be governed by the scale of production desired. If the grower wishes a regular yearly harvest, he should plant a part of his property every year. If, say, it takes 7 years to raise a crop of Christmas trees, he should plant one-seventh of the total area for each of the first 7 years. At the end of the fifth year, some trees will probably be large enough to harvest from his first plantation; most will be removed from it in the sixth year; and at the end of the seventh year he will harvest the remaining merchantable trees and clear-cut any unmerchantable trees. The next year he will start the cycle again by replanting this area. By following this system, the amount of labour and the costs and returns, as

well as the amount of planting stock he must order, are kept fairly equal from year to year.

Planting Stock

Stock obtained from government nurseries is usually the least expensive. However, the provincial governments differ widely in their policies of seedling distribution. In some provinces stock is distributed free, in others a charge is made, and in others no stock is distributed under any conditions if it is to be used for growing Christmas trees. The grower should refer to his provincial forest service on this point. The alternative is to purchase stock from a commercial nursery.

Three- or four-year-old transplants are usually the safest age class to plant. These are more expensive than seedlings, but should give higher survival, particularly in an unlucky year of drought. Also, they can be harvested a year or two earlier.

Some growers may find it less expensive to purchase two-year-old seedlings, and raise them in garden plots for a year or two before planting them in the field. These will require some care, in the form of watering and weeding. It has been suggested that wild balsam fir seedlings be dug up and transplanted in this way. This may be the only means of obtaining balsam fir stock at present. Generally, however, the use of wild seedlings is not recommended.

Unless the grower plans production on a very large scale it will not pay him to raise his own stock from seed. Nursery work is very exacting and time consuming, since young seedlings need constant attention.

Site Preparation

The planting site should be cleared of brush and shrubs prior to planting. If there is a tall, dense growth of herbaceous vegetation, furrows should be ploughed at the proper spacing, and the trees planted in the furrows. This will keep the small trees free from competition which might check their growth, or, by shading the lower branches, add a year or two to the time required to grow a merchantable tree. Double furrows, with a furrow slice turned to both sides, creating a fairly wide strip on each side of the seedlings, are most beneficial.

Season

Planting is usually carried out in the spring, as soon as the snow is off the ground and the soil can be worked. It should not be delayed until growth has started. Fall planting may sometimes be more convenient, but should not be started before the autumn rains. Heavy soils, and soils on which there is no vegetative cover or which will not be covered by snow, should not be planted in the autumn owing to the possibility of frost heaving.

Spacing

As a rule, trees should be planted at a spacing of 5 to 6 feet in each direction. If small table trees are to be grown, 4 feet may be suitable. Extra large trees, more

than 8 feet tall, might require 7 feet. The difference in one foot of average spacing makes a great change in the number of trees per acre. For example—

Spacing	of	4	by	4	feet	requires	2,722	trees	per acre
"	"	5	by	5	"	"	1,742	"	" "
"	"	6	by	6	"	"	1,210	"	" "
"	"	7	by	7	"	"	889	"	" "

The grower should decide in advance the size of trees he wishes to grow. Spacing should be regular if the trees are to develop evenly on all sides. Sometimes a plantation is established for pulpwood or sawlog production, in which case a thinning for Christmas trees might allow an early return on the long-term investment. In such a plantation the initial spacing might be 4 by 4 feet, with every other tree to be removed in the thinning.

Stock Storage

When the planting stock is received from the nursery it must not be allowed to overheat or dry out before planting. It may be left in the shipping containers for a few days, if they are placed in the shade and kept moist. For longer periods, the stock should be heeled in. This is done by digging a shallow trench about 10 inches deep, with a sloping side. The bundles of seedlings are broken apart and placed side by side with their roots in the deepest part of the trench. The roots are covered with 4 or 5 inches of soil which is tramped down firmly and watered. The seedlings are then removed as required.

Planting Method

Hand planting is best accomplished by crews of two men. One man digs the hole, and the other carries the seedlings and places them in the ground. The stock is usually carried in a pail with the roots covered by water or wet moss. The roots must not dry out. The hole must be large enough so that the roots can be spread out naturally. The tree should be planted at the same depth at which it grew in the nursery, or slightly deeper. The soil must be tightly packed about the roots. Under open-field conditions, and in light soils, a two-man crew should be able to plant 1,000 trees per day.

Machine planting is more economical for large areas, provided the soil is free from large stones; production with a 3-man crew (including the tractor driver) should approximate 5,000 to 8,000 trees per day. The possibility of renting machines from co-operatives or forest services should be investigated.

Refilling

The plantation should be examined carefully the next year for failures. If mortality was more than 15 per cent, the dead trees should be replaced. Replacement for more than two successive years is probably not worth while.

Natural Stands

The foregoing deals with planting an open field. Sometimes it is necessary to supplement seeding-in of a natural stand by planting. The principles remain the same, although of course machine planting is not possible.

Protection

The investments in planting and treating stands of Christmas trees are well worth protecting. Both prevention and active control are necessary. Christmas trees are not more susceptible to damage than are other trees, but their value depends so much on appearance that their salability can be seriously affected by even small injuries that do not greatly threaten their health. Although trees may recover from such disfigurations as frost-killed shoots or partial defoliation, a year or more has been added to the rotation.

Fencing

The first step in protection should be to fence the property. This will exclude farm stock which by trampling and browsing are very destructive to young trees. A fence will discourage trespassers, and thus reduce the chance of fires started by smokers.

Fire

Ten-foot-wide fireguards should surround each stand and plantation, and should subdivide all large areas. Fireguards should be disced every year, or sprayed periodically with weed-killer, to keep them free from inflammable vegetation. Unused slash from pruning and thinning should be scattered and spread flat, or else piled and burnt in the winter.

Under certain circumstances it may be possible and advisable to obtain fire insurance. In their short rotation, simplicity of valuation, accessibility, and relative ease of protection, Christmas tree plantations resemble farm crops more closely than most other forest crops do, and insurance companies might be prepared to give coverage at reasonable rates. However, conditions will vary greatly, and growers should make enquiries locally.

Insects and Disease

The grower should acquaint himself with the appearance and symptoms of the common pests which may attack his trees. He should inspect his stand frequently during the growing season for signs of disease or insect damage.

Insect epidemics can cause ruinous damage in a few days, but prompt treatment, usually by spraying, can give excellent control of some species. Diseases are rare in young trees, but once established are very difficult to control. If they are severe, and recur for several years, it may be that the tree species is unsuited to the local site and environment.

Insects or disease found in the stand should be reported at once to the Forest Entomology and Pathology Branch, Department of Forestry, Canada, Ottawa, with a request for advice on suitable control measures. The advice received should be adopted without delay.

Animals

Wild animals most likely to cause damage are deer, rabbits, porcupines, squirrels, and mice. Except for mice, for which poison bait is sometimes effective, these animals are best controlled by hunting. The type of fencing required to exclude wild animals effectively is very expensive.

Weather

Adverse weather is of course uncontrollable. Frosty sites and frost pockets can be avoided at planting. Severe droughts may cause high mortality within a year or two of planting, and the only remedy is refilling. Another effect of drought may be a yellowing of the foliage, and although temporary this may delay harvesting a year. Unseasonable frosts which kill new growth will also set back the trees, and sleet storms can break or deform branches. However, in some cases careful shearing will help restore appearance.

Theft

The absentee owner will have difficulty guarding against theft. The location of the stand is important in this respect. If it is not visible from a highway, it may be less prone to opportunist thievery. An arrangement might be made with a neighbouring farmer to keep an eye on the stand.

Harvesting

Time can be saved at harvesting if the trees to be cut have been already chosen and tagged. There is then no need for the cutters to try to judge the trees. There is also less likelihood of overcutting if it is made clear beforehand that every felled tree must bear a tag.

For a local retail market it may be possible to delay cutting until just before Christmas, and thus avoid overcutting. Otherwise, harvesting the current year's crop should start in plenty of time to allow for delivery, and to avoid the probability of deep snow and of low temperatures which tend to make the branches brittle. The pines and firs are often cut as early as October, usually without undue drying or loss of colour and needles. However, it has been recommended that balsam fir for export should not be cut before November 1. Cutting the spruces should be deferred until December. It might be mentioned that cold storage facilities have been used to make very early cutting practicable for one type of operation: small tops of swamp-grown black spruce have been cut in the spring and stored successfully in this manner until the following winter.

If stump culture is to be practised, trees should be cut with a saw. Otherwise an axe may be used, and care should be taken to remove all living branches from

the stump. Slash from the operation should be thoroughly scattered. After cutting, the trees should be carried or dragged to a loading point which is easily accessible by vehicle.

Baling

Unless the haul to market is very short, the trees should be tied together in bales. All trees in a bale should be the same size. Baling allows the loading of many more trees into a truck or railway car, and thus reduces freight costs; it prevents excessive drying, makes handling much simpler, reduces breakage, and allows quick sorting by size.

The number of trees in a bale is not official. Standards generally adopted in two provinces are as follows:

Douglas Fir in British Columbia		Balsam Fir in Nova Scotia	
Tree Height	Trees per Bale	Tree Height	Trees per Bale
(feet)		(feet)	
2 — 3	8	2— 3	8
3 — 4½	6	3— 5	6
4½— 6½	4	5— 7	5
6½— 8½	3	7— 8	4
8½—10½	2	8— 9	3
10½ and over	1	9—11	2
		12 and over	1

Scots pine have much stiffer branches and cannot be packed as tightly as the firs. One Ontario grower of Scots pine packs his 6-foot trees in bales of two, and claims a 20 to 30 per cent saving in loading space.

For baling, trees should be piled with their lowest whorls aligned. A wooden rack with adjustable side and top arms will help to compress the branches for tying. A bale should be tied with twine at every whorl, or at about one-foot intervals. The butts should then be sawn square.

Bales should be stored in the shade to reduce drying. They may be piled on skids for easy loading, although standing them upright with the butts on the ground is said to minimize drying.

Christmas greens should be collected at this time also. Prunings, thinnings, and stump branches are suitable. They should be tied up in 25-pound bundles.

MARKETING

Retail

Retail selling is likely to be the most profitable, and is well adapted to the smaller grower with a local market.

Buying direct from the plantation is popular with the consumer, since it enables him to choose his own tree before it is cut. At the same time the grower solves his transportation problems and can be certain that he will not end up with

a surplus of cut but unsold trees. This system requires an excellent location, close to the city. It also means that the grower must be on hand at his plantation at all times for two or three weeks before Christmas. There is some risk of damage to his crop unless he supervises cutting carefully.

Most retail selling, however, takes place in the city. If the plantation is not too far, the grower can truck in trees daily, adjusting the number to his sales, and thus avoid a large surplus. Sales are usually made in a vacant lot, service station, parking lot, or some such place. The grower should complete his arrangements for sales space well in advance of the selling date. He may rent space, or agree to pay the owner so much per tree sold.

A sales lot should be centrally located, and the trees should be visible from the street. The lot should be large enough for displaying the trees adequately—not just piling them up. Nearby parking space is an asset.

Sales can no doubt be increased if the lot is decorated and efficiently organized. It should be well lighted at night. The trees should be standing upright, for easy inspection, with the price clearly marked. Trees might be priced individually, or all trees in a group might be priced the same. The salesman should know the species. Other items for Christmas decoration may help to attract customers; these might include bundles of evergreen branches, Oregon grape, holly, mistletoe, and small painted trees and cones.

Wholesale

The large producer, the exporter, the grower who has not developed a retail market, or whose stand is at a remote location, will probably sell his trees wholesale. He should arrange for their disposal well in advance of harvesting—by early autumn at the latest. He should reach a definite understanding with the buyer as to date and method of delivery, sizes, grades, baling specifications, number of trees, prices, and method of payment. He should require a contract setting forth the terms of this agreement. A sound practice is to require a deposit when the contract is signed, and payment of the balance when the trees are called for or delivered. It has been stated frequently that the grower should never cut his trees until he has a sales agreement, and never release the trees until they are paid for. Consignment selling, whereby a wholesaler takes a load of trees on speculation, and merely agrees to pay the grower a percentage of his sales, is not recommended. It is well worth while seeking out a reputable buyer, and experienced local growers should be able to give useful advice on this point.

Local sales are made chiefly to merchants, or to truck drivers who may operate their own lots or attempt to re-sell to a retailer. The large wholesalers must usually ship trees a considerable distance, either by rail or tractor trailer.

The buyer may agree to purchase trees on the stump or at roadside. The latter is preferable from the grower's standpoint. If he does his own harvesting he has much better control over which trees are cut, and over the disposal of slash, and he can be sure that there is no unnecessary damage to the remaining trees. In fact, each additional operation, including cutting, skidding, baling, and hauling to selling

point or railhead should increase the price to the buyer. The grower must decide for himself at which point he will make the greatest profit, and adjust the contract accordingly.

Co-operative selling has certain advantages. Organized growers are placed in a better bargaining position. Pooling the crops of several small growers may make it worth while for buyers to enter an area. Growers in isolated locations have a better chance of selling their trees if they can ship them to a central market. The standardization of grading and baling practices in an area should prove a definite attraction to buyers.

Local or regional associations of growers are active in British Columbia, Ontario and New Brunswick. Organizations of this sort can be of real value to their members through co-operative grading and marketing procedures and the exchange of information.

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