GROWING CHRISTMAS TREES ON SUBMARGINAL LAND IN THE PACIFIC NORTHWEST

by

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PREFACE

Much of the land in the Pacific Northwest that is contained on small farms is submarginal for farming, and because of the heavy bracken fern growth is not suitable for pasture. Studies conducted by Dr. W. F. McCulloch of Oregon State College indicate that the bracken fern is beneficial to the seedlings during their juvenile growth, without causing any distortion in their shape.

The object of this paper is to show that the small farmer, who has ten to fifteen acres of land to devote to Christmas tree plantings, may make a steady yearly income. In these plantations only land that is now submarginal for farming shall be included. There is no attempt made to present the bright side of the picture. Rather, the facts are reported as they were found.

TABLE OF CONTENTS

TABLE OF CONTENTS

INTRODUCTION

Christmas trees were inaugurated when the Romans began decorating palms for the festive season and were later promulgated by the Roman soldiers in their conquest of what is now Germany. Here the custom flourished for a while, but with the decline of the Roman Empire, it practically disappeared; and it remained for Martin Luther to reserect and establish it as an inseperable part of the Yuletide season. Most sources agree that the custom was introduced to this country by the Hessian soldiers who were fighting for the British in the Revolutionary War.(1)

Evergreen trees have been used as Christmas trees since the introduction into Germany. The main reasons for this are that only evergreens offer good foliage at this time of year and that they have a pleasant odor. The Christmas tree is now a tradition in the American home, with even the poorest having a tree of some sort. Therefore, there is a constant market in every city of any size.

Previously, all the trees used on the Pacific Coast were wild trees, and the market has not been too good compared to the Eastern market because Christmas trees have been considered weeds of the forests. Such trees are usually taken from thinnings which are less shapely and of lower general quality than the plantation grown trees. Serious local damage has been done the reproduction in Western Oregon because of such thinnings, for these so called thinnings

were poorly supervised and as a result the better shaped trees were taken, which in all cases are the dominant trees and the ones most likely to succeed in the fight for survival.

The increased acreage which is being placed under sustained yield management and the increasing State and private regulations of forest practices will gradually end this indiscriminate cutting practice. This past year (1947) saw California inaugurate an additional border control, in regard to Christmas trees, whereby anyone transporting trees into California must show by a Notarized statement that said trees were duly purchased from the authorized owner. With all trends showing a tendency toward stricter controls over the forests, both public and private, it follows that Christmas tree plantations are economically feasible on those portions of low value land where the topography is unsuitable for farming.

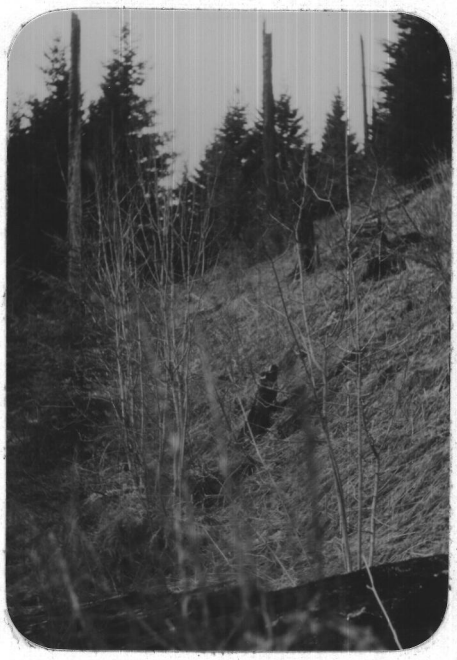
No effort has been made in this paper to cover all the methods and techniques that could be used in the growing of Christmas trees. Instead, the writer has tried to proceed step by step with an economically sound plan for the production of Christmas trees on plantations in Western Oregon.

PART 1 - PROPOGATION OF CHRISTMAS TREES

SITE SELECTION

Where To Plant.

Land used for Christmas tree production should be cleared land; this can be land that has been cleared in logging or it may be a bracken fern hillside.



View of land that might be utilized by the farmer for Christmas tree production.

After logging, slash should be disposed of by burning; however any large logs left after burning, or the stumps will have no harmful effects.

Typical land for Christmas tree production showing ground cover and accumulation of down material.

Best soils are loams and sandy loams with a high organic content, and should be well drained. The site for growing Christmas trees should be rather poor so that growth may be slow, the annual whorls of branches close together and the tree should have a bushy appearance. The presence of rock is not important save for the difficulty of planting. Northern and Northeastern slopes are preferred; however plantings on Southwest slopes are feasable under a cover of bracken fern. It will be necessary to keep the area free from grazing for the first three or four years with controlled grazing thereafter.(2)

Time to Plant.

Spring planting has been found to be the best for

Western Oregon; this means any time after the first of March. Too early planting will result in frost-heaving, or winter killing, causing a high percentage of mortality.(3) On the other hand if the trees are planted too late, they will not have a chance to become established before the dry season, and a high loss will result. In the end the best criterion is to wait until the ground is frost free and while it is still cloudy and rainy. Local conditions will to a degree dictate the planting season.

Taxes and Interest On Money Invested.

It is the general consensus of opinion among farm owners that taxes are based upon the unit as a whole. Land devoted to the Christmas tree plantations would be the small isolated patches and the land that was submarginal for grazing. To make the computations complete the author has included a charge of twenty-five cents per acre per year for the tax.

CHOICE OF GROWING STOCK

Species.

An ideal Christmas tree should possess the following characteristics: symetrical form, a good green color and a good needle retention with whorls placed closely and the foliage abundant.

A poor Christmas tree. Poor color and poor shape. Notice the distance between branches.

Douglas-fir (Pseudotsuga taxifolia) produces a very symetrical tree with branches that have strength enough to support the lights and ornaments. Color is very good, and the needles will last for two to three weeks in a room of moderate temperature. This tree is native to all of Western Oregon and will make good growth on all but the most adverse of sites.

There are other species which have all of the above attributes except that some work would have to be done on the introduction of these exotics into this region. Douglas-fir has branches that are slender enough to allow for

bundling which is a deciding factor in its favor when contemplating shipping trees a long distance.

Age Of Planting Stock.

The ideal planting stock would be 2-2 stock as there is an almost ideal balance between the roots and the tops. Transplants are preferred for they have a well developed root system and will mature into trees with compact foliage and full, well shaped crowns. The use of older trees will also result in less loss from drought and other climatic factors. This has led to the practice, by some plantation owners, of buying two year old stock from the nurseries and then setting them in transplant beds for two or more years. In all cases the trees should be root trimmed before planting so that moisture intake can equal transpiration.

How and Where To Order Planting Stock.

Trees for Christmas tree plantations are available to farmers through the Oregon Forestry Nursery at Corvallis, Oregon. All orders must be placed with the State Forester, Salem, Oregon. Shipments cannot start until the trees are thoroughly hardened which is around the last of November, and shipments must stop as soon as the spring growth starts which is near March first. Trees are supplied at $2.50 per thousand plus the mailing charges. In Western Oregon the charge can be roughly figured at $.50 per thousand. Order blanks must be Notarized with the owner swearing that the trees are to be used on his farm in accordance

with the Clark-McNary Act.

PLANTING

Time Of Planting.

Planting may be done, in Western Oregon, from the first of November until the first of March if the season is at all usual. The ideal planting day is one when there is no wind, and it is raining gently. Experiments show that plantings made in the spring make better growth and that the rodent damage is less due to the natural forage available to the rodents at this time.(4)

Care Of Seedlings.

Trees will ordinarily arrive from the nursery in bales of 1000 trees. These bales are made by placing a layer of burlap on a table; next comes a heavy piece of waxed paper. On top of this is placed a layer of damp peat moss or shingle toe, and the trees are placed on top of this with the roots toward the middle. The packing and the bundle are then thoroughly wet down. The bundle is completed by wrapping the burlap and waxed paper around the roll tightly and binding it with wires. Such bundles will ship well and can be kept in good condition for several days at the planting site; however, if for some reason the stock must be held for a week or two, the bundles should be broken and the stock "heeled in". To "heel in" the stock select a level area in the shade and out of the wind where the soil is easy to dig and well

drained and where a water supply is at hand. Dig a trench about a foot wide and a foot deep, with one side sloping at a sixty degree angle and as long as needed. Open the bales and remove the packing. Now place the trees in a thin layer along the side of the trench that has the sixty degree slope, with the normal ground line of the trees just below the level of the ground. Place two to three inches of soil on the roots and pack down firmly with the heel. By digging from the opposite bank and shoveling the dirt onto the roots until there is a six inch layer, and repeating, several rows may be "heeled in". No more than six to eight rows should be treated in this manner. Wet the soil thoroughly at once and, if the soil or air is dry, every day or two thereafter as needed. Trees must be kept very wet, but must not be allowed to stand in water as this will prevent airation. If the "heeled in" trees are not in the shade and they are to be left several days, erect over them a framework two feet high and cover with evergreen boughs. Do not cover with a tarp as that shuts off ventilation but not the heat.(5)

At planting time the trees are dug from the heel-in area and taken to the planting site as needed. At the planting site precautions must be taken to prevent losses. Tree bundles must be protected from the sun's rays and be kept damp at all times. The care of the trees while planting will be covered later.

Site Preparation.

Some of the plantations in the eastern part of the United States are cared for much the same as a farm crop, with the land being plowed, harrowed, fertilized and then planted. However as this paper is only treating Christmas tree production as a sideline to the regular farming, it would be inadvisable to cultivate that intensively in this region. If the area is covered with herbaceous material or bracken fern, it may be necessary to clear it either by controlled burning or by close confinement of livestock. The use of livestock is the recommended method for it is not only safer, but the animals tend to provide a seed bed. If the cover is predominately bracken fern, it is recommended that a spot be scalped or cleared about a foot square and the seedling planted in the center of this clearing. Tests conducted by D. W. F. McCulloch, of Oregon State College, show that bracken fern is beneficial in the juvenile growth of Douglas fir.(6)

Spacing.

Spacing is one of the most important factors in the development of salable Christmas trees. Trees must be spaced so that they utilize all of the available ground but at the same time ample space is required so that the side light can develop a symmetrical shape. The spacing that fulfills these requirements is four feet by four feet, which will accommodate two thousand seven hundred and four trees to the acre.(3) If it is planned to sell

the trees while fairly small, the spacing may be reduced to three feet by three feet which will give four thousand seven hundred and sixty trees to the acre.

In actual practice, planting will not conform to any exact mathematical scale. Almost always it will be necessary to move a tree one way or another, and seldom will they be planted at the exact spacing figure. However the alignment and the spacing should conform as nearly to the pattern as is possible, while remembering to pick the best spot for each tree. Avoid decayed wood, depressions or mounds and fire baked soils.(7)

Planting Technique.

The roots of coniferous trees may be damaged very quickly by even a short period of exposure to sun or wind. It is because of this fact that special precautions must be taken to keep the roots damp at all times. The type of bag recommended is one having two sections. Unopened bundles of trees are placed on one side with sufficient moss or shingletow to hold moisture well and thoroughly wet down. The other side is for the opened bundles that the planter is using; these must also be kept damp ~~too~~ to prevent dessication.

Planting.

The only method of planting considered in this paper shall be the "one-man grub hoe method", for on the type of lands considered this is the only feasible method due to

the rough topography. The only tool necessary is a grub hoe with a four inch blade that has been heated and the blade straightened so that it is at right angles to the handle.(7)

The "one-man grub hoe method" of planting trees was perfected by Dr. Thornton T. Munger,(7) and consists of the following steps:

> Step 1. Drive the grub hoe blade into the ground near the center of the scalped area perpendicularly; its full length is possible in one stroke.
>
> Step 2. Raise up on the handle to open the hole at the bottom.
>
> Step 3. Thrust the handle downward and at the same time draw the blade forward making thus a clean square hole.
>
> Step 4. Keep the blade of the grub hoe in the hole (to hold back the soil) and insert one tree vertically; roots should be spread in the hole as naturally as possible, not twisted or allowed to hang together like a rope. Spread the roots with the fingers if necessary.
>
> Step 5. Still holding the tree with one hand so that its former ground line is slightly below the ground line on the downhill side of the hole, partly pull out the blade and, reinserting it at an angle and giving a downward thrust, press a wedge-shaped mass of soil against the lower roots; fill in the bottom of the hole.
>
> Step 6. Remove the blade and with a downward push fill the hole with soil full and solidly. If this step is properly done, little further filling or tamping is necessary under most conditions.
>
> Step 7. Before moving to the next tree, stamp with heel (not toe) beside the tree to firm the soil. If this causes a depression, scrape the soil with the toe of shoe to fill it.

An experienced planter can plant five hundred to eight hundred trees per eight hour day by this method.

FURTHER CARE OF PLANTATIONS

Fire Protection.

Because of the extremely dry summer months experienced in the Pacific Northwest, fire presents a major problem in the care of Christmas tree plantations. Should a fire get started in the young plantations, a whole rotation could be wiped out in a very few minutes. It is therefore advisable to take protective measures to secure your investment.

Fire protection should be the pre-suppression type where the bulk of the work is done in the prevention of fires, and, should one start, in the lessening of its chances to spread. Controlled grazing is perhaps one of the best means of removing inflammable material from the ground. In laying out the areas to be planted it is wise to take advantage of any natural fire breaks such as roads, creeks or plowed fields. The rough roads that are planned to haul out the trees to the main roads can also be made into fire breaks by discing them to prevent plant growth.

Cultivation.

Because the author plans to use only the land that is either isolated or too steep or left out of the general farm scheme because of some other factor for the plantations, cultivation is not considered in this paper. Studies have

shown that intensive cultivation causes excessive growth of the leader which is undesirable for a good Christmas tree. The controlled grazing by cattle during the period between the third year and the harvesting will cause enough disturbance of the soil to keep down rank brush growth. In the conducting of controlled grazing, care must be taken to prevent the cattle from bedding in the area which would cause serious damage to the seedlings.

Pruning.

As a result of observations taken along highways where the lower branches were trimmed for visibility, and there seemed to be a compacting of the crowns, pruning was done two years ago on several dozen trees. This pruning consisted of taking off the lower whorls of branches that seemed to have lost their vigor. Examination of these trees this past spring showed that all of the trees have started new growth between the original whorls. Additional studies should be made along this line to determine later results.

System Of Rotation.

Actual measurements of field specimens taken at random over several hundred acres of land in Columbia County show that if Christmas trees were grown on a ten year rotation, they would reach a height of five to eight feet.

Trees would be harvested on the clearcutting method. Using a light hand ax and making two cuts to a tree, one workman could harvest roughly one thousand trees per day.

In harvesting trees in this manner workmen should be warned that rough handling will reduce the subsequent value of the tree as Christmas trees are purchased on their beauty. After cutting, the trees are hauled to the road by sleds where the butts are squared with a pruning saw, and they are stacked to await the trucks.

The reasons why clearcutting the area is best are as follows:

1. It is cheaper to cut all the trees at one time rather than attempting to select only the best.

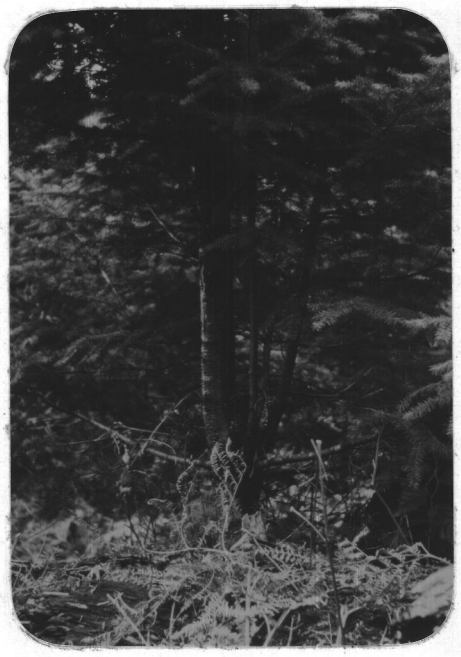
2. Selection cutting would disrupt the rotation and increase the planting costs.

3. Trees should vary in size to have the best sales value.

4. The trees left on an area would sunscald and would end up being worthless.

Observations have been made of trees that were cut above the first branch clusters, and then the two dominate branches were staked up to produce a new tree. In the illustrations used no additional work was done; however in actual practice only two branches would be allowed to start, and during the second year the one showing dominance would be left and the other removed. Most authorities seem to think that the stem reproduced in this way would be too crooked to make a Christmas tree. The trees observed which had recovered and were making good growth had straightened up and were forming a good bole.

Young Douglas fir that has been cut off and the lateral branches have taken over and are producing several strong trees.
Note: All but one of these branches should have been cut off after dominance had been asserted.



An older Douglas fir showing that the lateral branches will produce straight trees if given the proper care.

By reproducing trees in this manner it is believed that the second rotation could be reduced to possibly eight years. As the root system is already established for a much larger tree, there would be very rapid juvenile growth. Following the second rotation, replanting would have to be done. The replanting should be made at the intersection of the diagonals from where the former trees were planted.

Replanting.

For the maximum return from the area it is necessary to replant the spring following harvesting. Each succeeding rotation will see the site improved and the planting show made easier. The same planting techniques should be used in the second rotation as in the first, that is the "one-man grub hoe method".

PART 2 - HARVESTING AND MARKETING

HARVESTING

Time To Cut.

The time of cutting will depend to a large extent upon the type of market and the distance to market. Generally they should be cut late enough in the season so that they reach the market in good condition. As the Douglas-fir has good needle retention and does not dry out very rapidly, they can be harvested as early as the first week in December for the most distant markets, and the cutting can be continued to within a week before Christmas for the local markets.

How To Cut.

As this paper deals only with the machineless production of Christmas trees, the only method of harvesting considered will be hand harvesting.

Using a light ax, or a heavy hand ax, grasp the tree with the left hand and bend it over; now cut it off in one clean cut. Using this method, two good workmen can harvest an acre a day. The method of using a light pruning saw to cut the trees is slower in the field but tends to somewhat reduce the t ime necessary to trim the butt ends. It was the experience of the author that the ax was the best method with the provision that the butts were trimmed at the stacking area.

Care and Transportation After Cutting.

Hauling from the cutting area to the trucks, or to the stacking area, must keep pace with the cutting crews so that the trees are not allowed to dry out in the hot sun. If the trees are being stacked to await shipment, they should be placed near a good road and where it is ~~good and~~ cool.

Bundling should be done only by order of the purchaser. Bundling is only necessary when the trees are to be handled several times; such as first shipping by truck to some transportation center where they are to be reloaded onto freight cars. They have the advantage of being easier and quicker to handle. When bundling use the following standardized proceedure:

Trees per bundle.	Height in ft.	Color of tag.	Estimated weight.
8	2 to 3	red	3 lbs. per tree
6	3 to 4	blue	4 lbs. per tree
4	5 to 6	pink	8 lbs. per tree
3	7 to 8	yellow	15 lbs. per tree
2	9 to 10	purple	25 lbs. per tree
1	11 to 12	orange	35 lbs. per tree

Binder twine that has not been creosoted should be used to bind the trees into compact bundles.

WHOLESALING

Individually.

The advantages of wholesaling over retailing are fairly obvious and are as listed below:

1. The risk factor is low because the buyer pays for the trees upon delivery thus taking the risk of poor markets, etc.

2. No additional investment is needed.

3. There is little wastage of trees, for if no orders are received, the trees need not be cut. The rotation is flexible enough to allow a year or two leeway.

With the individual tree producer the difficulty usually encountered is the establishment of a good market.

Cooperatively.

It is this field that progress could be made. Under this method of marketing a continuous market would be assured with a fairly constant price level. These advantages could only be gained where there were at least three plantation owners.

Cost Analysis.

The cost of producing Christmas trees and the price received for them tends to maintain a constant ratio during any period of times. The following tabulations will give the relationship between the costs and the selling price.

Cost of Production.

2704 seedlings @ $2.50 per thousand	$ 6.75
Freight @ $0.50 per thousand	1.35
Labor on site. 4 days @ $8.00	32.00
Planting. 5 days @$8.00	40.00
Protection. For 10 years @ $2.00 per acre	20.00
Taxes. For 10 years @ $0.25 per acre per year ...	2.50
Plantation care. 1 day per year @ $8.00 per day .. for 10 years.	80.00
TOTAL.....	$182.60

Total production costs of $182.60 capitalized @ 6 percent interest for 10 years $327.00

The cost of the land was not figured in the a bove computations as it is planned to have the Christmas tree plantations in conjunction with a farming setup where the land not used by the farm would be utilized by the plantations.

Selling costs.

Cost of cutting trees. 4 days @ $8.00 per day	$ 32.00
Cost of bundling. 4 days @ $8.00 per day ..... (under certain conditions this item may be dispensed with and the money saved put into the plantation care.)	32.00
Cost of hauling to the main road. 4 days @ $8.00 per day.....	32.00
TOTAL.....	$ 96.00

Net Profit From Sale.

Number of trees planted 2704

Number of trees harvested after figuring 25 per cent loss during the rotation period 2028

2028 Christmas trees @ $0.50 per tree $1014.00

Cost of production .....$ 327.00

Selling costs 96.00

TOTAL COSTS ...$ 423.0

Returns from 2028 trees @ $0.50 per tree $1014.00

Total costs 423.00

Net profit. One acre for 10 years .....$ 591.00

Net profit. One acre for 1 year .....$ 59.10

CONCLUSION

Christmas tree plantations have not been feasible in the Pacific Northwest in the past because of the large numbers of wild trees, which were considered little more than weeds. At the present time with more and more land being put under sustained yield, and with the introduction of new laws and regulations, the picture has changed. In 1946 California introduced a new border control measure which makes it necessary to have a Notarized bill of sale for all trees hauled in the state. This means that the day of going out and cutting your own Christmas tree is almost a thing of the past, for it is certain that additional regulations shall be imposed not only by California, but by the rest of the states in the Northwest. The requirements for Christmas tree production are fully met in the Pacific Northwest. They are cheap land, a temperate climate, a source of seedlings, a good labor supply and nearness to good transportation arterials. There are numberous experimentations still to be made in this field, but the farmer who wishes to devote some of his poorer land to this enterprise shall have a steady annual income, the returns from which will equal or more than equal the returns obtained from pasturing the land.

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