

GROWING CHRISTMAS TREES

in West Virginia

BY A. EDWIN GRAFTON



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INTRODUCTION

Christmas trees can be successfully and profitably grown in West Virginia. Interest in undertaking a tree growing enterprise may be attributed to:

- A good retirement hobby
- A good investment
- A family business
- A livelihood
- A little extra cash
- Property tax savings, as it is a farm product
- Easy money with minimal work
- A project for children in 4H or FFA

Though there are many reasons for establishing a Christmas tree farm, many misconceptions and pitfalls persist. Growing high quality Christmas trees requires intensive labor for success including site preparation, planting, protection, shearing and harvesting. It is not a "get rich quick" operation. Six or more years will lapse before any monetary returns occur.

Marginal land for other agriculture uses is not necessarily a good location for growing Christmas trees. The ideal site is gently rolling land, less than ten percent slope, with well-drained sandy loam soils, adequate fertility, good nutrient levels and a pH 6.0 to 6.5.



GROWING RISKS

When growing Christmas trees, even on good to excellent sites, many risks may be encountered. Storm damage from rain, wind or snow is usually minimal. Drought can be serious especially following recent planting. Commonly drought can cause mortality of twenty-five percent or more, of newly planted seedlings. Watering newly planted seedlings and young trees where possible will reduce damage. Mulching may also reduce losses.

Frost damage can be another issue, which can be decreased by avoiding frost pocket areas for Christmas tree species that break bud early. Frost pockets are areas where the cold air accumulates. Cool air flows down hill, slopes and settles into low areas, and this continues throughout the nighttime hours as colder and colder air sinks into a valley or basin. In certain seasons, especially in the early spring, the air can be so cold it will freeze succulent tips of trees that are just budding out.

Insect and disease can result in high mortality and must be controlled. Controlling by spraying pesticides with backpack sprayers is problematic at best. Delivery of pesticides with high pressure spraying systems may be necessary. Insect damage is usually needle removal, resulting from feeding and or girdling on needles and twigs or boring into stems (*see photo 8, page 10*). Assistance with identification can be provided by the West Virginia Department of Agriculture, (WVDA) personnel, foresters and experienced tree growers among others. Diseases can be especially devastating. Diseases are usually specific to a particular tree species and on occasion to a genus of trees. Look for symptoms such as small spots or streaks on needles, discoloration, and/or defoliation (*see photo 14, page 12*). Time is crucial. Collect twigs exhibiting symptoms, place the twigs in a plastic locking bag, with a moist paper towel and get them to WVDA experts or others for identification and recommended preventive or controlling measures.

Fire can be a potential problem. Preventive measures such as clean access lanes and minimal fuel buildup from grass and weeds will reduce the risk of major losses due to fire damage.

Rabbits and moles seem to prefer white pine and fir. However, on occasion they will chew off any small conifer. Hunting pressure and eliminating habitat appears to be the most logical solution to small rodent damage.

Deer damage is another major threat to growing conifers (*see photo 14, page 12*). Deer browse usually occurs during the dormant season when few plants are growing. It is most severe during winter months, with heavy snow cover. White pine seems to be the preferred browse species, but some fir species are also at risk. The most crucial portion of a young tree that requires protection is the terminal leader (*see photo 9, page 11*). Various deer repellent sprays are available. One or more applications may be needed, depending on weather. Deer damage permits and increased hunting pressure may be necessary to remove surplus deer. Temporary protective cages can also aid the seedlings and small trees in preventing damage. Another method, which has proven quite successful, is stapling a small piece of paper four inch by five inch, or larger around the top of the terminal leader. It needs to be stapled firmly to the tree to prevent removal from strong winds. Normally paper would be stapled on the tree in early December and removed in early April, after spring vegetation has gotten high enough for the deer to have their regular food source. You should start checking for damage as early as late October or early November, when there happens to be a failure of mast, such as acorns, and various other items on which the deer rely.

An eight-foot woven wire fence is the most certain preventive measure for controlling deer damage, but it is the most costly. Deer damage permits and increased hunting pressure ~~can~~ may be necessary to remove surplus deer.

Grass and weed competition must be controlled especially around recently planted seedlings and young trees. Heavy vegetation around trees impedes air circulation and provides an ideal microenvironment for the build up and expansion of plant diseases.

MARKETS

Most national surveys today indicate that fewer than fifty percent of households use real trees for their Christmas celebrations. Over ten percent of households do not use any type of Christmas tree. A major problem in West Virginia is the lack of locally grown, high quality trees.

Local Christmas tree farms specializing in "Choose and Cut" marketing, have high potential for success in meeting demand for consumers. Customers will travel twenty to twenty-five miles for Christmas trees. Better quality roads or farms near major highways corridors will result in customers driving longer distances. Availability of consumer preferred species would also attract customers from more distant locations.

SITE ANALYSIS

When growing Christmas trees, avoid wet poorly drained areas. Few conifers grow well on these sites. Soils need to be tested for pH and nutrient availability. Since most conifers grow best in slightly acid soils, pH is rarely a problem in the State. Lack of some trace minerals, or reduced availability, may be a problem for some species, especially firs. West Virginia University (WVU), has a soils analysis laboratory where soils may be tested at no cost. Sample collection materials, which contain detailed collection procedures, can be obtained at local or regional Natural Resource Conservation (NRCS), offices or at the WVU Extension offices.

Avoid planting on land with slopes exceeding twenty percent. Mowing will become much more difficult. If herbicides are used in control of competing vegetation, erosion could become a problem on steep slopes. Steep slopes also cause the loss of two or more years of growth in order to get a whorl of uniform branches near the base of the tree. The upslope branches will die on steep slope due to shading and lack of growing space.

Competing vegetation must be managed in a manner that enhances tree growth and prevents erosion or harvesting issues. This type of vegetation needs to be controlled by mowing and/or herbicides. If using herbicides, low vegetation, grasses, weeds and some woody plants can be controlled with foliar sprays. Many woody plants cannot be killed with the recommended solutions of herbicides that will kill the grass, weeds and still not harm Christmas trees. These species of woody plants can be killed by mechanically cutting them off near ground level and applying properly mixed herbicide solutions to the cambium layer of the stump (see photo 2, page 9).

If using herbicides, always follow recommendations on the label. It is a good idea to check with foresters and other professionals, for their recommendations, which are gained through experience, research and education. Experienced Christmas tree growers can also be very helpful.

SPECIES SELECTION

Only two native West Virginia species, white pine and Canaan fir, are widely grown for Christmas trees. Essentially all species grown for Christmas trees in West Virginia are pines, spruces or firs. The choice of species is of primary importance to insure a project that results in consumer desirability, thus profitability.

Consumer preferences vary widely. In general well-shaped trees with green foliage will be marketable, regardless of species. Shaping that is reasonably dense but has sufficient space between branches for decorating, is most often preferred. Some consumers prefer bluish green foliage. Rigid firm branches are an advantage. The prickly ends of needles on Scotch pine and blue spruces are normally a disadvantage. Other desirable traits include straightness of the main trunk, needle length, density of foliage, needle retention, needle color and fragrance.

Species under consideration need to be matched to site characteristics. Crucial factors include soil characteristics, slope facing direction, and climatic factors. Local foresters, NRCS personnel, WVU extension agents, and experienced growers can be very helpful with these determinations.

PINES (*Pinus species*)

Needles are borne in bundles of two to five, along new growth with buds clustered at the tip of twigs. The needles on potential Christmas tree species in WV are generally two to five inches in length. Needle retention after cutting is good to excellent.

Fertility and nutrient demands are lower than for most other Christmas tree species. Pines grow best on well-drained sandy loam soils. However, they adapt to a wide variety of sites.

Shaping must be completed in the latter part of the twig elongation period. In WV this is June and July to insure new bud set following the shaping process.

White Pine (*Pinus strobus*)

This species is the only native pine widely planted and successfully marketed for Christmas trees in WV. It has five needles in a bundle, normally two to five inches in length and often with a bluish green appearance. Needle retention is excellent. Branches are weak and droop with heavy decoration items.

Although the tree grows best on moist well-drained, sandy loam soils, it adapts well to most sites except poorly drained areas. Seven-foot trees can be grown in six-nine years. Shearing must be completed in June or early July to insure proper bud set. If sheared too early a flush of new "lomas" growth may occur in August, requiring a walk through to eliminate the extra new growth. If sheared too late, no bud set will occur leaving an open spot in future years.

White pine is a preferred winter browse food for white tail deer and protection measures may be necessary. Heavy hunting and crop damage permits are often needed.

Prominent insect and diseases on white pines include, but are not limited to, White pine weevil, sawflies, white pine blister rust, and white pine root decline. White pines are more susceptible to air pollution than most other Christmas tree species. Growers must be prepared to undertake preventative and protective measures when symptoms appear. Contact professionals and experienced growers for assistance.

Scotch Pine (*Pinus sylvestris*)

This species was one of the most commonly grown Christmas trees in the state. Today few are being grown due to widespread diseases. The species is also susceptible to several insect pests including sawflies, white pine weevil and others. If planted, the grower must be prepared for intensive insect and disease control activities. Shearing should be completed in June or July to assure bud set.

Other Pines

Red pine (*Pinus resinosa*) and Austrian pine (*Pinus nigra*) have been grown for Christmas trees but with very limited success. These species do not respond well to shearing and are difficult to market.

SPRUCES (*Picea species*)

Needles are borne singly along the twig rarely exceeding one inch in length and usually have sharp-pointed tips. They grow best on moist well-drained sandy loam soils. Some species can tolerate wetter poorly drained sites. Most species grow slowly and will take eight to ten years to produce a well-shaped specimen. Trees should be shaped when twig elongation is essentially completed. Buds form along twigs, thus new bud set is not an issue. Shearing can be carried out from mid to late July through most of March annually (*see photo 3, page 90*).

Several species break bud early and are subject to late freezes and frost damage. Some species exhibit limited resistance to deer browsing. Needle retention on cut trees has historically been a problem, but recent development of "anti-oxidant" products, has largely eliminated this concern.

Norway Spruce (*Picea abies*)

This species grows remarkably well in the state for timber, landscaping or Christmas trees (*see photo 16, page 12*). The foliage is a deep green color, an inch or less in length, with sharp pointed needles. Needle retention is poor on cut trees and "anti-oxidant" product use is encouraged.

The tree grows best on well-drained, sandy loam soils, however, it can adapt to some sites with minor drainage problems. The tree grows faster than most other spruces grown in the State and seven-foot trees can be grown in seven to eleven years. Branches are strong with good to excellent ornament holding ability. Insects and diseases can be damaging but are usually controllable with few losses in marketability.

Colorado Blue Spruce (*Picea pungens*)

Until recently this was a widely planted Christmas tree species. The bluish foliage and strong twigs historically made this a consumer-preferred tree. Very sharp pointed needles make the tree nearly pet proof and child proof. Needle retention on cut trees is poor to good and treatment may be necessary with the "anti-oxidant" products.

Insects and diseases have almost totally eliminated plantings for Christmas trees. Deer damage has been minimal.

The tree grows very slowly requiring eight or more years for a seven-foot tree. The tree grows best on well-drained sandy loam soils, with good levels of fertility and nutrients.

Black Spruce (*Picea mariana*)

This species has short, sharp-pointed needles with a slight bluish appearance. Black spruce grows very slowly, reducing shaping time, but taking ten or more years to reach seven feet. A major advantage is the ability to grow well in poorly drained soils.

White and Black Hills Spruce (*Picea glauca*)

Black Hills spruce is a variety of white spruce. These spruce species are very slow growing, requiring ten or more years to reach seven feet. The foliage is generally green and often with a disagreeable odor. It too does best on well-drained soils with good fertility.

Serbian Spruce (*Picea omorika*)

The tree is native in Europe with bluish needles that are shorter than those of blue spruce. It can adapt to a variety of sites but does best on fertile, well-drained soils. It grows very slowly requiring more than ten years to reach seven feet.

FIRS (*Abies species*)

Three species of fir constitute nearly all the trees grown in the State for Christmas trees. If available a large proportion of consumers currently prefer firs, including Douglas-fir, which is not a true fir, but a member of the (*Pseudotsuga genus*), and grows native in the Western US. Fir foliage varies in color from green to blue green, or silvery green. The needles are generally two inches or less in length, often with silver or whitish areas, and without sharp pointed tips. Needle retention is good to excellent. Firs tend to grow slowly, requiring eight or more years for marketable trees. Firs do best on well-drained, sandy loam soils with good fertility and nutrient levels. Most species prefer a cool climate, with the exception of Canaan fir. Some break bud early and are susceptible to late freeze and frost damage. Shearing to shape trees can occur between mid-July through March. Buds grow along twigs, so bud set is not relevant.

Fraser Fir (*Abies fraseri*)

This species is native in the Southern Appalachian Mountains range, primarily in parts of North Carolina, Virginia, and Tennessee. It is similar to balsam fir, except that needles are dark green above with white bands underneath. Buds tend to break later than true balsam fir making it less susceptible to late freeze or frosts.

A well-drained sandy loam soil, with good fertility and nutrient availability makes an ideal site for Fraser fir. Cool climatic conditions are desirable. If planted below 2,000 feet in elevation, it should be grown on north and east facing slopes. Poorly drained soils can result in root rot problems.

In WV, the species has become one of the most preferred Christmas trees. Its soft, fragrant foliage with silvery tint makes the tree very marketable. Needle retention is good to excellent on cut trees. Trees can be shaped from July through March. Seven-foot trees can be expected in eight or more years.

Canaan Fir (*Abies balsamea* var. *pharecolipsis*)

This tree is native primarily in the Canaan Valley of WV (see photo 13, page 12). Botanically it is a close relative of balsam and Fraser fir. The foliage is soft, green, with a fragrant balsam odor. Sometimes the foliage is slightly two-ranked, resembling hemlock.

The balsam wooly aphid is devastating many of the native stands in Tucker County and can be a problem elsewhere. Today seed is primarily available from established seed orchards, well outside the native range of the species.

The major advantage of this species is late bud break, which greatly reduces due its susceptibility to late freeze or frost damage. Needle retention is fair to good and can be substantially reduced by using "anti-oxidant" products. Branch strength is good.

The tree grows best on well-drained, sandy loam soils, with good fertility and nutrient levels. It can be shaped from July to March annually. In many areas deer browsing seems to be less than on Fraser fir. Control measures may be necessary to reduce deer damage.

Concolor Fir (*Abies concolor*)

This fir, also known as silver or white fir, is native in the Western US, usually at high elevations. Needles are the longest, up to two inches, of the firs grown for Christmas trees in WV. The needles are blunt, usually silvery and very aromatic, with a citrusy fragrance. Most people think they smell like oranges, and customers refer to them as the orange tree. Needle retention on cut trees is excellent. Twigs exhibit fair to good ornament holding ability.

The tree grows slowly requiring minimal shaping. On occasion it tends to grow multiple terminal leaders. Some must be removed to maintain a single stem. The tree is difficult to establish in many areas. It does best on well-drained sites with good fertility and nutrient levels. Normally, it takes ten or more years to grow a seven-foot tree. On some sites it may be necessary to apply a trace mineral fertilizer. The tree is naturally a tap-root species and care must be taken to avoid "J-rooting" when planting.

Currently the tree has few insect and disease problems. Deer browsing does not seem to a problem. The tree does break bud early and late frost and freezes can cause severe damage.

Other True Firs (*Abies* species)

Various growers in WV have made experimental plantings of other fir species. In recent years this included Noble fir (*Abies procera*), Nordmann fir (*Abies nordmanniana*), Turkish fir (*Abies bornmuelleriana*), Korean fir (*Abies koreana*), and Ernst fir (*Abies ernesti*). No large-scale plantings have been made. Most of the species have been subjected to severe deer browsing. Due to limited testing in the State, these cannot be recommended for general planting at this time.

Douglas-Fir (*Pseudotsuga menziesii*)

Douglas-fir is not a true fir (*Abies*) species. It is native in the Western US, where historically it has been a major lumber species. There is a wide variation in growth characteristics and appearance, depending on seed source. Seed sources from the Rocky Mountains seem to develop better in WV. West Coast seed sources do not seem to exhibit sufficient cold hardiness.

This species also breaks bud early and can suffer severe freeze and frost damage. The trees are very susceptible to Swiss needle cast, which requires control measures.

The foliage is soft, flattened like hemlock, and often with a blue-green appearance. Needle retention on cut trees is good to excellent. Seed sources from the Southwest US tend to exhibit the blue-green tint and often grow faster.

The tree requires a well-drained sandy loam soil with good fertility and nutrient levels. In WV, it grows well at most elevations but seems to do better on east and north facing slopes. It usually takes eight or more years to obtain a high quality seven-foot tree.

OTHER CONIFERS

Four other conifers need further testing in WV conditions as potential Christmas trees. Preliminary trials show rapid growth and fair branch/twig strength. These three conifers are available only as rooted cuttings, thus more expensive when purchased for plantings. Planting entails the use of shovel, mattocks and or augers.

Leyland Cypress (*Cupressocyparis leylandii*)

This species has been successfully marketed as a Christmas tree in Southern US (see photo 3, page 9). The foliage is scale-like and rich green in color. The tree can reach six feet in three years. Proper shearing techniques are still in the experimental stages. Deer browsing has been reported as serious in some counties and minimal in other counties of the State.

Blue Ice Cypress (*Cupressus arizonica*)

The foliage is scale-like and distinctly bluish. The tree appears to grow rapidly and can reach four to six feet in three to four years. Multiple trunks can be an issue. The tree grows tall with a narrow crown. Shearing techniques are still being determined. The foliage does not seem to attract deer.

Green Giant Arborvitae (*Thuja standishii* x *Thuja plicata*)

This species is a variety of Western red cedar. Western red cedar is a rapidly growing giant tree in Oregon and Washington states. Foliage is green normally but yellow or brown twig tips develop in the dormant winter season. A colorant may be required to produce marketable Christmas trees.

Eastern Redcedar (*Juniperus virginiana*)

This species is native to West Virginia and grows on a wide variety of sites. Deer browsing may be a problem.

PLANTING STOCK SELECTION

Selection of planting stock is largely dependent upon soil type and planting tools. Historically most growers planted bare rooted seedlings designated by numbers like 3-0, which refers to the age of the seedling. The first number refers to the years in the original planting bed, which in this example (3-0) is three years. The second number refers to the years in a transplant bed. In the case of the example (3-0), this seedling has not been transplanted. Seedlings should be six to twelve inches in height with good stem diameter or about ¼ inch or more. The root to top ratio should be about equal.

Transplants are also available. The biggest advantage of transplants is a better root system or better root to top ratio. Transplants will be designated by numbers like 2-2, meaning the tree was in the original seedbed for two years, and placed in a transplant bed for two additional years. These seedlings are more expensive and normally cannot be successfully planted with a planting bar due to the larger root system.

Many nurseries now produce seedlings as "plugs", designating them as Plug 1 or Plug 2. The number refers to the age as a plug developed individually in a tapering container. These specialized containers permit the development of a nearly perfect root system that is essentially undisturbed when removed from the container for shipment. Plugs are more expensive but survival is normally better and height growth is more rapid. Some Plug 1 seedlings can be planted with a planting bar but most will require other tools.

Rooted cuttings are grown in small pots. They are more expensive but have excellent survival rates. They require shovels, mattocks, augers or similar tools when planting.

SITE SELECTION

Christmas tree growers should take great care in evaluating requirements necessary for specific species they desire to produce (see photo 7, page 10). Environmental factors affecting Christmas tree development into marketable trees include soil type, soil moisture, availability, soil drainage, temperature, and percentage of slope, slope compass direction, frost pockets, and similar factors.

Even though soil requirements are less demanding for Christmas trees than many other agricultural endeavors, it is important to have professional evaluations of current conditions. Soil fertility and nutrient evaluation can be conducted at the Soils Laboratory at West Virginia University. Currently there is no direct cost. This evaluation can be completed specifically for each species the grower wishes to produce. The local NRCS office can provide information on drainage and soil moisture availability. Impeded drainage is a serious problem in growing white pine and most fir species.

As percentage of slope increases the difficulty in completing cultural practices, such as shearing and mowing increases as well. Mowing on steep slopes is both difficult and dangerous. Shearing is also more difficult and dangerous on steep slopes.

Appropriate site-specific information is available from local foresters, agricultural specialists and experienced tree growers.

SITE PREPARATION

Most Christmas tree farms are established on current or abandoned cropland or pastureland. Abandoned cropland and pastureland often requires some site preparation depending on type and aggressiveness of plant growth. Heavy grass and herbaceous growth will present problems with seedling survival on most sites. The proper application of herbicides is the most common method of removing herbaceous growth and grass competition, to levels that have minimal impact on seedling survival. Read the label before using any herbicide and consult with other experienced individuals for application rates and methods. Glyphosate is currently the herbicide of choice with most tree growers.

Brush control may be necessary using a currently available herbicide that causes minimal or no damage to conifers. Low brushy species may be controlled with foliar spray (*see photo 12, page 11*), prior to planting Christmas tree seedlings. Avoid foliar applications for brush eradication after Christmas tree seedlings are planted. Prior to planting seedlings, larger brush and small saplings can be cut and use herbicides to kill stumps to prevent sprouting (*see photo 2, page 9*).

Large brush can be eliminated using "frilling or hack and squirt" methods of herbicide application. In this method axe cuts are made around the stem about one to two inches apart. Herbicide solution is applied to the cut areas. There are other techniques contained in the label instructions.

Spot spraying is a common method of preparing a planting location by eradicating other plant competition in a two to three-foot diameter circle the year before planting. A pre-emergent herbicide can be useful also if applied at the same time to prevent germination of seed already present.

PLANTING DESIGN AND SPACING

Careful planning of layout should be taken in order to avert future problems with maintenance and operations. Access lanes should be established throughout the planting to accommodate work activities and harvesting. These lanes should be every six to ten rows and be ten to twelve feet wide. Avoid sharp turns and steep slopes. Be sure to plan an area for parking and or loading trees that is convenient and accessible to the public.

Distance between trees in rows and the rows depends on the kind of equipment and machinery used to maintain the plantings. The most crucial factor is the width of the mower and/or tractor. The most popular spacing is six feet between trees in rows seven or eight feet apart. This allows adequate space for shaping regardless of the shearing method, mowing and spraying. A spacing of six by seven foot will allow about 1,000 trees per acre, while six by eight foot spacing results in about 900 trees per acre. Access lanes will reduce the number per acre slightly depending on width and pattern.

PLANTING ACTIVITIES

Tree seedlings should be planted as quickly as possible from the time lifted and packed at the nursery until planted on the tree farm. In WV tree planting should occur from mid-March to early-April. Once the trees arrive at the farm, they need to be inspected for quality. Make sure the roots are protected and damp.

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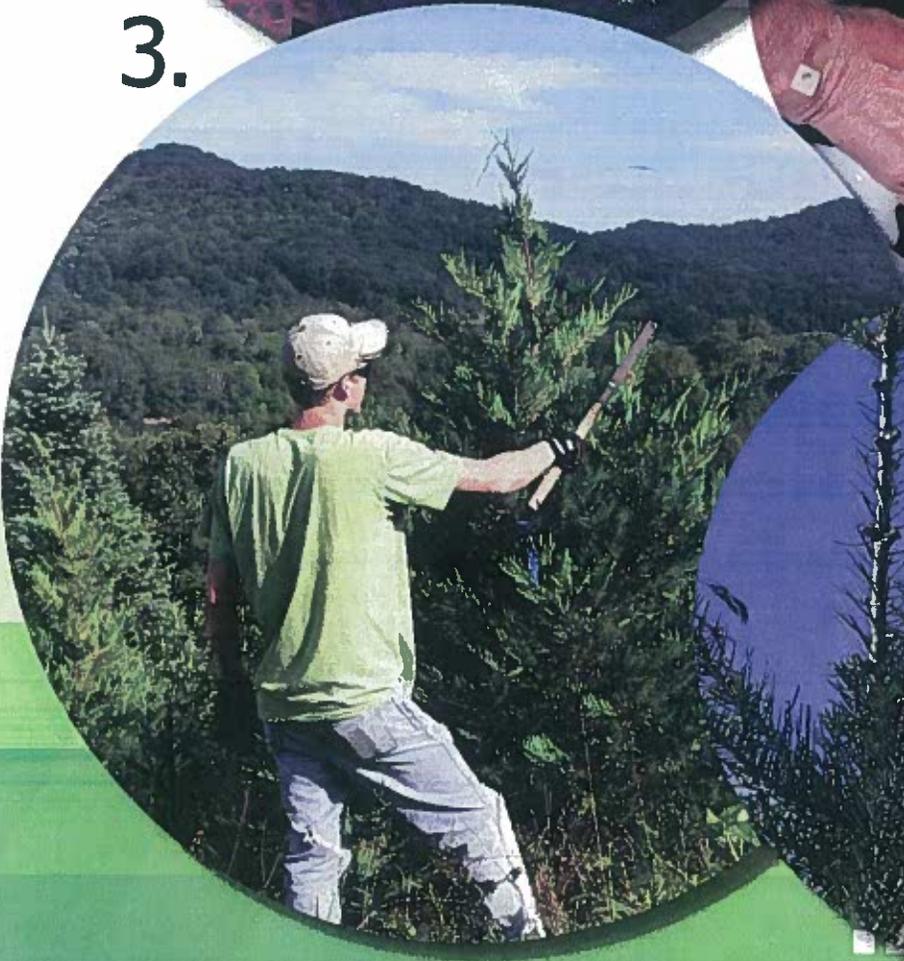
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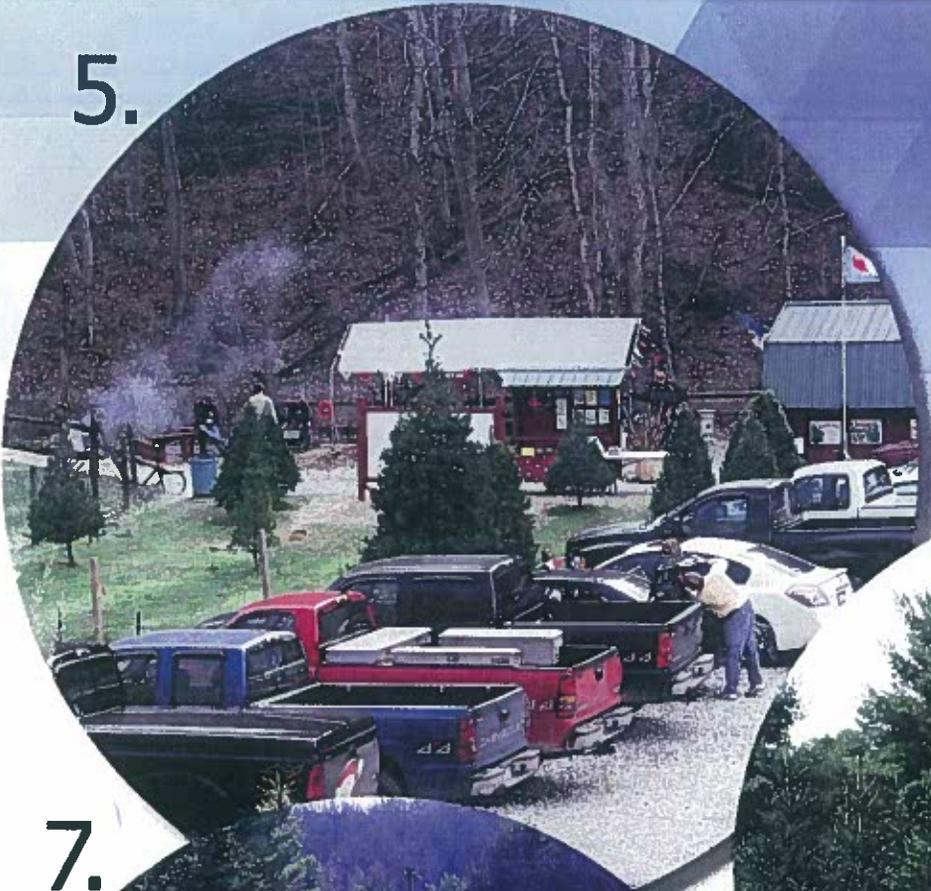
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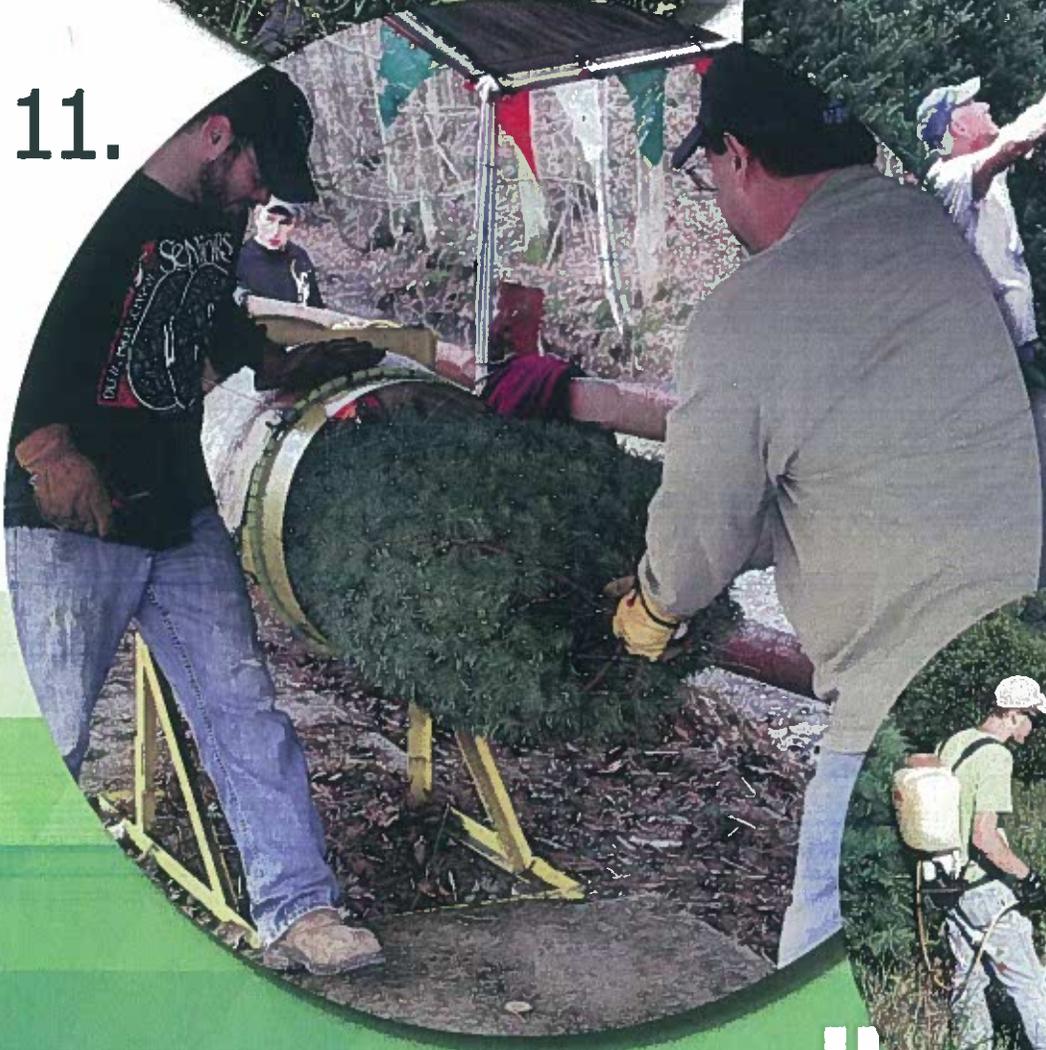
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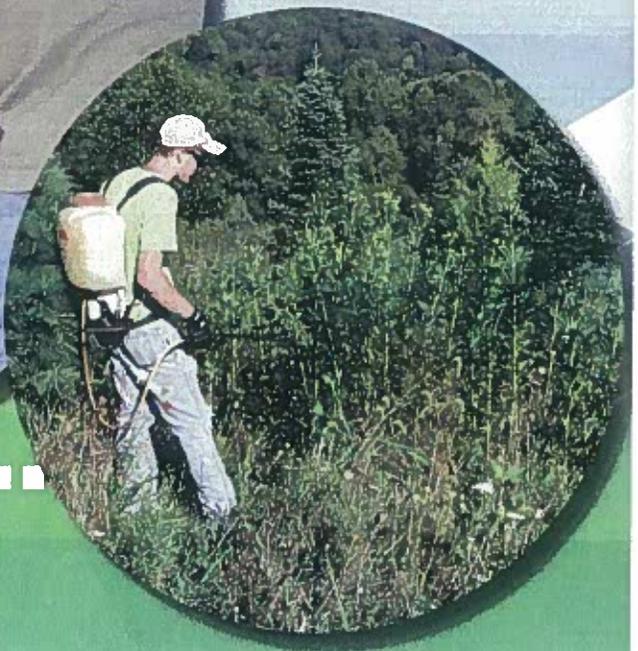
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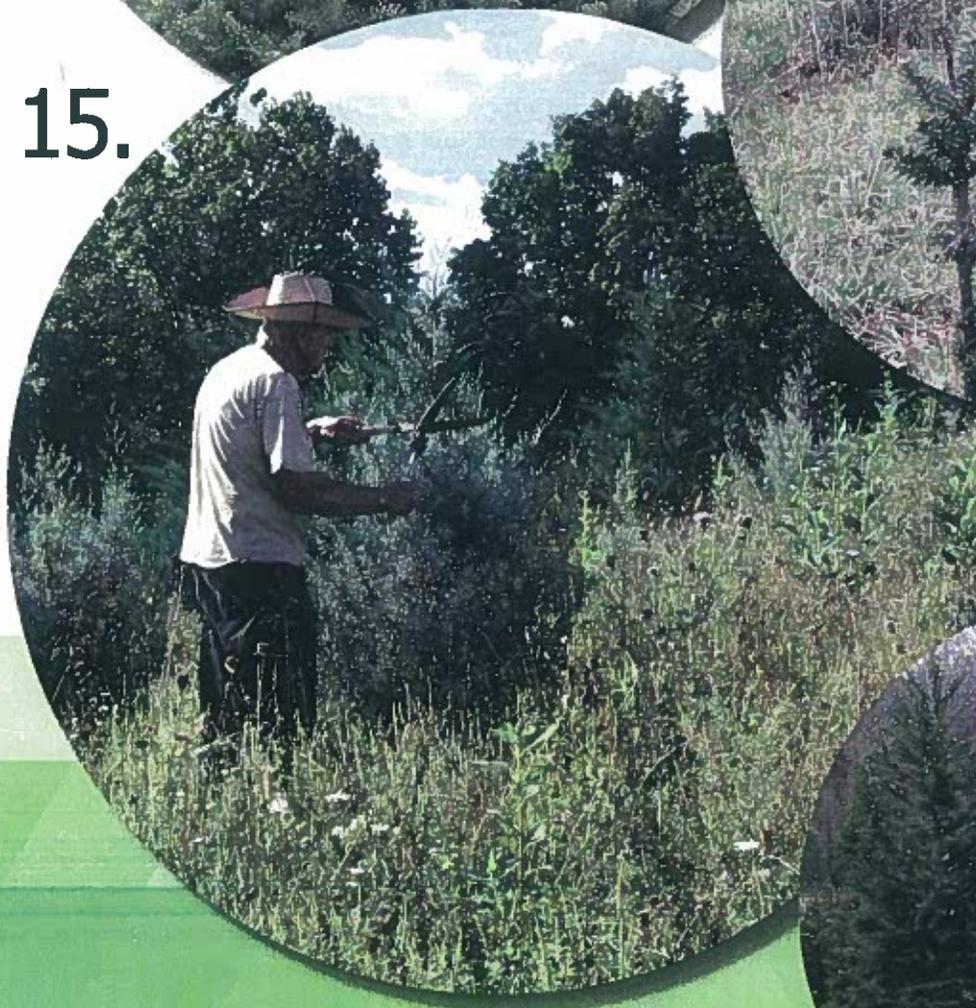
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16.



If seedlings are to be planted in one or two days, cover the roots with packing material, damping roots thoroughly and rewrap them. Wrap them tightly to prevent air circulation, which will dry the roots. Store the seedlings in a cool place such as a refrigerator, cool basement, root cellar, in or under a cool outbuilding or other cool location.

If seedlings are to be held for a longer period before planting, dig a trench in a cool shaded area and cover the roots with soil. Leave roots in bundles but be sure they are well watered and roots are completely covered. Roots can be further protected by using root gels.

CARE OF SEEDLINGS IN THE FIELD

Seedlings should be placed in containers to protect roots from direct sun. The young root hairs can be damaged or destroyed with minimal exposure to direct heat from the sun. Treatment of the roots with a soil moisture polymer, such as Terra-Sorb, will help seedlings survive when soils in the planting areas dry out. Where deer browsing is an issue, the tops of seedlings should be treated with a repellent product, such as Plantskydd, before planting.

Regardless of planting method be sure the roots extend straight downward in the planting opening/hole. Avoid bending or crooking of roots as this causes "U" or "J" roots. Make certain that you are keeping the root system straight. If roots are longer than the opening is deep, prune the roots until they extend downward in the opening without bending. This bending results in "U" or "J" rooting and the seedling will eventually die from the entangled roots. Always plant the seedlings at the same depth they were in the nursery. This depth can be determined by a distinct change in the color at ground level at which they were growing in the nursery.

When using a planting bar it is important to be sure not to leave air pockets at the bottom of the planting hole. After the seedling is properly placed in the "v-notched" hole insert the bar parallel and about two inches from the edge of the hole. Push the bar to the same depth as the planting hole and pull the top of the bar toward the person planting. This will firmly pack soil against the roots at the bottom of the hole. Then push the bar toward the seedling hole to seal the top against the seedling stem. Extract the bar and use the heel of the planter's boot ~~heel~~ to close the hole where the bar was removed. Be sure the seedling is vertical. If leaning too heavily the time needed to obtain a straight trunk will be extended by one or more years. Most WV sites do not require fertilization at the time of planting. Most growers can plant 30 or more seedlings per hour with a planting bar.

PLANTING TO SHEARING TIME FRAME

After the original planting is completed other management practices are needed. All seedlings will not survive until harvest size. Experience has shown that ten to twenty percent will die due to poor planting stock or poor planting techniques. An additional ten to twenty percent will be lost due to insect, diseases, or animal damage. Another five to ten percent could be lost to weather conditions such as drought or storm damage. Grass competition can also impact losses. Therefore, forty to fifty percent of the original plantings will not make it to market. Replanting dead seedling spots after the first and second year is highly recommended. Many growers continuously fill open spots annually.

Before seedlings reach a height of two to three feet multiple terminal leaders need to be removed (see *photo 4, page 9*), leaving the healthiest one. The base of the tree needs to be evened up by means of basal pruning, leaving at least a six inch height from the lowest whorl of branches to ground level. If preferred, basal pruning can be done when trees exceed three feet.

Pines grow buds only on the tips of new twigs. To increase density and achieve desired shape, the tips of some twigs must be cut/sheared. Shearing of pines can only be carried out in June and July in WV. If sheared too late new buds may not reset on cut twigs.

Spruce and fir can be sheared generally from July through March annually. Most growers prefer shearing the current year's marketable trees in July through October. Non-marketable spruce and fir trees can be sheared during the same period if time allows. However, the spruce and fir can be sheared between November and March.

Shearing tools include hand pruners, hedge shears (*see photo 15, page 12*), shearing knives (*see photo 3, page 9*), and power trimmers (*see photo 10, page 11*). By far the most commonly used shearing tool is the power trimmer, with a single rotating blade. These trimmers are available with gasoline or electric motors. Shearing knives designed for Christmas tree shaping are still used by many growers. Leg guards are necessary when using a shearing knife. Small trees can be shaped conveniently and efficiently with hand pruners or hedge shears. Proper techniques using any type of shaping tool can best be obtained from experienced tree growers.

The time to begin shearing varies by species. In general shearing should begin when twig elongation is nearly complete and needles length us three quarters or more complete. In WV the time to start will be later as altitude increases.

MARKETING CHRISTMAS TREES

Most WV Christmas tree farms are "Choose and Cut" operations, whereby individuals and families will walk the area to find their favorite tree. Most operations mow between rows to accommodate the selection process. However, it is possible to mow access pathways throughout the plantings to ease access.

To attract more customers the best method seems to be "word of mouth". Some growers have had success with newspaper, and radio and or television advertisements. Today, many people search the web for their information. Free ads can be placed in the WVDA, Market Bulletin. The WV Division of Forestry publishes a "Choose and Cut" booklet annually for distribution and on their website.

Other useful promotions include school tours whereby classes come to the farm and a tree is donated to their school. Providing a free tree to local towns is also a useful promotional activity.

Promotional booths at craft shows and county fairs are good opportunities. Articles can be written for local newspapers and inviting TV, radio and news crews to visit during the holiday season are potentially valuable also. Some farms provide trees and or wreaths for local festivals such as the Mountain State Forest Festival in Elkins.

OTHER PROMOTIONAL INCOME ACTIVITIES

Growing a pumpkin patch can get young children and parents out to the Christmas tree farm in the fall. While there it allows the opportunity to tag their Christmas tree.

Some growers also grow blueberries or other berries, which brings folks to the farm in the off-season.

Many growers make wreaths for additional income (*see photo 1, page 9*). This allows for the utilization of overgrown or poorly shaped trees. Selling garland and boughs are also possibilities.

Horse and buggy rides or "petting zoos" also offer income potential. Liability insurance may make this activity not feasible due to expenses.

Live tree sales in the form of potted trees, "grow bag" trees and or "balled and burlap" trees are becoming more popular. To legally sell trees, the grower must be a licensed tree nursery. Being a licensed tree nursery in WV offers another major advantage in that a WVDA Nursery Inspector will visit and examine your trees annually to determine the incidence of insect pests and for diseases problems. The inspector will provide you with an inspection report, which will also contain information on recommended control and prevention measures.

HARVESTING

Adequate parking is necessary with plenty of turning space as some customers will come with trailers or arrive in large trucks (*see photo 5, page 10*).

A tree shaker is a good investment for removing dead needles and other debris that has collected in the tree over its lifetime. Usually some dead grass and leaves will be present in the tree from dragging it from where it is cut to the vehicle.

Most growers invest in a netting machine (*see photo 11, page 11*) to place netting around the cut tree. This netting compresses the branches to the diameter of the netter cone (18"-30") for ease in transporting to the location where it is to be displayed.

BUSINESS MANAGEMENT

In any business accurate record keeping is crucial to success. The business of growing Christmas trees is no exception. Accurate records are necessary for taxation purposes as well as providing information to the owner in making sound business decisions. Records are needed to comply with IRS rules and regulations. Christmas trees are a capital asset and profit is treated as a capital gain or loss. Some costs must be capitalized and recovered when trees are sold. These costs include but are not limited to, site preparation, seedling cost and labor cost of planting. Always check with the IRS for current regulations.

Other day-to-day management costs such as labor for mowing and shearing can be deducted annually. Costs for equipment and materials such as tools for planting, shearing and sprayers can be deducted annually. Expensive items cost may have to be recovered through depreciation. Costs for materials such as herbicides, fertilizers and similar items can be deducted annually.

All growers need to take advantage of the capital gains tax treatment. All reputable CPAs and experienced growers can provide valuable insight as to how the analysis is completed.

SOURCES OF ASSISTANCE

A new grower, undertaking a Christmas tree business, will likely encounter problems along the way. In WV becoming an active member of the West Virginia Christmas Tree Growers Association (WVCTGA) can provide invaluable information on a wide variety of growing and marketing subjects. Contacts with experienced growers can be very helpful in resolving management problems. Growers are urged to join the WVCTGA.

The WV Division of Forestry (WVDOF) has field foresters covering all counties to provide landowner assistance in growing and managing forests and tree plantings for products including Christmas trees.

The WVU Extension Service has specialists in forestry and agriculture that can provide assistance.

The WV Department of Agriculture (WVDA) has plant nursery, insect, disease and pesticide experts to provide assistance statewide. All Christmas tree growers should obtain a nursery license and private applicators license from the WVDA.

Example: WV CHOOSE & CUT CHRISTMAS TREE PRODUCTION ANALYSIS

A small Christmas tree operation can potentially be a good income source and provide locally grown real trees to replace those fake imported trees. A small operation can also be a low investment business, however, the first payday is likely seven years away. To provide two hundred trees annually you need five acres of reasonably "level" (less than twenty percent slope) land available. The least labor and care is required for spruce and fir species, but they will require three to four years longer to reach a marketable height of six to eight feet.

The best species selection for West Virginia is Canaan fir, Concolor fir, Fraser fir or Norway spruce. At a spacing of seven feet between trees and eight feet between rows, five acres are required to produce two hundred marketable trees per year. Experience shows about sixty percent of planted trees should survive and be marketable as Christmas trees.

Investing in a wreath-making machine, wreath rings and decorations can further enhance the operation. It has been determined at some of the presently operating farms, that twenty to thirty percent of tree buyers also purchase a wreath.

Wreaths sales can begin after nine years of growing. Sufficient materials will be available from poorly formed trees, surplus trees and or lower branches left on the stumps of previously harvested trees. Experience has shown that approximately ten to twenty percent of consumers will also purchase a wreath. Wreaths on twelve-inch frames constitute most of the market as this size fits a standard door. They are also sufficiently large to use on easels for cemetery display.

Another highly recommended practice is to provide netting for trees making it easier to transport, providing a tree disposal bag, and needle retention, antioxidant compound like, "Forest Fresh." These three items can be provided for an additional cost of five dollars per tree, and should be added to the basic tree price.

At the recommended spacing of seven feet by eight feet, 330 trees will need to be planted annually in order to sell 200 marketable trees per year when in full production. Annual planting will require about ten hours. Once in full operation shaping trees with a shearing knife will require about twelve hours per acre.

CHOOSE & CUT TREES 12 YEAR PLAN

Year	Item	Cost Per Item	Total Expenses per Year	Revenue
1	Planting Bar	\$45.00		0.00
	Planting Bag	35.00		0.00
	Backpack Sprayer	100.00		0.00
	Seedlings (330 at \$.60/avg.)	198.00		0.00
	Stapler and Staples	75.00		0.00
	Herbicides	80.00	533.00	0.00
2	Hand Pruners	50.00		0.00
	Seedlings (330 at \$.60/avg.)	198.00	\$248.00	0.00
3	Seedlings (330 at \$.60/avg.)	198.00	198.00	0.00
4	Seedlings (330 at \$.60/avg.)	198.00	198.00	0.00
5	Seedlings (330 at \$.60 avg.)	198.00		0.00
	Shearing knife (18" to 20" handle)	65.00		0.00
	Leg Guards	40.00		0.00
	Hedge Shear	75.00	378.00	0.00
6	Seedlings (330 at \$.60/avg.)	198.00	198.00	0.00
7	Seedlings (330 at \$.60/avg.)	198.00		0.00
	Netter (18" to 20")	235.00		0.00
	Netter Table	250.00		0.00
	Bow saws (3 at \$14.00)	42.00		0.00
	Spare blades	40.00		0.00
	Sales Extras (tree preservative) \$5/tree x 10	50.00	815.00	0.00
	Tree Sales 10 @ \$30			300.00
8	Seedlings (330 at \$.60/avg.)	198.00		0.00
	Herbicides	80.00		0.00
	Sales Extras (Packaging, Tree preservative) \$5 per tree x 30	150.00	428.00	0.00
	Tree Sales (30 at \$30)			900.00
9	Seedlings (330 at \$.60/avg.)	198.00		0.00
	Wreath machine and table	265.00		0.00
	Wreath rings	75.00		0.00
	Wreath ribbon	250.00		0.00
	Bow saws (7 at \$14)	98.00		0.00
	Sales Extras (Packaging, Tree preservative) \$5 per tree x 70	350.00	1,227.00	0.00
	Tree Sales (70 at \$30)			2100.00
	Wreath Sales (6 at \$25)			150.00

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Year	Item	Cost Per Item	Total Expenses per Year	Revenue
10	Seedlings (330 at \$.60/avg.)	198.00		0.00
	Netter (26" to 30")	350.00		0.00
	Telescopic clipper	150.00		0.00
	Sales Extras (Packaging, Tree preservative) \$5 per tree x 120	600.00	1,548.00	0.00
	Tree Sales (120 at \$30)			3,600.00
	Wreath Sales (\$20 at \$25)			500.00
11	Seedlings (330 at \$.60/avg.)	198.00		0.00
	Sales Extras (Packaging, Tree preservative) \$5 per tree x 170	850.00	1,048.00	0.00
	Tree Sales (170 at \$30)			5,100.00
	Wreath Sales (\$30 at \$25)			750.00
12	Seedlings (330 at \$.60/avg.)	198.00		0.00
	Sales Extras (Packaging, Tree preservative) \$5 per tree x 200	1,000.00	1,198.0	0.00
	Tree Sales (200 at \$30)			6,000.00
	Wreath Sales (40 at \$25)			1,000.00
			\$8,017.00	\$20,400.00
			NET PROFIT	\$12,383.00

If herbicides are used for control of competitive vegetation, spot spraying with a backpack sprayer will take about three hours per acre. If mowing is carried out another two hours per acre will be needed.

The analysis that follows, contains the cost and income information from a central WV choose and cut Christmas tree farm, which has been in operation for over thirty years. Trees to be planted are spruce and fir, which require about twelve years to reach a marketable size of six to eight feet in height. Spacing is seven feet by eight feet. Planting will be with a planting bar and shearing with a knife. Sixty percent of the trees will be marketable and competitive vegetation will be controlled with spot spraying using a backpack sprayer. Mowing is recommended especially when the first trees are expected to be marketable. The cost of a mower is not included in the calculations. Most landowners have a mower that can be adapted to the tree project by planning and designing tree spacing and row layout to accommodate the mobility and size of the mower.

This analysis assumes that it will not be necessary to hire labor. If all goes as planned at the end of the first 12 years rotation the total costs invested will be \$8,017. The total expected revenue at year 12 would be \$20,400 resulting in a net profit of \$12,383. Subsequent years would naturally result in higher profits, as the only necessary costs would be for seedlings, herbicide and equipment repairs or replacement.

This analysis assumes that future inflation changes would equally impact costs and revenues. The analysis assumes the worst case of seedling survival. If seedling survival is greater than sixty percent more marketable trees will be available. If all planting spots caused by seedling mortality are promptly replanted, then the needed acreage for the total project will be reduced.

When the 2014 planting is twelve years old, the 200 marketable trees will be obtained as follows:

- 2014 planting now 12 years old – yields 30 trees
- 2015 planting now 11 years old – yields 50 trees
- 2016 planting now 10 years old – yields 50 trees
- 2017 planting now 09 years old – yields 40 trees
- 2018 planting now 08 years old – yields 20 trees
- 2019 planting now 07 years old – yields 10 trees = 200 trees total

This pattern would continue in subsequent years if annual planting continues at the same rate.

A Christmas tree farm is just one investment opportunity. Money could be invested in other income producing alternatives such as stocks, bonds, bank savings accounts or many other options. If a minimum of five percent is desired the expected return to investment can be calculated from the examples anticipated costs and incomes. The costs and incomes are compounded to the end of twelve years. The costs plus interest at five percent equals \$9,669. The income plus interest at five percent equals \$21,745. The expected return to investment is about seventeen percent.

It should be obvious that this will be reduced if any other costs are incurred during the twelve-year timeframe. Other costs could be investment in an auger for planting larger trees, a power trimmer, tree shaker, winch, advertising, labor or other miscellaneous costs. In a like manner if harvested tree prices were increased the expected return to investment would increase.





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