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CHRISTMAS TREE



Production

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SUMMARY

- (1) Christmas trees with good characteristics can be grown in Alabama and the Southeast.
 - (2) Fifteen varieties of trees, involving nearly 5,000 plants, were used in this hillculture experiment, begun in 1940.
 - (3) Greater tree growth was obtained from the crimson clover-rescue grass combination, which was used as an erosion-control practice.
 - (4) Arizona cypress and red cedar give promise as Christmas tree selections. In harvest tests, Arizona cypress ranked first, red cedar second, and pine third.
 - (5) In a one-season market test, Arizona cypress sold for well over \$1 per tree, while red cedar averaged about 85 cents each.
 - (6) Spacing on contour rows 4 feet wide with plants 4 feet apart in the row gave good results.
 - (7) Results indicate that the same plant may furnish trees over and over again by the normal habit of top-renewal.
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The COVER . . .

Ten-foot Arizona cypress growing on an erosion-control cover of crimson clover and rescue grass. These trees were planted in 1940 as seedlings. The test market preferred Arizona cypress over other trial species because of its good form, fine aroma, smooth needles, and blue-green color. The Arizona cypress appears to be the best variety for Christmas tree production in Alabama and the Southeast.

CHRISTMAS TREE



*Production*¹

JOSEPH C. MOORE, *Project Leader*²

CHRISTMAS TREE production is a new specialty crop possibility for Alabama and other Southeastern States where there are suitable idle lands, long growing seasons, and plenty of rainfall.

Several varieties of Christmas trees have been found to make excellent growth in the Region. Some of these varieties are just as rich in color and fragrance, and as stately in form as any trees produced in the North or Northwest. Furthermore, they may be grown in much shorter time and at less cost.

Production of a specialty crop usually requires a period of waiting by the grower for the crop to mature or to reach a stage of growth for market. This is true of Christmas tree production, which requires at least 2 to 5 years. Thereafter, with proper care and management, annual crops may be harvested from a Christmas tree plantation.

EXPERIMENTS *with* CROPS *on* SLOPES

For a number of years, experiments have been conducted to determine new types of crops for profitable and safe use on sloping lands where erosion makes it inadvisable to grow cultivated crops. Included in this hillculture research, are experiments in growing Christmas trees under soil-conserving methods.

¹ Joint project between the Soil Conservation Service Research, and the Alabama Agricultural Experiment Station.

² Work was begun by Ozell A. Atkins, former Project Supervisor, now in military service.

Fifteen Varieties of Trees Tested

Fifteen different kinds of Christmas trees were set in 1940 for these experiments. The number planted of each ranged from 308 to 338 seedlings. The common and scientific names of the trees tested, numbers planted, percentage of survival, rate of growth, and rating of comparative values for production as commercial crops of Christmas trees are given in Table 1.

Erosion-Control Practices Used

The planting site was divided into 16 plots, on which each of the following erosion-control covers were replicated four times: (1) Native vegetation, (2) partridge peas, (3) *Lespedeza sericea*, and (4) combination of crimson clover and rescue grass.

These practices were randomized, in order that each would be fairly well represented on the varying degrees of erosion occurring on the planting site.

Lespedeza sericea, a summer perennial, and partridge peas, a summer annual, were sown in the spring soon after the tree seedlings were planted. The sericea was seeded at the rate of 20 pounds of seed per acre, and the partridge peas at 30 pounds per acre.

Crimson clover and rescue grass, both winter annuals, were planted in combination the following fall. The per-acre seeding rate for crimson clover was 20 pounds, for rescue grass 30 pounds. This combination has produced volunteer stands each year since it was planted.

Cultural Methods Followed

All plants were set in contour rows 4 feet wide and spaced 4 feet apart in the rows, giving approximately 2,700 trees per acre.

The soil was plowed and harrowed, in order to speed planting operation. One man made the holes, another dropped the plants, and a third pushed a dibble into the ground near the plants to cover the roots. To prevent the seedling roots from becoming dry, they were kept in buckets partly filled with water.

No fertilizer was used during the first growing season, since the planting was on land where well-fertilized corn was grown

TABLE 1.—RATE OF GROWTH, AND POSSIBILITY RATING OF 15 KINDS OF TREES¹ GROWN AT MAIN STATION, AUBURN, 1940-44

Common Name	Scientific Name	Plantings	Survival	Height at 4 years	Possibility Rating		
					Good	Fair	Poor
		<i>Number</i>	<i>Per cent</i>	<i>Feet</i>			
White Fir	<i>Abies concolor</i>	331	4.4	1.2			x
Arizona Cypress	<i>Cupressus arizonica</i>	332	99.4	11.7	x		
Oneseed Juniper	<i>Juniperus monosperma</i>	332	93.9	1.8			x
Eastern Red Cedar	<i>Juniperus virginiana</i>	336	99.7	6.5	x		
White Spruce	<i>Picea glauca</i>	332	0	0			x
Alberta White Spruce	<i>Picea glauca albertiana</i>	334	0	0			x
Norway Spruce	<i>Picea excelsa</i>	332	0	0			x
Oriental Spruce	<i>Picea orientalis</i>	336	0	0			x
Colorado Spruce	<i>Picea pungens</i>	335	0	0			x
Eastern White Pine	<i>Pinus strobus</i>	328	65.5	3.8		x	
Scotch Pine	<i>Pinus sylvestris</i>	308	93.0	1.7			x
Scrub Pine (Virginia P.)	<i>Pinus virginiana</i>	328	71.3	5.1		x	
Douglasfir	<i>Pseudotsuga taxifolia</i>	336	0	0			x
Canada Hemlock	<i>Tsuga canadensis</i>	331	0	0			x
Oriental Arborvitae	<i>Thuja orientalis</i>	332	97.9	5.1			x

¹ Plants used were obtained through the Soil Conservation Service Nurseries.

TABLE 2.—COMPARATIVE HEIGHTS OF PROMISING VARIETIES GROWN UNDER DIFFERENT COVERS, 1943-44

Varieties	Height of trees on native vegetation		Height of trees on <i>Lespedeza sericea</i>		Height of trees on partridge peas		Height of trees on crimson clover-rescue grass	
	1943	1944	1943	1944	1943	1944	1943	1944
	<i>Feet</i>	<i>Feet</i>	<i>Feet</i>	<i>Feet</i>	<i>Feet</i>	<i>Feet</i>	<i>Feet</i>	<i>Feet</i>
Arizona Cypress	7.5	9.8	7.5	9.0	6.9	9.3	9.9	11.7
Red Cedar	2.6	3.2	1.7	2.9	2.4	3.6	4.4	6.5
Scrub Pine	3.2	3.8	3.0	3.4	3.4	4.2	3.9	5.1
White Pine	2.4	2.9	2.3	3.0	2.5	3.1	2.9	3.8

[5]



Above: Red cedar, grown on an erosion-control cover of crimson clover and rescue grass, averaged $6\frac{1}{2}$ feet in height at 4 years of age.

Below: Red cedar, grown on an erosion-control cover of partridge peas, averaged about $3\frac{1}{2}$ feet in height at 4 years of age.

the year before. All plots were fertilized with 300 pounds of superphosphate and 75 pounds of muriate of potash per acre at the time the crimson clover-rescue grass combination was planted.

The spring-planted plots in *Lespedeza sericea* and in partridge peas received no further cultivation after seeding. The plots that were allotted to native vegetation and to the clover-grass combination were cultivated once during the summer to eliminate the competition of weeds. A second cultivation was given the clover-grass plots in the fall after the fertilizer was applied and the rescue grass seed were sown. This was done primarily to cover the grass seed and prepare the soil for planting the clover. The crimson clover was treated with commercial inoculum and then mixed with soil from a field that had previously grown clover. This seed-soil mixture was then broadcast but left uncovered.

Growth from Different Treatments

Growth response of the most promising plants to each of the erosion-control practices used during 1943 and 1944 is shown in Table 2.

All practices were effective in controlling erosion. However, cover crops in three of the practices make their growth during the summer and seriously compete with the young trees.

The crimson clover-rescue grass combination makes its growth during the winter and early spring when the trees are dormant. The mature vegetation falls to the ground and forms a heavy mulch, which practically eliminates weed growth in the summer. The effect of this mulch upon soil improvement is still to be determined.

Four species have made satisfactory growth and have other characteristics that make them promising for Christmas tree production. On the basis of present results, they rank in the following order: Arizona cypress, red cedar, scrub pine, and white pine.

Arizona cypress grows rapidly, has good form, and is bluish-green in color. The tree is easily handled because of its smooth needles. It holds its needles and rich aroma over a long period after cutting. Arizona cypress has one minor disadvantage. The



Above: Red cedar, grown on a no-treatment plot of native vegetation, averaged 3-1/5 feet in height at 4 years of age.

Below: Red cedar, grown on an erosion-control cover of *Lespedeza sericea*, averaged about 3 feet in height at 4 years of age.

disease *Macrophoma cupressi* attacks the tender growing points of some of the trees, giving them a brownish color. Very little damage, however, occurred the first 4 years.

Red cedar grows less rapidly than Arizona cypress, coming into production 2 years later. However, it has several good qualities that give it some possibilities as a tree crop. Red cedar is less susceptible to diseases, and it has a fine aroma and good form; also, it produces a high percentage of marketable trees.

Red cedar has two disadvantages: (1) it has sharp needles, making it prickly to handle, and (2) it is the alternate host for apple cedar rust. This disease does not damage red cedar as a Christmas tree. However, care must be taken not to plant red cedar close to an orchard, since apple rust causes serious damage to the apple tree.

Top-Renewal Studies

In December 1944 several trees of each recommended variety were harvested for the local market. The Arizona cypress, red cedar and pine were cut to give Christmas trees of good form and of desirable size.

The stumps of the Arizona cypress varied in height from 1 to 5 feet, whereas the stumps of the red cedar and pine averaged about 8 inches. This difference in stump height is due to the more rapid growth of the Arizona cypress.

When spring growth began in 1945, the limbs of the Arizona



This Arizona cypress, 10 feet high on September 1, 1945, was cut for a Christmas tree the previous December. A 4-foot stump was left. By top renewal, this plant has produced another tree of good form and height. To harvest the tree, the cut is made 6 inches below the original stump. A plant may be made to produce several trees by this method.

cypress immediately below the cut turned upward without pruning or training. These limbs formed as desirable or in some instances a more desirable tree than the original.

The red cedar and pines also formed terminal leaders from limbs left below the cut. However, pruning to one leader was necessary in the case of both before a well-balanced tree could develop. Since these trees grow slowly, it would require 2 or more years before a second Christmas tree could be cut from the same stump.

Results from this study indicate that several Christmas trees may be harvested from one plant. This practical phase of Christmas tree production is commercially important for several reasons: (1) the soil is protected by a continuous cover; (2) poorly shaped trees can be corrected to make marketable trees; and (3) cash returns per acre may be greatly increased by continuous cutting.

Harvesting and Marketing Experiments

Experimental harvesting was begun in 1942, in order to determine how long the plants would hold their color and needles, and retain fresh appearance. Arizona cypress ranked first in these tests, red cedar second, and the pines third.

Experiments to determine consumer preference were begun on the Auburn, Alabama market in December 1944. Arizona cypress was by far the best seller, and red cedar was second; no pines were bought. The Arizona cypress averaged well over \$1 per tree, while the red cedar averaged about 85 cents. The relatively high market preference for the Arizona cypress is indicated by the fact that for every red cedar sale there were five Arizona cypress bought.



Northwest, imported Christmas trees sold on the Auburn, Alabama market in 1944 were of poor quality, and had broken limbs and naked bases. In contrast, locally-grown Arizona cypress Christmas trees on the same market had excellent form, good quality, and well filled out bases.



No white pine (foreground) or scrub pine (background) Christmas trees were bought in the marketing experiment. Apparently, neither species met the customer's Christmas tree wants, even though both had good form and color. The two species shown are on a plot having a soil-protecting cover of crimson clover and rescue grass.

METHODS *of* PRODUCING CHRISTMAS TREES

Arizona cypress, red cedar, white pine, and scrub pine may be grown for Christmas trees on lands not suited to row-crop production. However, the Arizona cypress and red cedar appear to be the more promising for market as Christmas trees.

Where to Get Planting Stock

There are several sources from which planting stock may be obtained. The first, easiest, and most convenient source is a reliable nurseryman. The price from this source will be a little expensive.

Another is the possible development of a small community nursery through the assistance of the local forestry agencies. In such a case, the cost of seedlings might be considerably less than that of commercial stocks.

Seedlings may also be obtained from the nursery of the State Department of Conservation.

It also is possible to grow tree seedlings at home. This, however, would involve the expenses of making the beds, and growing the plants from seed. On the other hand, the grower might sell extra plants to cover the cost of production.³

Where to Plant

There are three general types of land in Alabama and the Southeast that can be used for Christmas tree production; these are in the general class of idle land:

- (1) Old broom-sedge fields make an ideal location to produce trees.
- (2) Fields where bench terraces make row crops difficult to handle are easily converted to Christmas tree production.
- (3) Recently cut-over land can be utilized for a crop of Christmas trees while a stand of timber is being established. In this case only part of the young trees would be harvested for Christmas trees, leaving the remainder to grow for timber.

Preparation for Planting

Land to be planted to Christmas trees will need some preparation before planting. Where broom-sedge is present on the site, it must be destroyed by cultivation before the trees are planted. This may be done by turning with a plow and cutting it well with a disk. If a large amount of roots and stumps are present, a gee-whiz scratcher with three teeth set at an angle may be used effectively.

Spacing the Seedlings

Contour rows 4 feet wide, with trees spaced 4 feet in the row, is the most practical spacing for Christmas trees. This spacing is ample for producing good tree form and aids in cultivation. The contour rows help to prevent erosion.

³ See U. S. Farmers Bulletin No. 1453.

Method of Planting

Any method of setting the plants may be used. Three methods commonly used by nurserymen are:

- (1) A wedge-shaped dibble is pushed into the ground and lifted, leaving a V-shaped hole. The seedling is then inserted, and the dibble is pushed into the ground by the side of the plant, making sure that the hole is filled to the bottom. This last hole is filled with the dibble or by packing with the foot.
- (2) A mattock may be used to dig and lift out the soil. The plant is placed at one side of the hole, and the dirt is returned and packed tightly with the foot.
- (3) The third method is to use a turning plow with a modified slot wing, which lets the dirt fall back into the furrow. One man plows, another places the plants down by the plow before the soil falls back into the furrow, and a third man packs the dirt by the plants with his foot. While this is a fast method, it is not quite as efficient as the other two.

What Fertilizers to Apply

If Christmas trees are to follow cotton or corn that has been heavily fertilized, it is not necessary to apply a complete fertilizer at planting time. However, if the planting is done on land that has been idle for several years, it is advisable to apply 600 pounds of 6-8-4 fertilizer at planting time.

When the ground covers are planted in the fall, an additional application of 300 pounds of superphosphate and 75 pounds of muriate of potash is given the crimson clover and rescue grass.

After the clover is planted no further applications are necessary.

Planting Erosion-Control Cover Crop

Planting an erosion-control cover crop during the fall after the trees are set is very important in Christmas tree production. Excellent results were obtained from crimson clover-rescue grass combination. This cover eliminated further cultivation, reseeded each year, controlled erosion, and eliminated practically all weed growth in the summer.

Cultivation Needed First Year

One cultivation is needed during the first summer after the trees are planted in order to help eliminate competing weeds. After the fertilizer is applied and grass seed are sown the following fall, another cultivation is needed to cover the grass seed and prepare the soil for planting the crimson clover. This method of cultivation does not require much time, and it aids the trees greatly during the first year.

When to Expect Returns

Some cash returns can be expected the second year from the sale of small potted trees. There is a demand for living Christmas trees for table decorations, which can be supplied by potting the best plants the second year. Customers can use the potted plants after the holidays as ornamental plantings in the yard.

Many trees may be expected to reach size for cutting from Arizona cypress the third year, and from red cedar the fifth year. In general, Christmas tree plantings are managed on a selection system, harvesting the larger trees and leaving the smaller ones for future cuttings.

