

**THE EFFECTS OF TWO CULTURAL TREATMENTS
ON FIVE CHRISTMAS TREE SPECIES
GROWN ON RECLAIMED MINED LAND**

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STUDY A:

Introduction:

This progress report (July 2004) provides an overview of a multi-year mined-land reforestation trial using five Christmas tree species. The multi-year project is designed to determine the effects of two cultural treatments on the growth and development of five Christmas tree species. The report summarizes results for the fourth year (2003-04) survival rates results.

Overall Objectives:

----- Research -----

1. Determine if using Brush Blanket^R will promote growth by inhibiting unwanted weed growth, increasing moisture retention, and raising soil temperatures around seedlings.
2. To determine what effects slow-release fertilizer will have on the growth and establishment of trees at time of planting.

----- Educational -----

1. To establish an area that can be used for educational programs.
2. To give students proper instructions on how to care for Christmas trees.

Methods And Materials:

This multi-year project was started in the spring of 2000. The study site, known as the Powell River Project, is located eight miles east of Norton, Virginia. The species of tree selected for this project are as follows:

1. Douglas Fir
2. Fraser Fir

3. White Pine
4. Scotch Pine
5. Blue Spruce

The following plots were used and growth of trees compared:

1. Bare Plots
2. Brush Blanket
3. Plots that received slow-release fertilizer.

Soil samples were collected from all the plots. The samples were tested for:

1. Nitrogen (N)
2. Phosphorus (P)
3. Potassium (K)

All testing was done by second-year students in the Forestry and Environmental Science Programs.

A 6' X 6' grid was used to ensure that the trees would have adequate space for proper growth and development. The trees were planted in rows with each row containing fifteen seedlings. Agriform^R 21g slow-release fertilizer pellets were placed six inches from the seedlings in the fertilizer plots. These pellets were placed four inches deep in the soil and four to six inches on two sides of the seedlings. The Bare plots did not receive any treatment. The Brush Blanket plots will promote rapid growth of seedlings by inhibiting unwanted weed growth.

Results And Discussion:

This is the fourth year report of this project. We have used standard deviation, range, and means in our statistical analysis. The standard deviation is an index of dispersion of individuals about the mean (Table 2).

The soil analysis indicated soil pH variations. The soil pH levels ranged from 5.1 to 6.5. The soil test also showed variations in needed nitrogen, potassium, and phosphorus.

Tree species yielded varying results in vigor and survival rate (Table 1 and Figure 1). Figure 1 also showed the distributions of living tree species according to treatments.

Conclusion:

At the end of the fifth year, students will draw final conclusions. The final conclusions will be based on data collected from year one to five.

Table 1: Living trees with maximum of 15 trees per row

Treatments	Species				
	White Pine	Douglas Fir	Blue Spruce	Scotch Pine	Fraser Fir
Fertilizer	6	10	7	7	10
Bare Plot	8	8	3	3	12
Bush Blanket	10	14	6	8	13

Table 2: Means, Standard Deviations, and Ranges of Treatment

Function	Species				
	White Pine	Douglas Fir	Blue Spruce	Scotch Pine	Fraser Fir
Standard Deviation	2.00	3.05	2.08	2.65	1.52
Mean	8.00	10.66	5.33	6.00	11.66
Range	6-10	8-14	3-7	3-8	10-13

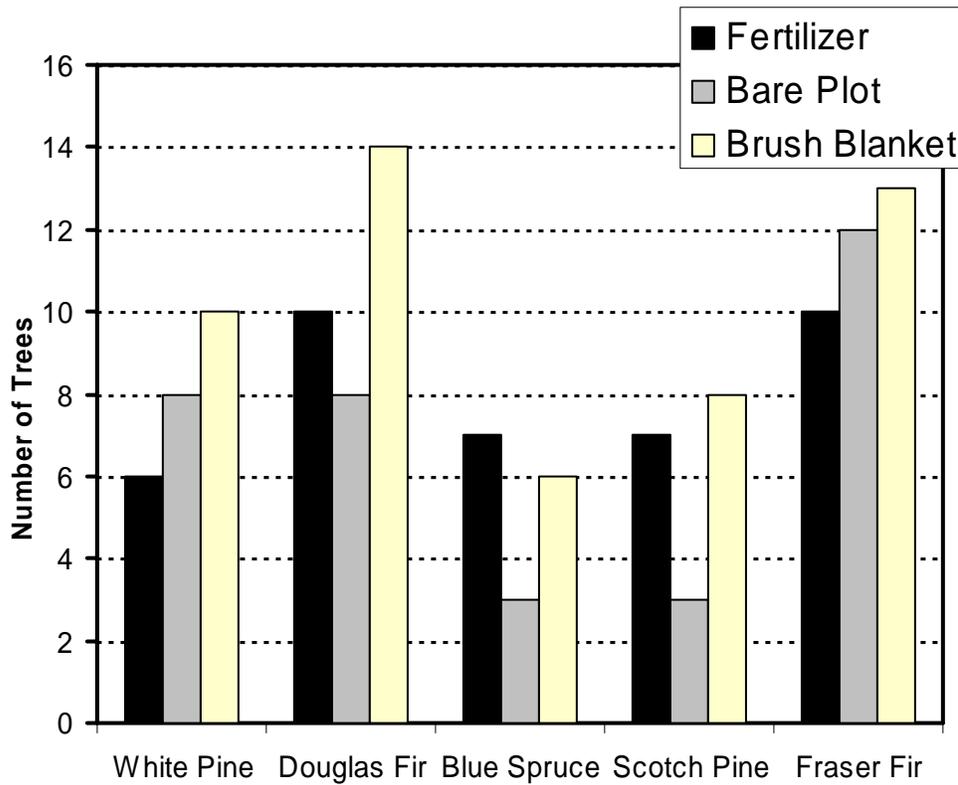


Figure 1: Distributions of Living Trees by Treatments

STUDY B: CHRISTMAS TREES DEMONSTRATION SITE

Introduction:

The plots were first established during the spring of 1994. The Christmas trees that are being grown at this site are used for decoration for homes during the Christmas season.

The advantage of Christmas trees is that they require less care than agronomic crops. They are suitable for growth in soils where regular broad-leaf trees simply could not survive.

Materials And Methods:

The seedlings were planted in 6' X 6' plots. The plots were established with seedlings ranging from two to three years old.

The following seedlings were planted on a random basis:

1. Douglas Fir
2. Fraser Fir
3. White Pine
4. Scotch Pine
5. Blue Spruce
6. Norway Spruce

Nutrient deficiencies were corrected by placing fertilizer pellets in holes four inches deep and four to six inches on each side of the seedlings. During summer months, the plots were mowed as needed by students. The trees were also sheared with shearing knives during the month of June.

Objectives:

- - - Educational - - -

1. To demonstrate different planting methods to students.
2. To illustrate to students the proper care for Christmas trees.
3. To demonstrate to students the proper methods of pruning and harvesting.
4. To illustrate to students the effective ways to market Christmas trees.
5. To provide a demonstration site that can be used by the community.

During the month of November 2003, the trees were sprayed with Malathion. This insecticide was used to control aphids and spider mites. Prior to spraying an insect survey was conducted by using mantis vacuum to collect insects, eggs, and dead remains.

Results And Discussion:

Twenty trees were harvested and sold for \$190.00. This year we expect to harvest about 30 trees.

This demonstration site is used for the following:

1. AGR 205: Soil Fertility and Management
2. AGR 208: Insect Control
3. FOR 100: Introduction to Forestry
4. FOR 215: Applied Silviculture
5. FOR 115: Dendrology
6. ENV 290/FOR 290: Internship
7. Governors School
8. Field Trips – Local Schools
9. ACCESS 2004

Conclusions:

Some of the problems students encountered:

1. Dry/Wet weather following the months of planting.
2. Compacted Soils – rocky subsurface not allowing for a healthy root – system to develop.
3. Leaching of Nutrients from heavy rains.
4. Water-logged areas.
5. Late Frost damage.

The site will continue to offer other educational benefits to MECC students. It is also accessible to the entire community as a demonstration site.

The following MECC students participated in the studies, gathered data and helped prepare this report: Jean Taylor, Michael Collins, Jessica Taylor, Matthew Varble, Greg Johnson, Keith Bevins, Josh Leonard, Jodi Spriggs, T.J. Shelburne, Brad Hamilton, Brooke Jones, and Chris Collins.