REFORESTATION SPECIES STUDY ON A RECLAIMED SURFACE MINE IN WESTERN MARYLAND

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Abstract.--Westvaco Forest Research established a species comparison test including eighteen species of trees in the spring of 1978 on a recently reclaimed surface mine in Garrett County, Maryland. After two growing seasons height growth of all species has not been impressive. Seven species have better than 75 percent survival with pitch pine being best. Seven other species have survival rates between 50 and 75 percent. Tall herbaceous vegetation, like crown vetch, can be a major deterrent to establishing trees on reclaimed surface mine sites.

INTRODUCTION

Westvaco Corporation is a pulp and paper company with four major mills located east of the Mississippi River. One mill is located in Luke, Maryland and produces fine papers. The land surrounding this mill supplies both wood fiber and coal for the production process. Westvaco Resources Incorporated, a subsidiary company, mines coal on company land to provide the main energy source for the mill. Obviously, Westvaco is interested in using trees for reclamation on both company and other land in order to prevent or minimize reductions in local wood fiber supply to the mill.

Reforestation in the Luke area is not a new topic to Westvaco. Virginia pine plantation establishment on company land has been and is a major project. Many of the same principles and practices used in this program are also applicable to reclaimed mine sites. We know that we need good quality seedlings that have been correctly lifted from the nursery and properly stored and planted. We also know that we should match the species planted to the site. However, reclaimed sites are not representative of "normal" forest sites since they have been drastically disturbed. So the question of which species is best suited to the site is not always easily answered.

PROCEDURE

In order to obtain more information with a variety of species a study was established on a recently reclaimed surface mine site located on Backbone Mountain in Garrett County, Maryland. Prior to study establishment, a literature search was conducted to determine which species have been planted successfully on mine sites in the northeast. A list from this search and personal observations of species growing well on mined sites was prepared. Seedling sources for as many of these species as possible were located. However, some species like bigtooth and quaking aspens, and black, yellow, and gray birch are not being grown commercially and could not be included in the study.

A total of 18 species, 11 hardwood and seven conifer, were used in the study and are shown on the following list:

Hardwoods

1. Hybrid poplar
2. Hybrid poplar*
3. Hybrid aspen
4. Paper birch
5. European white birch
6. Red oak
7. Red oak*
8. Black locust
9. Red maple
10. American chestnut
11. White ash
12. Chestnut oak
13. American sycamore

Conifers

1. Red pine
2. Red pine*
3. White pine

Procedure (continued)

Conifers (continued)

4. White pine*
5. Virginia pine
6. Containerized Virginia pine
7. Pitch pine
8. Scotch pine
9. Japanese larch
10. Austrian pine

*Interplanted with European black alder

Three replications of these species-treatments were planted. Hybrid poplar, red oak, red pine and white pine were duplicated within each replication; interplanting one plot with European black alder. The purpose of the interplanting treatment is to determine if the alder can fix enough nitrogen to be beneficial to the other species. Virginia pine was also duplicated by including seedlings grown in containers to see if containerized stock might have better survival and growth.

RESULTS

Height and survival results after the second growing season since planting are shown in the following table:

Species-Treatment	Height	% Survival	Rank by Survival
Pitch pine	1.1	94	1
Chestnut oak	1.2	88	2
American chestnut	1.6	88	2
Austrian pine	0.9	85	3
Hybrid poplar	1.0	81	4
Hybrid aspen	2.0	77	5
Scotch pine	0.8	77	5
White ash	0.8	71	6
Red pine*	1.1	69	7
Virginia pine	1.2	69	7
Hybrid poplar*	1.0	69	7
Red maple	1.6	69	7
Containerized Virginia pine	0.6	65	8
European white birch	1.1	60	9
Red oak	0.6	46	10
Red oak*	0.6	44	11
Black locust	2.3	44	11
Paper birch	1.1	42	12
Japanese larch	0.9	42	12
Red pine	0.9	29	13
White pine	0.8	27	14
White pine*	1.0	27	14
American sycamore	0.4	6	15

*Interplanted with European black alder

Results (continued)

Height growth has not been impressive. European black alder, which is not listed on the table because it was planted only as a nitrogen fixing nurse tree, had the best height growth. Alder was not planted as a crop tree because our past experience has shown that after fast initial growth to a size of 15 to 20 feet it discontinues growth and funnels all its energy into seed production. Black locust is the tallest test species averaging 2.3 feet.

Survival results at this stage might be more important than height results. Seven species have survival that could be rated as good (>75%) with pitch pine being best. Seven other species have fair survival (50-75%), and nine species would have to be classified as having poor (<50%) survival.

Some of the poor survival can be related to poor seedling stock quality. We did have to go to different nurseries to obtain the variety of species used for this study. Variation in seedling stock quality is also the probable cause of the large survival difference between the two red pine treatments. Most of the survival and height growth problems, however, can be attributed to the harsh site and competition from herbaceous vegetation. Grass competition has certainly held back seedling growth, but in plots where crown vetch is present the seedlings have been completely smothered. Vetch is also spreading and we anticipate the loss of other seedlings before they grow above this competition. If we are to establish trees on our reclaimed mines we will have to develop herbicide treatments to at least spot kill the ground cover now being established in the areas.

CONCLUSION

Our preliminary results show that height growth has been slow for all species other than European black alder. Several species have good survival after two years in the field. Tall herbaceous vegetation, like crown vetch, can be a major deterrent to establishing trees on reclaimed surface mine sites.