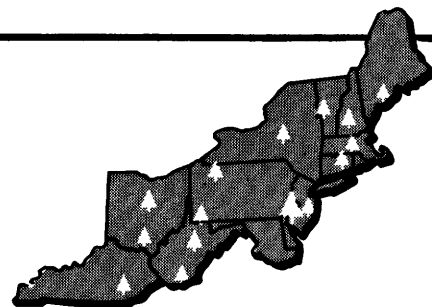


1976

Northeastern Forest Experiment Station



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HYDROMULCH: A POTENTIAL USE FOR HARDWOOD BARK RESIDUE

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Abstract.—Hardwood bark fines and two hardwood bark fibers were compared with wood-cellulose fiber and paper fiber mulch to determine their effectiveness as hydromulches in revegetating disturbed soil. The results showed that either bark fines or bark fibers can be utilized as a hydromulch to aid in the revegetation of strip mines, highway construction sites, and similar earth-moving operations.

KEYWORDS: mulching, hardwood bark, revegetation.

In the Appalachians, most land disturbed by surface mining, highway construction, and similar earth-moving projects is mulched with hydroseeders. These machines apply a water-borne mixture of mulch, seed, and fertilizer in a single operation. The mulches used most often in hydroseeding (hydromulches) are either wood or paper fiber. Wood fiber is the most commonly used.

Research has shown that coarse hardwood bark residues perform effectively as mulch for revegetating severely disturbed soils. But commercial use of bark mulch has been limited by the lack of efficient application equipment. The machines commonly used for

applying coarse mulches are incapable of spreading bark mulch over the long slopes common in the region. Consequently, we investigated the potential for using hardwood bark fibers as hydromulches.

The Study

Our objective was to compare three types of bark fibers—bark fines and two processed bark fibers—with other commercial hydromulches for establishing vegetation on severely disturbed soils.

Bark fines result from screening shredded hardwood bark to produce decorative bark mulches. The fines make up about 20 percent



Figure 1.—Hydroseeder applying seed, fertilizer, and bark fines.

of the total bark residue volume, and have limited commercial markets.

The two bark-fiber products were produced from raw bark from a sawmill debarker: Bark fiber A—raw bark was hammermilled and processed through a pressurized refining system. Bark fiber B—raw bark was hammermilled and processed through an attrition mill. Except for color, both bark-fiber products were physically similar to wood-fiber hydromulch.

Preliminary tests revealed that bark fines small enough to pass through a screen with 1/10-inch openings, and all bark fiber A and bark fiber B could be applied with a hydro-seeder.

Procedure

In the spring of 1973, eighteen 1/20-acre plots were established on a regraded strip mine. All plots had a southeasterly aspect and the same percent of slope. Five mulch treatments were used: bark fines, bark fiber A, bark fiber B, wood fiber, and paper fiber. All mulches were applied at a rate equivalent to 1,500 pounds per acre at 20 percent moisture content. The treatments were replicated twice and applied randomly to the test plots. Three plots were left unmulched for controls.

All plots were fertilized with 100 pounds of ammonium nitrate and 100 pounds of 18-46-0 fertilizer per acre and seeded with 15 pounds of Kentucky 31 fescue (*Festuca*

Table 1.—Vegetative coverage of sample plots

Treatment	Vegetative coverage ¹		
	27 June 1973	26 October 1973	13 June 1974
Control	63 b	75 a	87 a
Wood fiber	58 b	83 a	92 a
Paper fiber	83 a	88 a	92 a
Hardwood bark fines	86 a	93 a	95 a
Hardwood bark fiber A	76 ab	89 a	89 a
Hardwood bark fiber B	67 ab	85 a	88 a
		(n.s.)	(n.s.)

¹Any two means with different letters are significantly different at the 5-percent level; n.s. appears at the bottom of columns when means are not significantly different.

arundinacea), 6 pounds of redtop (*Agrostis alba*), 3 pounds of lovegrass (*Eragrostio curvula*), 13 pounds of perennial rye (*Lolium perenne*), 20 pounds of sericea lespedeza (*Lespedeza cuneata*), and 10 pounds of Japanese millet (*Echinochloa frumentacea*) per acre. Fertilizer, seed, and mulch were applied with a hydroseeder (fig. 1).

Ocular estimates of the percentage of vegetative cover on the plots were made 2 months after hydroseeding, at the end of the first growing season, and 14 months after hydroseeding (table 1). All estimates were made independently by three observers. For each inspection, the mean values of percentage of cover for the five treatments and the controls were analyzed by analysis of variance to determine differences among the treatments. Percentage-of-cover data for the treatments were then analyzed by Duncan's new multiple-range test to determine differences between the individual treatments.

Results

Two months after hydroseeding, the plots mulched with hardwood bark fines and paper fiber had significantly more vegetation than (1) plots mulched with wood fiber and (2) the unmulched control plots (table 1). There were no significant differences in percentage of vegetative cover among the plots mulched with hardwood bark fines, bark fiber A, bark fiber B, and paper fiber.

By the second and third inspections, the percentage of vegetative cover had increased on all plots, but there were no significant differences either among treatments or between treatments (table 1). All plots contained adequate vegetative cover.

Conclusions and Recommendations

Both bark fines and fiberized bark are as effective as commercial hydromulches for establishing and maintaining vegetation on severely disturbed soils. Either hardwood bark fines or fiberized bark can be applied successfully with a hydroseeder.

Bark fines should be screened to remove materials larger than 1/10-inch in diameter to prevent clogging the hydroseeder. Raw bark can be processed through a hammermill and attrition mill or fiberizer and used without screening. Bark fines are the cheapest form of bark hydromulch because they are the byproduct of hammermilling and require only screening before use.

Acknowledgments.—I thank the Plumly Lumber Company of Winchester, Va., Lester Lumber Company of Martinsville, Va., Hammer Lumber Company of Ronceverte, W. Va., and Bauer Brothers Company of Springfield, Ohio, for supplying the hardwood bark mulches used in this study. Our thanks go also to Ranger Fuel Corporation of Beckley W. Va., and Willco Reclamation Company of Summersville, W. Va., for supplying manpower, materials, and hydroseeders for the field tests. Mention of a commercial product does not imply endorsement by the Forest Service or the U. S. Department of Agriculture.