



PRESCRIBED BURNING AND DIRECT-SEEDING OLD CLEARCUTS
IN THE PIEDMONT

Abstract. -- Logging slash 14 to 26 months old was burned at different seasons of the year in the Georgia Piedmont. The following winter, loblolly pine seeds were broadcast 1 to 13 months after burning. Burning 1-year-old slash during early- or mid-growing season resulted in better stocking, greater height growth, and more effective hardwood control than burning during the dormant season. Both growing-season and dormant-season burns were more effective for seedbed preparation than no burning.

Prescribed burning of fresh logging residues usually prepares an excellent seedbed for loblolly pine (*Pinus taeda* L.). If site preparation is delayed, however, fuel arrangements begin to change. Slash begins to defoliate 3 months or more after cutting, depending on the season of harvest. Within 20 to 24 months most needles have fallen from the logging slash and formed thick, dense mats where combustion is inefficient.¹ Often this litter is overgrown by vines, biennial briars, and hardwood sprouts, and burning becomes ineffective or perhaps impossible during some seasons.

The study reported here was designed to determine the best season in which to prescribe burning of old logging slash for seedbed preparation. The influence of slash age on the effectiveness of burning for site preparation was also observed.

METHODS

A 12-acre tract on the Hitchiti Experimental Forest in the lower Piedmont near Macon, Georgia, was selected for study. It was within a 39-acre area that had been clearcut 14 months before in November. The timber harvested was predominantly loblolly pine. Logging residue, consisting mainly of limbs and intact tree crowns less than 4 inches d.o.b., remained undisturbed and was generally distributed evenly over the tract. Immediately after the harvest, the dry weight of logging slash was estimated at 9.4 tons per acre.

¹Wade, Dale D. 1973. Logging residues disposal hazards in Georgia's Piedmont. South. Lumberman 226(2802):15-18.

The experimental design was randomized complete block, replicated four times, with blocks established on the same slope contour. Each block contained six $\frac{1}{2}$ -acre (2 by 2.5 chains) plots. One of the following treatments was randomly assigned to each plot within a block:

<u>Month and year of burn</u>		<u>Slash age</u> (months)	<u>Seedbed age</u> (months)
January	1967	14	13
May	1967	18	9
August	1967	21	6
October	1967	23	4
January	1968	26	1
Not burned		27	27

Each plot, except the control, was burned by prescription using strip-head fires. The following weather conditions were typical for the burns made during the dormant and growing seasons:

	<u>Dormant</u>	<u>Growing</u>
Temperature (°F)	72	81
Relative humidity (%)	45	47
Wind speed (mph)	9	6

The four replicates of each treatment were burned the same day, usually within a time period of 2 to 3 hours.

In February 1968, treated and stratified loblolly pine seed from a single, local source were broadcast over the entire tract at a rate of 1 pound per acre. Laboratory tests indicated an average of 15,800 viable seeds per pound. After seeding, 16 permanent milacre (1/1000 acre) subplots were systematically located in each treatment plot. The effectiveness of each burning treatment was based on the stocking, survival, and growth of 2-year-old seedlings. The effectiveness of each treatment in reducing hardwood competition was evaluated by rating each seedling as overtopped or free to grow.

RESULTS

Seedling Stand Characteristics

The number of seedlings per acre and percent milacre stocking² after two growing seasons were considered to be indicators of successful regeneration. Except for the January 1967 treatment, both the seedling count and milacre stocking steadily declined as slash age increased and burning was done later in the year (fig. 1).

$$^2\text{Percent milacre stocking} = \frac{\text{(No. milacres per plot stocked with 1 or more seedlings)}}{\text{(16 milacres per plot)}} \times 100$$

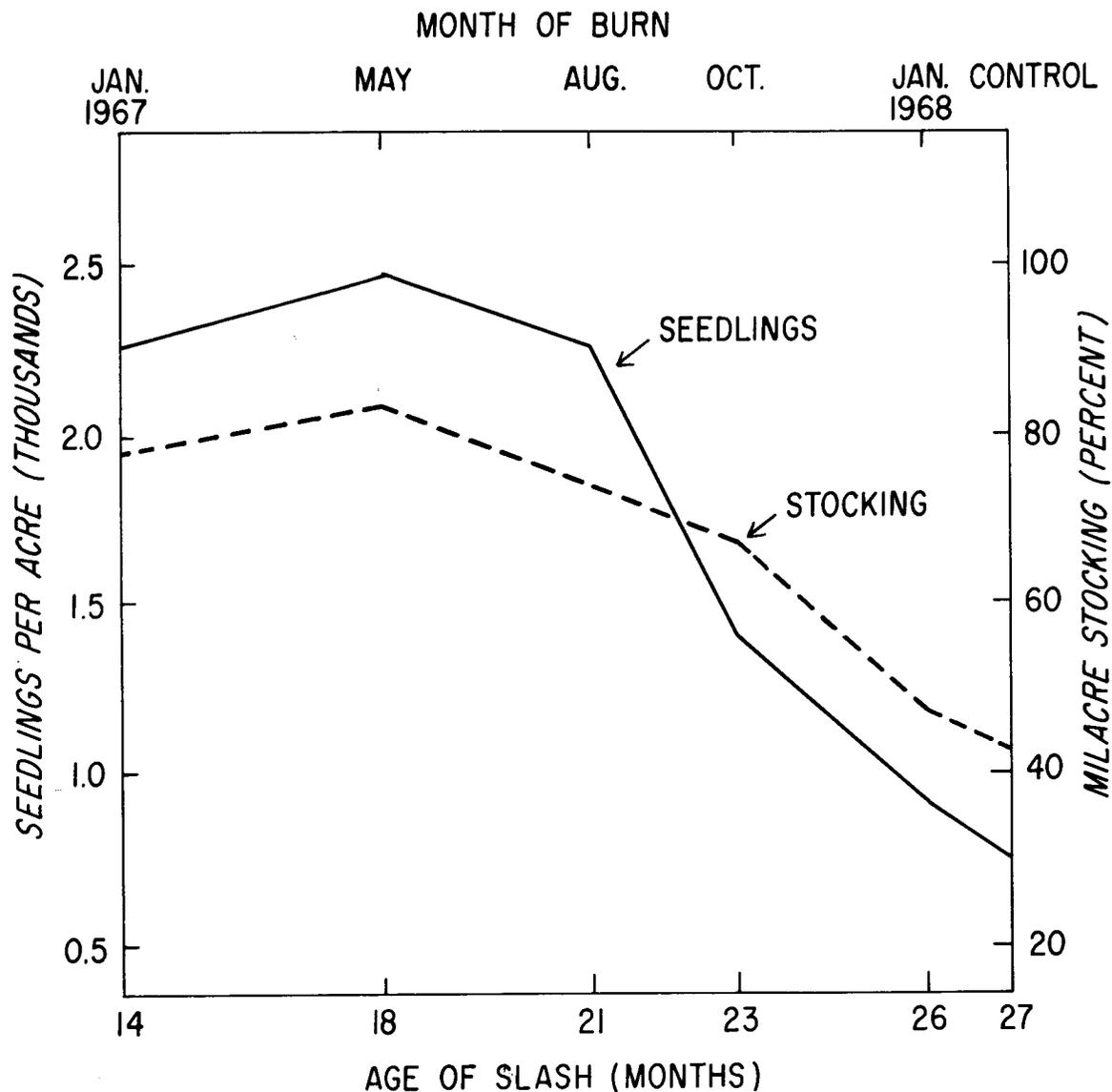


Figure 1. --Seedling stand and milacre stocking of 2-year-old loblolly pine seedlings as affected by the age of slash and season of prescribed burning.

The trends for seedling numbers and milacre stocking generally parallel each other throughout the study period, except that delaying burning from August to October reduced numbers of seedlings per acre far more than milacre stocking. For both parameters, the January 1968 and control means were significantly lower than treatment means on the January, May, and August 1967 burns. The October treatment, being almost midway in the range, did not differ significantly from any other treatment.

Seedling Height and Mortality

Mean heights of dominant seedlings at the end of the second growing season were uniform among all burned plots (table 1). Seedlings on the control plots were significantly shorter than on burned plots.

Table 1. --Seedling growth, hardwood competition, and mortality on the six prescribed burning treatments after two growing seasons

Month and year of burn	Total seedling height	Seedlings overtopped	Total seedling mortality
	Feet	- - - - - Percent - - - - -	
January 1967	0.73a	12.4a	29.8a
May 1967	.68a	6.4a	30.4a
August 1967	.74a	5.6a	34.2a
October 1967	.80a	4.7a	34.5a
January 1968	.66a	10.9a	42.6a
Control	.44b	42.8b	47.7a

Treatment means in columns followed by the same letter are not significantly different at the 5-percent level.

Although there were no significant differences among the seasons of burning on hardwood competition, I believe the results are consistent with other findings of understory hardwood kill from prescribed burning in the Piedmont³. The three treatments with fewest seedlings were all growing-season burns. About half as many seedlings were shaded on plots burned during the summer months as on plots burned during the winter. Although there were no significant differences in mortality between treatments, there was a general trend toward higher seedling losses with increasing age of slash.

CONCLUSIONS

Prescribed burning to prepare clearcut areas for direct seeding in the Piedmont should be done as soon after harvest as possible to take advantage of better fuel arrangement and site conditions, and to quickly return the land to timber production. If site preparation must be delayed, burning 1-year-old slash during the early- or mid-growing season results in more uniform and complete seedbed preparation, better hardwood control, and better seedling growth than burning during the dormant seasons. Both growing-season and dormant-season burns are better than no site preparation.

³Brender, Ernst V., and Robert W. Cooper. 1968. Prescribed burning in Georgia's Piedmont loblolly pine stands. J. For. 66:31-36.

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