Southern Forest Experiment Station

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Research Note

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Spring Burn Aids Longleaf Pine Seedling Height Growth

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SUMMARY

Prescribed burning in midspring may stimulate height growth of longleaf pine seedlings. Seedlings were planted on sandy and clayey sites that were prescribed burned 2 years later. Treatments were cool, moderate, and hot burns and an unburned control. The hot, May burn significantly increased height growth of seedlings on the sandy site. The number of seedlings with 50 percent or more brown-spot infection was reduced on both sites after the fires, and the hot and moderate burns were better than the cool burn.

Additional keywords: *Pinus palustris* Mill., brown-spot needle blight, *Scirrhia acicola,* planting.

Spring burns may stimulate height growth by longleaf pine (*Pinus palustris* Mill.) seedlings on some sites, a possibility suggested by follow-up observations on a burning study reported earlier (Croker 1975). The study was established on the Escambia Experimental Forest in southwest Alabama to determine the effect of hot, moderate, and cool prescribed fires on survival of grass-stage longleaf pine seedlings. Two years after burning, an inspection of the plots revealed that many seedlings were beginning height growth where fires had been set. The effects of the fires on height growth of seedlings and on brown-spot infection are reported here.

METHODS

Six blocks of plots were established for this study. Three were on a sandy soil characterized by loamy sand to a depth of 5 feet or more, and classified as Alaga soil series. The other three were on a heavier soil, classified as Dothan soil series, with loamy sand or sandy loam surface soils underlain by a sandy clay loam subsoil at 12 to 14 inches.

Each block was a rectangular clearing in longleaf pine stands of sawtimber size. These clearings, about 2 chains wide and 6 chains long, were oriented in a north-south direction. Each block was divided into four 0.2 acre plots extending from wall to wall across the clearing. Three intensities of fire and an unburned check were randomly assigned among plots in each block. Four transects, each 3 feet apart, extended perpendicularly from the east-facing timber wall on each plot. Ten Grade one, 1-O longleaf seedlings were planted at 6-foot intervals along each transect.

Burning treatments were applied in 1973, the second year after planting. Weather at the time of setting the fires is shown in table 1. Although the burning treatments were designated as cool, moderate, and hot, the intensity of these fires was modified by lighter rough and higher fuel moisture and relative humidity than would normally be expected with these classifications.

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Table 1 .-*Weather conditions when burns were made.*

Item	Cool	Moderate	Hot
Date	I-I I-73	I-15-73	5-I O-73
Time	12 noon-I:30 p.m.	10:00 a.m.-1:00 p.m.	1:00 p.m.-3:35 p.m.
Last previous rain			
Date	I-I I-73 (before the burn)	I-12-73	5-08-73
Amount, inch	0.12	0.02	0.50
Humidity, percent	55	65-32	40-35
Temperature, °F	48	55	85
Sky	Cloudy	Clear	Clear
Wind			
Mph	2-5	o-7	Light
Direction	NE	NW	Variable

Height of surviving seedlings was measured to the nearest 0.1 foot in January 1975, 2 years after burning (4 years from planting). Longleaf pine seedlings with 50 percent or more of the needles infected with brown-spot disease (*Scirrhia acicola* (Dearn.) Siggers) were also tallied at that time. Treatment effects on seedling height and brown-spot infection were evaluated by analysis of variance.

RESULTS AND DISCUSSION

Contrary to expectations, the spring burn did not significantly reduce seedling survival (Croker 1975). Seedlings on sandy sites burned in May were significantly taller two years after burning than those in any other soil-burn treatment combination (table 2). Also, a higher proportion of the seedling stand was in active height growth. Grelen (1975) reported that after 12 years of study, longleaf pines periodically burned in May were significantly taller than seedlings on unburned areas and taller than those burned in March or July. Why a spring burn should stimulate longleaf seedling height growth is not known. Further research and testing are needed to find reasons for this response and the conditions under which it occurs.

Two years after burning, the percentage of seedlings with half or more of their foliage destroyed by brown-spot was significantly greater on the unburned plots (28%) than on the burned. Cool-burned plots had significantly more seedlings with high brown-spot (16%) than plots receiving the other burning treatments. Only five percent of the seedlings on plots burned with moderate fires in winter and hot fires in spring had half or more of their needles destroyed by the disease. Soil type had no effect on these brown-spot infection levels.

LITERATURE CITED

Croker, T. C., Jr. 1975. Longleaf seedlings survive fire in clearcut strips. USDA For. Serv. Res. Note SO-188.3~. South For. Exp. Stn., New Orleans, La.

Grelen, H. E. 1975. Vegetative response to twelve years of seasonal burning on a Louisiana longleaf pine site. USDA For. Serv. Res. Note SO-192, 4 p. South. For. Exp. Stn., New Orleans, La.

Table *2.-Average height of longleaf pine seedlings and percent in active height growth 2 years atter burning (5 'years from seed).*

Fire treatment	Seedling Total Height		Seedlings in Height Growth [1]	
	Sandy Soil	Clay Soil	Sandy Soil	Clay Soil
	Feet		*Percent*	
Control	.29	.23	20	16
Cool	.32	.18	26	10
Moderate	.30	.21	19	19
Hot	.56	.24	38	15
Average	.37	.21	26	15

[1] Seedlings 0.5 foot or more in height to base of the terminal bud.

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