THE EFFECT OF TIP BLIGHT ON SURVIVAL AND GROWTH OF OUTPLANTED LOBLOLLY PINE AFTER TWO YEARS

by

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Abstract

Survival, height and diameter growth of loblolly pine infected with tip blight were not affected two years after planting on a wet site. At a mesic site, survival after the first year and survival, height and diameter growth were reduced at the .01 level of significance after two years. Drought in the first year of outplanting contributed to the growth reduction on the mesic site.

INTRODUCTION

In the forest nursery, terminal dieback and reddening of needle tips of southern pines is called tip blight. The basal portion of the foliage may also be affected. Two fungi, Fusarium moniliforme var. subglutinans Wr. and Reink. and Diplodia gossypina Cke., are considered strongly pathogenic while Pestalotia sp. and Phomopsis sp. (weak pathogens), despite generally being present, may not be involved (Rowan, 1982).

Throughout the Southeast the summer of 1979 was wet. Tip blight appears to follow this type of weather. In December 1979 two sites, a wet one (standing water near the planting perimeter) on the Bienville National Forest (Strong River Ranger District) in Mississippi and a mesic one (sufficient moisture, but without standing water) at the Stuart Seed Orchard (Kisatchie National Forest) near Pollock, Louisiana, were outplanted with control (no tip blight) and tip-blighted loblolly seedlings.

Data at outplanting indicated that tip-blighted seedlings were .03 to .04 inches smaller in diameter than control seedlings. Also, diseased seedlings averaged 1.5 to 2.5 inches shorter as a result of loss of terminal growth.

METHODS

Twenty-five seedlings per row were handplanted at the two sites. The two treatments (diseased and controls) were replicated five times in a randomized complete block design (8' x 8' spacing). In June and December 1980 and December 1981, survival, heights, and diameters were evaluated.

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No survival and growth readings were made in June 1980 at the Bienville National Forest.

RESULTS

Data from seedlings at the Bienville National Forest showed non-significant differences (> .05 level) in survival one and two years after outplanting; the Stuart Seed Orchard site had a small difference after six months, but a significant difference (.01 level) one and two years after outplanting (table 1).

Table 1. Percent survival of tip-blighted and control loblolly pine seedlings at the Bienville National Forest site (BNF) and the Stuart Seed Orchard (STU) six months, one year, and two years after outplanting. A significant difference (.01 level) is indicated by an asterisk.

		Time After Outplanting		
Location	Seedling Condition	6 Months	1 Year	2 Years
BNF	Tip-blighted	-	79	77
	Control	-	89	86
STU	Tip-blighted	91	44*	41*
	Control	99	69*	67*

Height differences were not significant at the Bienville National Forest for either year, while at the Stuart Orchard they were significant at the .01 level after two years.

Table 2. Heights (in.) of tip-blighted and control loblolly pine seedlings at the BNF and the STU one and two years after outplanting. A significant difference (.01 level) is indicated by an asterisk.

		Height (in.)	
		Time After Outplanting	
Location	Seedling Condition	1 Year	2 Years
BNF	Tip-blighted	12.0	27.2
	Control	14.7	32.7
STU	Tip-blighted	15.6	24.8*
	Control	17.3	30.4*

Diameter readings at the Bienville National Forest were not significantly different (> .05 level) for either years. However, differences at the Stuart Seed Orchard were significant at the .005 level after two years.

Table 3. Diameter (in.) of tip-blighted and control loblolly pine seedlings at the BNF and the STU one and two years after outplanting. A significant difference (.005 level) is indicated by an asterisk.

		Diameter (in.)	
		Time After Outplanting	
Location	Seedling Condition	1 Year	2 Years
BNF	Tip-blighted	.19	.39
	Control	.24	.50
STU	Tip-blighted	.23	.42*
	Control	.26	.61*

DISCUSSION

Results of this evaluation are preliminary since a third year's observations on survival and growth are planned. However, trends at the wet site (Bienville National Forest) have been noted. Survival, height, and diameter differences are not expected to increase to a significant level on the wet site since they did not increase greatly between the first and second years after outplanting. The disease has declined on both sites and differences in survival and growth rates are not expected to increase. While differences increased on the mesic site (Stuart Seed Orchard) to significant levels, it must be remembered that the diseased seedlings were smaller in diameter and height at the time of outplanting. Also, the seedlings on the mesic site went through a severe drought (summer 1980) which saw only 4 to 5 inches of rainfall for the official summer. Rainfall at the Bienville National Forest site, where more water was present at outplanting, was higher during the same summer.

Rowan (1982) concluded that tip blight did not appear to be of significant concern to nurserymen and stated that 2-year old plantings of slash and loblolly pine indicated no differences in survival and growth. This work supports that position, except that small seedlings, slightly larger than that which would normally be culled (normally 1/8 inch root collar diameter), did not survive outplanting when they experienced a severe drought in the first year.

LITERATURE CITED

Rowan, S. J. Tip dieback in southern pine nurseries. Plant Disease 66: 258-259; 1982.