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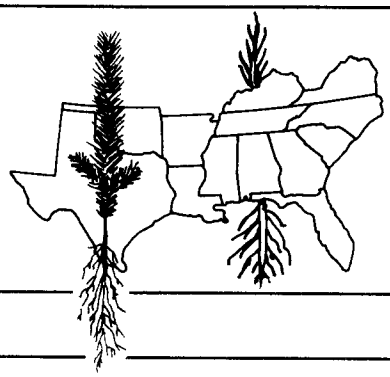

RESEARCH REPORT 97-8

THE RELATIONSHIP BETWEEN PITCH CANKER STEM INFECTIONS AT A LOBLOLLY SEED ORCHARD AND SUBSEQUENT SEEDLING DISEASE

by
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INTRODUCTION

Pitch canker varies among clones in loblolly pine seed orchards (Kelley and William, 1982) and disease distribution in nurseries is characteristic of seed transmission (Blakeslee and others 1989). There has been no indication, however, that disease incidence among seedlings is associated with the incidence among mother trees. During the 1995 growing season, mature loblolly pines at an industrial loblolly pine seed orchard near Camden, Alabama, had a high incidence of pitch canker infections within their crowns. These infections are believed to have resulted from the colonization of ice-storm caused wounds by the causal agent *Fusarium subglutinans*. We decided to make use of this infection and follow the incidence of *Fusarium* transmission through seed production in the orchard and use in the nursery.

METHODOLOGY

Pitch canker infections in the orchard were evaluated in August 1995. Three blocks of 2nd generation selections established 1 year apart between 1983 and 1985 were rated for disease severity. These blocks covered 22 acres and 509 trees in 22 clones were assessed. A single evaluator estimated severity for all trees by observing all of each crown visible from the south side and without knowing the clone of the tree being rated using the following 5 point scale:

Rating	1	No observed infections
	2	Few infected branches
	3	Several infected branches but not the terminal
	4	Several infected branches plus the terminal
	5	Numerous infected branches

All clones, clones with more than 10 ramets, and clones with more than 20 ramets were analyzed for effects of block and clone on pitch canker infection rate. A previous evaluation of these clones for rust resistance was used to assess the correlation with pitch canker incidence in the orchard.

Clones 8-1546, 8-1514, 12-1122, and 24-1002 were selected as representing the range of pitch canker incidence from among those few clones producing enough seed to process by clone. Cones were harvested in fall 1995, processed and held in cold storage over winter. On April 29, 1996, the seed received the standard pre-sowing treatments of Bayleton, Gustafson 42-S and Captan in a latex sticker. After treatment, seed were returned to cold storage and removed for sowing on May 9. Five plots were sown in each of two blocks with seed from each selected clone. Seedbeds were checked for diseased seedlings and seedbed densities were determined June 14, August 5, and October 24, 1996.

RESULTS

Seed Orchard Evaluation

Those 10 clones with more than 20 ramets (total of 418 trees) differed significantly in their severity of pitch canker infection (Table 1). Each older orchard block had significantly more pitch canker than the one established the previous year. Severity estimates for blocks established in 83, 84, and 85 were, respectively 2.32, 2.07, and 1.85. There was a slight ($p=0.06$) negative correlation (-0.48) between the foliar pitch canker symptoms and fusiform rust scores determined previously from progeny trials.

Nursery Evaluation

There was no evidence that pitch canker occurred among any of the test families sown in the nursery (Table 2). Bed densities differed significantly in June due to variable efficiency of the Coop's sower with different seed lots. There was minimal post emergent damping-off and no seedlings with symptoms of pitch canker were observed in study beds during the season.

IMPLICATIONS FOR MANAGEMENT

This study indicates that abundant infections in loblolly pine seed orchards do not necessarily indicate that infections should be expected among seedlings produced by the seed crop. Moreover, the overall health of the nursery crop supported this conclusion.

At one time, there was speculation that resistance to fusiform rust might be inversely correlated to pitch canker. The study, however, found only a very weak correlation between rust resistance and pitch canker for the families surveyed.

LITERATURE CITED

Blakeslee, G. M., T. Miller and E.L. Barnard. 1989. Pitch canker of southern pines. In Forest Nursery Pests. Ag Handbook No. 680. 184pp.

Kelley, W.D. and J.C. Williams. 1982. Incidence of pitch canker among clones of loblolly pine in seed orchards.

Table 1. Pitch canker severity for 10 seed orchard clones in August 1995 and rust resistance estimates from progeny trials.

Clone	Ramets	Pitch Canker[1]	Rust[2]
12-1067	45	4.13	49
8-1546	40	3.83	62
17-1056	57	2.66	36
8-1514	44	2.19	30
7-1505	39	1.46	48
21-1005	22	1.36	59
10-1048	47	1.27	44
12-1122	52	1.24	51
24-1002	40	1.07	57
28-1001	32	1.03	42

1) Pitch canker was rated on a five point scale (see Methodology)
2) Rust rating from progeny trials as percentile of check

Table 2. Growth and mortality for seedlings from four seed orchard clones differing in severity of pitch canker foliage symptoms.

		Seedlings/ft^2		
Clone	Rate[1]	June	October	Change
8-1546	3.8	15.4 b	16.1 b	+ 0.65 b
8-1514	2.2	28.0 a	25.6 a	- 2.43 a
12-1122	1.2	16.0 b	16.7 b	- 0.69 b
24-1002	1.0	16.7 b	18.0 b	+0.52 b

1) Pitch canker was rated on a five point scale (see Methodology)