BENOMYL CONTROLS PHOMOPSIS BLIGHT ON ARIZONA CYPRESS IN A NURSERY

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Abstract

In north-central Mississippi, 0.5 lb/acre of active benomyl controlled blight caused by Phomopsis juniperovora on first-year nursery seedlings of Cupressus arizonica; no phytotoxicity was observed. Other non-mercuric chemicals did not give control at rates tested.

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Phomopsis blight is a serious disease of eastern redcedar (Juniperus virginiana) and Arizona cypress seedlings in nursery beds. Many of the infected seedlings die, and the rest are discarded, inasmuch as tests with eastern redcedar have shown that survival is poor when diseased trees are outplanted (1, 2).

Control of the fungus was achieved in 1959 and 1964 with 7.5% phenylmercuritriethanolammonium lactate (PAS) (Puratized Agricultural Spray[2]) (3, 4). Because mercuric compounds may be banned for agricultural use, three non-mercuric compounds were tested on 5-year-old eastern redcedar in 1969 and on first-year Arizona cypress seedlings in 1970. In both instances the fungicides reduced the incidence and severity of infection.

The study reported here was established in 1971 to test further the efficacy of these non-mercuric compounds for the control of Phomopsis blight and for phytotoxic effects on the growth of first-year Arizona cypress seedlings.

MATERIALS AND METHODS

The three fungicides were tested in the State forest nursery at Winona, Mississippi. Three adjacent beds were divided into two equal blocks (4 by 250 ft). On each of the six blocks, seven treatments -- two concentrations of each fungicide plus a check -- were randomly assigned to 35-ft plots. The fungicides were: methyl 1-(butylcarbamoyl)-2-benzimidazolecarbamate (benomyl) (Benlate, 50% WP); cupric hydroxide (K 101) (Kocide 101, 86% WP); cis-N-[1,1,2,2-tetrachloroethyl)thio]-4-cyclohexene-1,2-dicarboximide (Dfn.) (Difolatan 4#-flowable). Rates of application are indicated in Table 1. A spreader-sticker, multifilm X-77 (non-ionic), was used with each fungicide.

To provide a comparison with the non-mercuric fungicides, PAS was applied on three beds (4 by 500 ft) on each side of the test beds.

Beds had been sown on April 20, 1971, and the fungicides were applied at 7- to 10-day intervals beginning June 3 and ending November 4. Application of PAS began June 17 and ended August 27.

Percentages of blighted seedlings were determined on August 19, September 2, September 23, November 4, and December 14. Three hundred seedlings per treatment were randomly examined on each date. On December 14, 10 branches on each plant were also examined, as a means of rating the severity of infection. Ratings were: None -- no branches infected, light -- one to two branches infected, medium -- three to five infected, heavy -- more than five infected.

An analysis of variance (0.05 level) was made after each count to determine significant differences among treatments.

Table 1. Percent[a] of Arizona cypress seedlings infected with Phomopsis juniperovora on various dates.

Chemical and rates/A of active ingredient	Dates of examination				
	8-19-71	9-2-71	9-23-71	11-4-71	12-14-71
benomyl					
0.50 lb	7.3	6.3	13.0	11.0	19.3
1.00 lb	8.0	5.7	10.0	11.3	18.0
K 101					
1.72 lb	10.7	18.3	33.0	57.0	60.7
3.44 lb	5.7	8.0	27.3	47.0	52.7
Dfn.					
1.00 lb	9.3	17.0	25.3	43.0	51.3
2.00 lb	8.7	10.0	25.3	44.3	55.3
Check	15.3	20.3	44.6	72.3	73.0
PAS					
2.40 oz	12.0	13.0	20.3	50.7	49.3

[a]Percent infected in 300 seedlings per treatment per date.

[2]Throughout this article, mention of trade names is for information only and does not constitute a recommendation by the U. S. Department of Agriculture. Before any chemical is applied, the user should make certain that it is registered for the purpose intended.

Table 2. Percent of Phomopsis blight-infected Arizona cypress seedlings by disease ratings, December 14, 1971.

Chemical and rates/A of active ingredient	Infection			
	Light	Medium	Heavy	Total
benomyl				
0.50 lb	16.0	1.0	2.3	19.3
1.00 lb	14.0	1.7	2.3	18.0
K 101				
1.72 lb	31.7	8.0	21.0	60.7
3.44 lb	34.3	7.7	10.6	52.6
Dfn.				
1.00 lb	30.3	7.3	13.7	51.3
2.00 lb	38.0	6.7	10.6	55.3
Check	27.7	11.0	34.3	73.0
PAS				
2.40 oz	32.3	6.0	11.0	49.3

RESULTS AND DISCUSSION

Blight symptoms first became evident on July 16. A positive identification of the fungus was made by placing infected branches on moist filter paper in Petri dishes; spores of Phomopsis juniperovora Hahn were produced within 5 days.

Duncan's Multiple Range Test on counts made September 2 and September 23 showed that both benomyl treatments were significantly better than the check. In the counts on November 4 and December 14, benomyl was significantly better than all other treatments. Disease incidence in benomyl plots (both rates) increased from 7.6% on August 19 to 18.7% by December 14. The 0.5-lb application of benomyl was as effective as the 1.0-lb rate. In the check plots, incidence increased from 15.3% to 73.0% over this same period (Table 1).

At the rates used, K 101 and Dfn. were not significantly different from the check. Plots treated with K 101 applied at 1.72 or 3.44 lb/acre produced 39.3 and 47.3% blight-free seedlings. Dfn. at rates of 1- and 2-lb/acre had 48.7 and 44.7% healthy seedlings.

Although 19% of seedlings were infected in benomyl treatments, most infection was considered light (one to two branches) in the severity ratings on December 14 (Table 2). Seedlings with light infection could probably be successfully outplanted if diseased branches were removed at time of lifting.

PAS, although significantly better than the check treatment, provided only 50.7% control. It might have given better results if the application period had been longer.

None of the treatments produced phytotoxic effects.

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