Control of Yellow-poplar Anthracnose with Seed Treatments and Foliar Fungicides

by

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For the past several decades one Mississippi forest nursery's only hardwood pest problem has been yellow-poplar anthracnose caused by Glomerella cingulata (St.) S. & V.S. Fumigation in the fall of 1984 with approximately 400 pounds per acre of MBC-2 failed to control early infection. During the same month the causal fungus was isolated from seed. Thus a combination of seed treatments and foliar fungicides was planned for the evaluation in 1985 in an effort to control seedborne inoculum. Residual and wind-disseminated inoculum were discounted since sanitation was practiced following the 1984 harvest, and the nursery has no large yellow-poplar on its borders.

Methods

Chemical and water seed treatments were made at two rates. Granular Meg A, a Tilt-like compound, was mixed with the seed just prior to seeding. Seed was also "hot-dipped" in water 50°C. (122°F.) seven days prior to seeding.

Three foliar fungicides - Benlate 50WP, Bravo 500F and DPX-965 (50G) were applied in an over the top spray at two rates from May 29 (50% germination) through June 27 at weekly intervals. The latter material is a more active form of Benlate. All sprays were applied at 20 gallons per acre. Additionally, from mid-July through August Benlate 50WP sprays were applied weekly at 2 pounds active to all treatments so that anthracnose development would be arrested and quota reached.

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In July and September 1985 density, seedling height and disease rate were evaluated. The latter is the product of a subjective severity and incidence rating. Severity was rated on a 0 to 5 scale with 5 a maximum; a rating of zero meant none of the foliage area was infected. The incidence ratings were in 20 percent increments with 5 being from 80 to 100 percent or dead. Greatest efficacy was achieved by those treatments with the lowest disease rate. Spray applications were made with a tractor-operated sprayer using a one bed width boom. Rates of seed treatments and foliar sprays are listed -

Treatment	Rate (a.i. per acre)	Application time
Water (50°C)	--	7 days before seeding
" "	--	" "
Meg A (2.5G)	1/4 lb.	Just prior to seeding
" "	1/2 lb.	" "
Benlate (50WP)	1 lb.	weekly (May 29 - June 27)
" "	2 lbs.	" "
Bravo (500F)	3 pts.	" "
" "	6 "	" "
DPX-965 (50G)	1 lb.	" "
" "	2 lbs.	" "
Check	--	-- --

2/ Water treatments were for 1/2 and 1 hour, respectively.

The test was replicated six times with all eleven treatments (including the control) being represented by a 40' plot in each of six nursery beds. Four 1x4 foot subplots were randomly evaluated within the central 30' length of each 40' plot. Treatments were distributed randomly within the bed and treatment beds were not placed adjacent to the riser line.

Results

Density of seedlings within beds was significantly better for the water treatments as opposed to Meg A - 1/2 lb., Benlate at both rates, or the check in both evaluations. There were no significant differences in height or disease rate in July, but Benlate - 2 lbs. ranked second in height in both evaluations and in disease rate in July. Little disease was noted in September. Meg A - 1/2 lb. controlled anthracnose best.

Results are given in Table 1.

Discussion

The forest nursery involved in this evaluation is concerned about seedling density in their yellow-poplar beds. As the data and statistical analysis show, the warm water treatments increase density and might assist the nursery in reaching quota. Warm water treatment may increase germination percent which is usually less than 10 percent.

Benlate at the 2 lb. a.i. per acre rate experimentally had a low disease rate in July, and performed satisfactorily in operational sprays in 1985. Warm water treatments performed worse than Benlate in controlling disease rate and apparently do not control seedborne anthracnose. Interestingly enough these warm water treatments control *Alternaria* infestation of safflower seed (Zazzerini et al. 1985). *Alternaria* sp., as a saprophyte, has been frequently isolated with the yellow-poplar anthracnose organism. Thus the water treatments may be controlling a competing organism and decreasing their disease rate effectiveness.

Treatments[1]

Seed	Fungicide[2] and rate/acre	Interval	No. of applications	Density[3] Jul	Density[3] Sep	Height (in.) Jul	Height (in.) Sep	Disease[4] rate Jul
Water at 122°F[5]			1	11.05a	6.93a	4.76	21.23	89.2
Water at 122°F			1	10.07a	7.02a	3.07	11.73	72.8
	Meg A 2.5G[6] 1/4 lb		1	3.00	2.61	2.78	12.23	107.8
	Meg A 2.5G[6] 1/2 lb		1	6.23b	5.88b	2.56	16.40	48.2
	Benlate 50W 1 lb	weekly	4	4.17b	4.30b	4.07	17.90	77.2
	Benlate 50W 2 lb	weekly	4	6.18b	6.00b	4.35	22.27	59.1
	Bravo 500F 3 pt	weekly	4	5.77	4.59	3.94	23.07	79.3
	Bravo 500F 6 pt	weekly	4	4.67	3.73	3.55	20.50	77.9
	DPX-965 50G 1 lb	weekly	4	2.49	2.20	2.30	17.00	92.8
	DPX-965 50G 2 lb	weekly	4	4.71	3.60	3.90	21.33	90.1
	Check			2.62b	2.31b	2.18	16.67	69.9

1/ Benlate at 1.25 lb ai was applied in eight weekly sprays to all treatments, including the check, from 17 Jul through 9 Sep.

2/ Based on 20 gal per acre rate and applied from 29 May through 27 Jun.

3/ Numbers are seedlings per square foot. Small letters that differ indicate significant differences with P=.05 or less with paired F-tests.

4/ A product of incidence, expressed as percent, and severity based on area of foliage infected. Severity ratings: 0 = no area infected, 1 = 1 to 20 percent, 2 to 5 = in 20 percent increments. Low rates indicate more treatment effectiveness.

5/ Stratified seed were treated for the two treatments at 1/2 and 1 hour, respectively, seven days prior to planting.

6/ Stratified seed were treated prior to planting.

Tilt, another seed treatment, had the lowest disease rate. This is not surprising because this compound greatly restricted the anthracnose fungus's growth on agar (Filer, written communication). In spray form Tilt cannot be used for anthracnose control because of its phytotoxicity to green house yellow-poplar (Filer, personal communication).

Seedlings treated with Benlate at 2 lbs. also ranked high in height in both evaluations.

Fumigation failed to control early anthracnose infection; early infection was probably from seedborne rather than soilborne inoculum. Also, fumigation may eliminate endomycorrhizal fungi which might give the yellow-poplar stand greater uniformity in height.

Recommendations

1. To reduce inoculum, remove leaves or cover with soil.

2. Test seed for anthracnose fungus before planting.

3. Hot water seed treatment is recommended if anthracnose is present on seed.

4. Weekly Benlate over the top sprays through August after 50% of seed germinate.

References Cited

Zazzerini, A.; C. Cappelli and L. Panattoni. Use of hot water treatment as a means of controlling Alternaria spp. onsafflower seeds. 1985. Plant Disease: 69(4)350-51.