Foliar Treatments for Control of White Mold in Soybean

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INTRODUCTION

Soybean white mold disease caused by the fungus *Sclerotinia sclerotiorum* has increased in severity in the upper Midwestern states in recent years. The disease can be very severe in soybean fields, especially during cool, wet summers. Soybean producers who have adopted management practices to maximize yield are often affected more by this disease. The growth and pathogenic activity of the white mold fungus is governed by the environment in the crop canopy, and is favored by dense canopies created by planting in narrow row widths, high seeding densities, early planting, high soil fertility and other factors that promote good plant health.

A long-term solution to white mold is the development of resistant soybean varieties. In the interim, white mold must be managed by careful variety selection and modifying crop management practices. One such management practice is the use of foliar applied fungicides and herbicides. This paper reports the results of field research studies conducted in Wisconsin from 1995 to 1999 designed to determine the effectiveness of using foliar applied chemicals to control white mold in soybean.

METHODS

Several field studies were conducted from 1995-1999 at Arlington, Wisconsin on a Plano silt loam. Fields were selected which previously had severe infections of white mold disease in soybean. High yield management practices such as early planting (May 5-15), narrow row spacings (7.5 in.), high seeding rates (225,000 seeds/acre) and high to very high soil fertility levels were utilized in all experiments.

Fungicide and herbicide studies reported in Table 1 and Figures 1 and 2 utilized both a moderately resistant variety (Novartis S19-90) and a more susceptible variety (Sturdy). All foliar treatments were made with a tractor mounted sprayer, in 30 gpa water at a pressure of 35 psi as a flat spray 15 inches above the soybean canopy. All treatment results reported were applied at R1 (initial flowering) with the exception of the 1998 treatments shown in Table 2 which were applied at either V4 or R1.

White mold disease ratings were made between the R6 and R8 growth stage and reflect the percent of plants with external white mold symptoms. Yields were obtained using plot harvestors and are adjusted to 13% moisture.

RESULTS

FOLIAR FUNGICIDES

Studies conducted for three years (1995, 1996, and 1998) compared the effectiveness of Benlate® and Topsin M® each applied at two rates, Table 1. White mold pressure was high in 1995 and 1996, but was low in 1998.

- All fungicide treatments increased the yield of the susceptible variety without consistently reducing the white mold disease level.
- Benlate applied at 1.0 lb/acre was the most effective treatment on the susceptible variety.
- Topsin M applied at 1.0 lb/acre increased yields of the moderately resistant variety slightly.
- Applying fungicides to the susceptible variety did not produce yields equal to the moderately resistant variety without a fungicide treatment.

Studies conducted for four years compared two rates of Topsin M. White mold pressure was high in 1995 and 1996 but was low in 1998 and 1999, Figure 1.

- Topsin M applied at 1.0 lb/acre in a high disease environment increased yields of both varieties, but did not decrease wm disease of either variety.

Applying Topsin M to the susceptible variety did not produce yields equal to the moderately resistant variety without a fungicide treatment.

RESULTS

FOLIAR HERBICIDES

Studies were conducted for four years 1995-99 to evaluate Cobra* herbicide for white mold control. There was no disease present in 1998, therefore data from only three years are shown in Figure 2.

- Cobra applied at 6 oz/acre increased yield of the susceptible variety and reduced disease of both varieties.
- Yield of the susceptible variety with Cobra was 10 bu/acre less than the moderately resistant variety without Cobra.

Studies conducted during 1998 and 1999 compared Cobra with several adjuvants for white mold control, Table 1. Disease pressure was very low in 1998 and was moderate in 1999.

- Cobra herbicide applied alone or with adjuvants at either the V4 or R1 growth stage in 1998 resulted in lower yields than when no treatment was applied.
- Adjuvants did not enhance disease control or yield of soybean when added to Cobra herbicide.

TABLE 1 FOLIAR FUNGICIDES FOR CONTROL OF WHITE MOLD IN SOYBEAN. WISCONSIN, 1995, 96, 98

TREATMENT[1]	RATE/ACRE	M. RESISTANT VARIETY YIELD	M. RESISTANT VARIETY WHITE MOLD	SUSCEPTIBLE VARIETY YIELD	SUSCEPTIBLE VARIETY WHITE MOLD
		bu/acre	% mortality	bu/acre	% mortality
Control	—	63	6	54	25
Benlate	0.50 lb	61	12	56	31
Benlate	1.00 lb	61	10	59	20
Topsin M	0.75 lb	61	5	56	31
Topsin M	1.00 lb	65	4	57	28
28%-N	1 qt.	61	16	57	26
LSD 10					
Variety		1	3	1	3
Treatment		2	4	2	4
V x T		3	5	3	5

FIGURE 1. EFFECT OF TOPSIN M FUNGICIDE ON SOYBEAN YIELD AND WHITE MOLD DISEASE. WISCONSIN, 1995-96 VS 1998-99

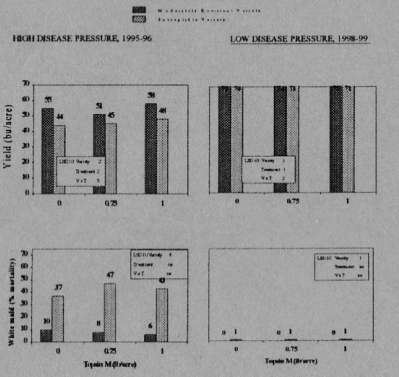
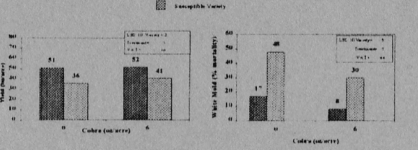


TABLE 2 EFFECT OF COBRA* HERBICIDE AND ADJUVANTS ON SOYBEAN YIELD AND WHITE MOLD DISEASE WISCONSIN, 1998-99

TREATMENT	YIELD (bu/acre) 1998[2] V4	1998[2] R1	1999[3] M Res.	1999[3] Susc.	% WM DISEASE 1998 V4	1998 R1	1999 M Res.	1999 Susc.
Control	77	73	57	52	1	1	20	30
Cobra	74	69	56	54	1	0	6	20
Cobra + COC[1]	72	65	56	49	1	0	3	18
Cobra + NIS	67	70	57	53	0	0	5	21
Cobra + AMS	70	69	51	51	0	1	6	28
Cobra + AMS + COC	74	62	—	—	0	0	—	—
Cobra + AMS + NIS	—	—	57	52	—	—	5	24
LSD 10 treatment	3	3	2	2	NS	NS	6	6

[1]Cobra @ 6 oz/acre, COC = Crop Oil Concentrate @ 8 oz/acre, NIS = Nonionic Surfactant @ 0.25% V/V in 1998 and 0.125% V/V in 1999, AMS = Ammonium Sulfate @ 4.0% V/V.
[2]1998 treatments applied at either V4 or R1 growth stages to Pioneer 92B21 Roundup Ready variety.
[3]1999 treatments applied to a moderately resistant variety (Asgrow AG2501) or a susceptible variety (Kaltenberg KB236). Both are Roundup Ready varieties.

FIGURE 2 EFFECT OF COBRA HERBICIDE ON SOYBEAN YIELD AND WHITE MOLD DISEASE. WISCONSIN, 1996, 1997, 1999.



SUMMARY

- Foliar applied fungicides Benlate and Topsin M increased soybean yields of white mold disease susceptible varieties when applied at the R1 growth stage, without consistently reducing WM disease levels.
- Yields of white mold susceptible varieties with a fungicide were not equal to yields of moderately susceptible varieties without a fungicide.
- Cobra herbicide increased yields of white mold susceptible varieties and reduced the disease level of both susceptible and moderately resistant varieties.
- Adjuvants did not enhance disease control or yield of soybean when added to Cobra herbicide.
- Variety selection is more important and more effective than the use of foliar fungicides or herbicides for control of white mold disease in soybean.

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