

Evaluation of chemical control of white mold on snap bean - Hancock, 2004.

A trial to evaluate efficacy of chemical and biological products to control white mold was established 28 Jun at the Hancock Agricultural Research Station, Hancock, WI. The cultivar Trueblue, from Harris Moran, was used for the trial. Each plot consisted of four 21-ft-long rows spaced 16-in.-apart with seeds planted approximately 10 per ft. Plots were arranged in a randomized complete block design with four replications. Drive rows were placed adjacent to plots to minimize soil compaction and damage to plants in treatment rows. Soil type was Sparta loamy sand with pH 7.2. Sunflowers grown in the field during 2003 were inoculated with *Sclerotinia sclerotiorum* and infected debris and sclerotia were incorporated by tilling into the soil in the fall. Apothecia produced from these sclerotia provided a natural source of ascospore inoculum for this experiment. The field was fertilized with 5-10-30 (100 lb/A, broadcast preplant, 15 Jun) and a sidedress application of 34-0-0, 100 lb/A, 27 Jul. Herbicide applications included: Poast, 1.0 pt/A + Basagran, 1.0 pt/A + Peptoil, 2.0 pt/A on 15 Jul and Basagran, 2.0 pt/A + Peptoil, 2.0 pt/A on 20 Jul. Fungicide treatments were applied to all four rows of each plot with a plot sprayer consisting of a tractor-mounted boom, pressurized with an air compressor. Treatments were applied at a rate equivalent to 35 gal water/A at 40 psi, using Tee Jet Hollow Disc Cone D3-23 nozzles (8 nozzles at 8-in. spacing). Application dates were: 5 Aug (10% bloom); 9 Aug (10% bloom + 4 days); 12 Aug (10% bloom + 7 days); 16 Aug (10% bloom + 10 days). Two 5-ft sections from each plot were rated for disease severity and pod infection on 30 Aug. The disease severity and the number of infected pods was determined for each of these plants. The two center rows of each plot (a total of 32 ft of row remaining) were mechanically harvested on 30 Aug and pods were graded to determine proportion of yield in different size classes based on pod diameter: 1-3 (< 9 mm diam), 4 (> 9 mm but < 11 mm) and 5 (> 11 mm). Rainfall recorded during the growing season (in.) was 28-30 Jun, 0; Jul, 3.7; Aug, 2.93. An additional 8.5 in. of water was applied as overhead sprinkler irrigation in 17 applications (1 Jul – 24 Aug).

Cool temperatures coupled with irrigation and rainfall during the bloom period favored development of white mold in this trial. At harvest, 53.8% of the plants in untreated plots exhibited symptoms of white mold and 31% of the untreated plants had at least one infected pod. Treatment protocols containing Topsin, either Flowable or WSB formulations, consistently resulted in low disease severity, incidence of infected plants and pod infection. The best disease control was observed in plots treated once at 4 days after 10% bloom with TD 2193-08 (Topsin 4.5FL). No pod infection was observed in plots treated with this material. The only treatment which increased net value was a single application of Topsin WSB four days after 10% bloom. Infected pods present as the beans enter the processing plant are a serious problem as it is difficult to remove sclerotia present in infected pods during processing. If a penalty for higher levels of infected pods had been included in the value calculation it might have resulted in increased value for some of the other fungicide treatments. All treatments containing any Topsin formulation had significantly fewer infected pods. Treatment with Sonata AS + Biotune appeared to increase disease severity and had no effect on disease incidence or pod infection when compared with the untreated control. None of the confidential materials (B1 at three rates or B2 at a single rate) provided acceptable control. A single treatment with either Switch (11 oz or 14 oz) or Omega did not provide acceptable control. There appeared to be a rate effect of Switch on yield, particularly the yield of pods in the largest size class. An additional rate study should be conducted with this material to examine treatment effects on total yield and yield components. There was no visual evidence of phytotoxicity in any of the treatment plots.

Table 1. Effect of treatment on incidence and severity of white mold on snap beans.

Treatment and rate - formulated product	Number of sprays & application schedule	Disease severity (%) ¹	Incidence of infected plants ²	Avg. no. infected pods/ plant	% of plants with						
					0	1	2	3	4	5	6
					infected pods/plant						
Untreated Control		16.4	53.8	0.5	69.0	18.7	9.6	1.3	1.0	0.0	0.4
Sonata AS (QRD 286) 2 qt + Biotune (QRD 602) 0.125% v/v	2, 10% bloom (10% + 7 days)	30.0	59.4	0.6	61.8	22.9	11.1	3.3	0.3	0.3	0.3
Serenade Max (QRD 141) 1 lb + Topsin- M 70WSB 1 lb + Biotune (QRD 602) 0.125% v/v	2, 10% bloom (10% + 7 days)	2.3	9.3	0.1	93.1	4.9	1.7	0.3	0.0	0.0	0.0
Topsin-M 70WSB 1.5 lb	1, 10% bloom + 4 days	5.4	14.3	0.1	93.0	4.3	2.7	0.0	0.0	0.0	0.0
TD 2193-08 (Topsin 4.5FL) 1 qt	1, 10% bloom + 4 days	0.2	1.8	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0
TD 2470-01 (Topsin M WDG) 1.5 lb	1, 10% bloom + 4 days	4.0	14.0	0.1	93.4	4.7	1.4	0.4	0.0	0.0	0.0
Cuprofix 40% (TD-2463-01) 1.5 lb + Topsin M Flowable 1 qt	1, 10% bloom + 4 days	1.3	8.9	0.1	95.3	3.9	0.4	0.4	0.0	0.0	0.0
Topsin-M 70WSB 1.0 lb	2, 10% bloom, 10% + 7 days	1.1	7.4	0.0	95.6	3.9	0.5	0.0	0.0	0.0	0.0
Conf 04-B1 0.43 pt	2, 10% bloom, 10% + 10 days	23.8	59.8	0.7	61.2	20.6	10.2	6.7	1.4	0.0	0.0
Conf 04-B1 1.28 pt	2, 10% bloom, 10% + 10 days	27.6	58.5	0.7	62.0	14.7	14.2	5.3	3.9	0.0	0.0
Conf 04-B1 2.14 pt	2, 10% bloom, 10% + 10 days	20.8	51.1	0.5	67.5	16.3	9.9	4.4	0.9	1.0	0.0
Conf 04-B2 0.38 lb	2, 10% bloom, 10% + 10 days	12.1	38.6	0.3	77.4	13.3	6.4	1.5	1.1	0.3	0.0
Switch 62.5 WG 11 oz	1, 10% bloom + 4 days	13.2	50.1	0.5	65.5	20.8	10.5	1.8	1.3	0.0	0.0
Switch 62.5 WG 14 oz	1, 10% bloom + 4 days	7.5	34.9	0.4	73.8	18.9	5.8	1.5	0.0	0.0	0.0
Omega 500F 5.5 fl oz	1, 10% bloom + 4 days	32.2	67.0	0.7	59.9	18.4	13.9	4.6	2.5	0.3	0.3
<i>P</i> > <i>F</i> ³		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.13	0.64
LSD		15.0	19.7	0.3	16.2	6.9	7.7	3.9	1.6	NS	NS

1 A ten-foot section of row was rated in each plot. Severity of disease on the entire plant was estimated for each plant on a 0-10 scale (0 = no infection, 1 = 10% infected, 2 = 20% infected . . . 10 = 100% infected). Numbers are the means of all plants rated (expressed as percentages).

2 The percentage of plants (out of the 10 ft of row rated) with any level of infection.

3 Analysis of variance was performed on data, and Fisher's protected least significant difference (LSD) was calculated (alpha=0.05). NS = not significant at *P* = 0.05.

Table 2. Effect of treatment on yield and value of snap beans.

Treatment and rate	Number of sprays & application schedule	Total yield (ton/A)	% of yield in size class ¹			Cost of chemicals per acre ²	Gross value of yield ³	Net value of yield ⁴	Effect of treatment on value ⁵
			1-3	4	5				
Untreated Control		2.5	12.3	45.0	42.7	0	209	209	0
Sonata AS (QRD 286) 2 qt + Biotune (QRD 602) 0.125% v/v	2, 10% bloom (10% + 7 days)	2.3	17.0	47.1	36.0	23	196	173	-36
Serenade Max (QRD 141) 1 lb + Topsin- M 70WSB 1 lb + Biotune (QRD 602) 0.125% v/v	2, 10% bloom (10% + 7 days)	3.0	10.0	40.3	49.7	59	239	179	-30
Topsin-M 70WSB 1.5 lb	1, 10% bloom + 4 days	3.1	6.7	44.1	49.2	25	247	222	13
TD 2193-08 (= Topsin 4.5FL) 1 qt	1, 10% bloom + 4 days	2.5	7.7	52.6	39.7	26	208	183	-26
TD 2470-01 (Topsin M WDG) 1.5 lb	1, 10% bloom + 4 days	2.5	8.0	47.6	44.4	25	205	180	-29
Cuprofix 40% (= TD-2463-01) 1.5 lb + Topsin M Flowable 1 qt	1, 10% bloom + 4 days	2.7	8.9	46.4	44.8	28	222	194	-15
Topsin-M 70WSB 1.0 lb	2, 10% bloom, 10% + 7 days	2.8	9.2	44.4	46.4	33	231	197	-12
Conf 04-B1 0.43 pt	2, 10% bloom, 10% + 10 days	2.5	13.9	47.6	38.5	--	212	--	.
Conf 04-B1 1.28 pt	2, 10% bloom, 10% + 10 days	2.2	12.2	42.4	45.3	--	179	--	.
Conf 04-B1 2.14 pt	2, 10% bloom, 10% + 10 days	2.3	10.5	48.3	41.2	--	193	--	.
Conf 04-B2 0.38 lb	2, 10% bloom, 10% + 10 days	2.9	11.6	40.8	47.6	--	239	--	.
Switch 62.5 WG 11 oz	1, 10% bloom + 4 days	2.7	11.2	50.1	38.6	42	234	192	-17
Switch 62.5 WG 14 oz	1, 10% bloom + 4 days	2.1	14.3	57.7	28.0	53	183	130	-79
Omega 500F 5.5 fl oz	1, 10% bloom + 4 days	2.3	11.3	46.3	42.4	16	193	177	-32
<i>P</i> > <i>F</i> ⁶		0.04	< 0.01	0.08	0.06	--	0.08	0.08	0.08
LSD		0.6	4.1	NS	NS	--	NS	NS	NS

¹ Size classes based on bean pod diameter: 1-3 (< 9 mm diam), 4 (> 9 mm but < 11 mm) and 5 (> 11 mm).

² Season-long cost of chemicals/acre (rate, number of applications and retail cost are included in calculation, cost of application is NOT included). Retail prices used include: Biotune = \$32.00/gal; Cuprofix 40% = \$1.70/lb; Omega 500F = \$370/gal; Serenade Max = \$11.50/lb; Sonata AS = \$20.50/gal; Switch = \$3.80/oz; Topsin M 70WSB = \$16.70/lb (used as an estimated price for Topsin M WDG also); Topsin 4.5FL = \$102/gal; No price information was available for experimental or unlabeled products. If ANY component of the treatment was an experimental product with no retail price, the cost of chemicals was not calculated

³ Based on a typical 2004 contract price for WI processing beans. Contract was based on actual amount harvested in each sieve size class – total yield was multiplied by the percentage of yield in each size class. The portion of yield in size 1-3 received \$113/ton; size 4, \$101/ton; size 5 \$59/ton.

⁴ Gross value minus cost of chemicals applied (calculated only for treatments with known chemical cost).

⁵ Effect of treatment on value = Net value for the treatment minus net value of the untreated control.

⁶ Analysis of variance was performed on data, and Fisher's protected least significant difference (LSD) was calculated (alpha=0.05). NS = not significant at *P* = 0.05).

