

### Evaluation of chemical control of white mold on snap bean - Hancock, 2001

A trial was established June 13 at the Hancock Agricultural Research Station in central Wisconsin to evaluate treatments to control white mold. Seeds of 'Probe' (Harris Moran, root rot tolerant) were planted in a randomized complete block design with four replications. Each plot consisted of four 21-foot-long rows spaced 16 inches apart with seeds planted approximately 10 per foot. The design included additional adjacent drive rows so that soil in treatment rows would not be compacted by pesticide application equipment. Soil type was a Sparta loamy sand with pH 6.8. Sunflowers grown in the field the previous season were inoculated with *Sclerotinia sclerotiorum* and infected debris and sclerotia were disked into the soil in the fall. Apothecia growing from these sclerotia produced a natural source of ascospore inoculum for this experiment. The field was fertilized with 0-0-60, 150 lb/A, broadcast preplant, April 16, and a sidedress application of 34-0-0, 20 lb/A, July 17. Herbicide applications included: Eptam 7E, 3.0 pt/A, June 11, Poast, 1.5 pt/A + Basagran, 1.5 pt/A + Crop Oil, 1.5 pt/A on June 22 and Poast, 1.5 pt/A + Crop Oil, 1.0 pt/A on July 19. Diazinon 50WP, 3.0 lb/A, June 11, and Orthene 75S (1 lb/A, June 29; 0.5 lb/A, July 19) were applied for insect control. 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-inch spacing). Application dates were: Jul 3 (1<sup>st</sup> week of July), July 18 (3<sup>rd</sup> week of July), July 24 (10% bloom), July 27 (10% + 4 days), July 31 (10% + 7 days), August 8 (10% + 14 days) (see schedules in Table 1). Rainfall (inches) was: 1.53 – June (13-30); 2.73 - July; 4.57 – August. An additional 8.1 inches of irrigation was applied in 16 applications during June-August. Two five-foot sections from each plot were evaluated August 13 and the number of infected pods and the disease severity was determined for each plant. The two center rows of each plot (a total of 32 feet of row) were mechanically harvested on August 14 and pods were graded to determine yield of size grades 1-3, 4 and 5 (Tables 1-2).

Unusually hot and dry conditions during the flowering period of this trial interfered with disease development. Additional irrigation was applied to this trial during this period, but high daytime and nighttime temperatures offset added water. Numerical differences in disease severity or incidence were not significant at the 5% level. However, the incidence of plant infection was numerically highest in the untreated control plots and lowest in plots treated with QRD 137, Switch and Omega. Infected pods were observed only in untreated plots and in plots treated with Elevate or Messenger. The addition of CaSO<sub>4</sub> to Topsin-M treatment did not affect disease development. Yields were generally low across all treatments, a likely result from adverse weather conditions. However, yields observed in plots treated four times with Messenger (9 oz./A), Elevate (1.5 lb/A) or a combination of Topsin-M and CaSO<sub>4</sub> were significantly higher ( $P = 0.10$ ) than yields in the untreated control plots. An evaluation of gross and net values derived from yield in this plot revealed that for those treatments currently being marketed to growers, there was a negative effect of treatment on crop value. In a year with low levels of disease, this is not unexpected. The increased yields in plots treated with multiple applications of Messenger were offset by the cost of chemical treatment so that in comparison with the untreated check, there was a negative impact on crop value. A similar trend was observed in plots treated with other registered products.

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

Treatment and rate - formulated product and active ingredient, ( in [ ] )	Number of sprays & application schedule	Disease severity (%) <sup>1</sup>	Incidence of infected		Avg. no. infected pods/ plant	% of plants with				
			Plants <sup>2</sup>	Leaf Only <sup>3</sup>		0	1	2	3	4
						infected pods/plant				
1 Untreated Control	0	0.8	6.1	0.0	0.005	99.5	0.5	0.0	0.0	0.0
2 TD-2389-01, 4.0 lb	2 10% bloom and 10% + 7 days	0.3	2.7	0.4	0.000	100.0	0.0	0.0	0.0	0.0
3 Topsin-M WSB, 1.5 lb [1.05 lb]	2 10% bloom and 10% + 7 days	0.3	2.5	0.4	0.000	100.0	0.0	0.0	0.0	0.0
4 Topsin-M WSB, 1.0 lb [0.7 lb] + CaSO <sub>4</sub> (Flo-Gyp, 12.5 pt)	2 10% bloom and 10% + 7 days	0.3	3.2	0.7	0.000	100.0	0.0	0.0	0.0	0.0
5 QRD 137, 4 lb	3 10% bloom, 10% + 7, 14 days	0.1	1.0	0.0	0.000	100.0	0.0	0.0	0.0	0.0
6 QRD 137, 8 lb	3 10% bloom, 10% + 7, 14 days	0.0	0.0	0.0	0.000	100.0	0.0	0.0	0.0	0.0
7 QRD 131, 2 gal	3 10% bloom, 10% + 7, 14 days	0.3	2.0	0.0	0.000	100.0	0.0	0.0	0.0	0.0
8 QRD 137, 4 lb + Topsin-M WSB, 1.0 lb [0.7 lb]	3 10% bloom, 10% + 7, 14 days	0.2	1.9	0.8	0.000	100.0	0.0	0.0	0.0	0.0
9 Elevate 50 WDG, 1.0 lb [0.5 lb]	1 10% bloom + 4 days	0.3	2.3	0.0	0.000	100.0	0.0	0.0	0.0	0.0
10 Elevate 50 WDG, 1.5 lb [0.75 lb]	1 10% bloom + 4 days	0.4	3.9	0.4	0.004	99.6	0.4	0.0	0.0	0.0
11 BAS 510 70% WG, 0.5 lb [0.35 lb]	2 10% bloom and 10% + 7 days	0.4	4.3	0.0	0.000	100.0	0.0	0.0	0.0	0.0
12 BAS 510 70% WG, 0.5 lb [0.35 lb]	1 10% bloom + 4 days	0.6	3.1	0.0	0.000	100.0	0.0	0.0	0.0	0.0
13 Topsin-M WSB, 1.5 lb [1.05 lb]	1 10% bloom + 4 days	0.2	1.5	0.0	0.000	100.0	0.0	0.0	0.0	0.0
14 Switch 62.5WG, 11 oz [0.43 lb]	1 10% bloom + 4 days	0.1	0.9	0.4	0.000	100.0	0.0	0.0	0.0	0.0
15 Messenger (3% WDG), 9 oz [0.017 lb] Messenger, 3 oz [0.006 lb]	1 1 <sup>st</sup> wk of July 3 3 <sup>rd</sup> wk of July, 10% bloom, 10% + 14 days	0.5	3.4	0.7	0.009	99.1	0.9	0.0	0.0	0.0
16 Messenger, 9 oz [0.017 lb]	4 1 <sup>st</sup> & 3 <sup>rd</sup> wk of July, 10% bloom, 10% + 14 days	1.1	2.0	0.0	0.000	100.0	0.0	0.0	0.0	0.0
17 Benlate 50 WP, 1.5 lb [0.75 lb]	2 10% bloom and 10% + 7 days	0.1	1.5	0.0	0.000	100.0	0.0	0.0	0.0	0.0
18 Omega, 5.75 fl oz [0.19 lb]	1 10% bloom + 4 days	0.0	0.3	0.0	0.000	100.0	0.0	0.0	0.0	0.0
Pr > F <sup>4</sup>		0.58	0.34	0.11	0.10	0.10	0.10	---	---	---
LSD <sup>4</sup>		NS	NS	NS	0.006*	0.6*	0.6*	---	---	---

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 The percentage of plants (out of the 10 feet of row rated), where the only part of the plant that was infected was a leaf.

4 Analysis of variance was performed on data, and Fisher's protected least significant difference (LSD) was calculated. NS = not significant at  $P = 0.10$  (\* indicates differences between treatments were significant at  $P = 0.10$ , but not 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			Cost of Chemicals per Acre <sup>1</sup>	Gross Value of Yield <sup>2</sup>	Net Value of Yield <sup>3</sup>	Effect of Treatment on Value <sup>4</sup>
			1-3	4	5				
1 Untreated Control	0	1.6	23.5	57.9	18.6	0.00	133.39	133.39	0.00
2 TD-2389-01, 4.0 lb	2 10% bloom and 10% + 7 days	1.5	27.9	57.3	14.8	---	123.92	---	---
3 Topsin-M WSB, 1.5 lb [1.05 lb]	2 10% bloom and 10% + 7 days	1.7	26.0	55.4	18.6	53.25	144.68	91.43	-41.96
4 Topsin-M WSB, 1.0 lb + CaSO <sub>4</sub> (Flo-Gyp, 12.5 pt)	2 10% bloom and 10% + 7 days	2.2	19.3	52.0	28.7	74.50	167.89	93.39	-40.00
5 QRD 137, 4 lb	3 10% bloom, 10% + 7, 14 days	1.8	20.8	54.8	24.4	---	142.91	---	---
6 QRD 137, 8 lb	3 10% bloom, 10% + 7, 14 days	1.8	25.7	53.3	21.0	---	147.46	---	---
7 QRD 131, 2 gal	3 10% bloom, 10% + 7, 14 days	1.8	21.9	55.6	22.5	---	152.68	---	---
8 QRD 137, 4 lb + Topsin-M WSB, 1.0 lb [0.7 lb]	3 10% bloom, 10% + 7, 14 days	2.1	20.1	56.8	23.1	---	173.20	---	---
9 Elevate 50 WDG, 1.0 lb [0.5 lb]	1 10% bloom + 4 days	2.0	18.4	56.9	24.7	34.25	165.11	130.86	-2.53
10 Elevate 50 WDG, 1.5 lb [0.75 lb]	1 10% bloom + 4 days	2.3	18.2	54.6	27.2	51.38	183.29	131.92	-1.47
11 BAS 510, 0.5 lb	2 10% bloom and 10% + 7 days	1.8	19.7	60.9	19.4	---	151.80	---	---
12 BAS 510, 0.5 lb	1 10% bloom + 4 days	2.3	19.0	52.2	28.9	---	175.30	---	---
13 Topsin-M WSB, 1.5 lb [1.05 lb]	1 10% bloom + 4 days	2.0	19.0	50.1	30.9	26.63	148.91	122.29	-11.10
14 Switch, 11 oz	1 10% bloom + 4 days	2.1	32.6	50.7	16.7	---	177.33	---	---
15 Messenger, 9 oz Messenger, 3 oz	1 1 <sup>st</sup> wk of July 3 3 <sup>rd</sup> wk of July, 10% bloom, 10% + 14 days	1.8	21.3	58.1	20.6	85.50	154.45	68.95	-64.43
16 Messenger, 9 oz	4 1 <sup>st</sup> & 3 <sup>rd</sup> wk of July, 10% bloom, 10% + 14 days	2.3	15.8	51.7	32.5	171.00	176.46	5.46	-127.93
17 Benlate 50 WP, 1.5 lb [0.75 lb]	2 10% bloom and 10% + 7 days	1.9	22.9	52.5	24.6	47.85	152.22	104.37	-29.02
18 Omega, 5.75 fl oz	1 10% bloom + 4 days	1.8	25.9	55.9	18.2	---	156.49	---	---
Pr>F <sup>5</sup>		0.06	0.05	0.58	0.30	---	0.19	< 0.01	< 0.01
LSD <sup>5</sup>		0.6*	8.9*	NS	NS	---	NS	40.4	40.4

1 Season-long cost of chemicals/Acre (rate, number of applications and retail cost are included in calculation). Retail prices used include: Benlate 50 WP = \$15.95/lb, Elevate = \$34.25/lb, Flo-Gyp = \$12.50/gal, Messenger = \$4.75/oz, Topsin M WSB (70 WP), = \$17.75/lb. 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.

2 Based on typical 2001 contract pricing for Midwest processing beans. Price is determined by the percentage of the yield that is sieve size 5 or larger. Price per ton is: <20.1 % #5 sieve - \$ 90; 20.1-30.0% #5 - \$81; 30.1-40.0% #5 - \$73; 40.1-50.0% #5 - \$67; 50.1-60.0% #5 - \$62; >60.0% #5 - \$60.

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

4 Net value of untreated control minus net value for the treatment.

5 Analysis of variance was performed on data, and Fisher's protected least significant difference (LSD) was calculated. NS = not significant at  $P = 0.10$  (\* indicates differences between treatments were significant at  $P = 0.10$ , but not at  $P = 0.05$ ).

