

**INTEGRATION OF BIOLOGICAL AND CHEMICAL CONTROLS FOR IMPROVED MANAGEMENT OF WHITE MOLD ON SNAP BEANS, 2000:** Field trials were established in grower fields in three locations in Wisconsin to evaluate the efficacy of Contans WG, a preparation of the fungus *Coniothyrium minitans* which has shown antagonistic activity to the white mold fungus, *Sclerotinia sclerotiorum*. At each location a rectangular area was staked out for the trial and Contans WG was applied at a rate of 4 lb/A to one half of the test area prior to bean planting. When fungicide was applied, it was applied to one half the test area, perpendicular to the Contans-treated portion, resulting in four treatment combinations: Untreated, standard fungicide application only (grower applied), Contans WG treatment only and Contans WG plus grower-applied fungicide. Four sampling areas, each 10 rows wide by 30 ft long, were marked in the central portion of each treatment area for subsequent data collection. These plots were evaluated for white mold development immediately before commercial harvest. Four 5-ft-long sections of row, chosen at random from each plot, were rated for pod infection and disease severity (Cumberland, 5 Sep; Hancock, 25 Aug; Plover, 28 Aug). The number of infected pods and the percent infection were determined for each plant in each row being evaluated. All fields were fertilized and treated with herbicide and insecticide according to standard grower practice.

The incidence of white mold was low at all three locations, but there did appear to be a decrease in white mold severity and incidence of infected plants and pods at all three locations in plots treated with Contans WG. Disease control using Contans WG was equivalent to control associated with the standard fungicide program at each site. At this low level of disease, there did not appear to be an additive benefit of using both Contans WG and a fungicide application. While limited in scope, these data are encouraging. Under normal circumstances, the application of Contans WG would occur three months prior to an anticipated outbreak of white mold, normally the blossoming period of the snap bean crop. In our field plots, the interval between Contans application and crop flowering was substantially less, due to scheduling difficulties related to the timing of pea harvest and snap bean planting. We would anticipate improved efficacy with Contans WG when applied three months prior to the blossoming of the snap bean crop.

Location	Cultivar	Planted	Contans WG applied:	Fungicide applied:
Cumberland	HyStyle	8 Jul	4 lb/A 9 Jun	Benlate 2 lb/A + Kocide 2000 1.5 lb/A, 17 Aug
Hancock	HyStyle	29 Jun	4 lb/A 28 Jun	Topsin M 1.5 lb/A, 10 Aug
Plover	DelMonte 0488	27 Jun	4 lb/A 23 May	Benlate 1.5 lb, 10 Aug

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

Site and Treatment	Disease severity (%) <sup>1</sup>	Incidence of infected		Avg. no. infected pods/plant <sup>4</sup>	% of plants with						
		Plants <sup>2</sup>	Pods <sup>3</sup>		0	1	2	3	4	5	
<b>Cumberland, WI</b>											
Untreated	1.8	12.1	2.0	0.2	89.7	4.4	1.9	2.4	0.4	1.2	
Fungicide	0.7	5.5	0.7	0.1	95.1	2.9	0.8	0.8	0.4	0.0	
Contans® WG	0.6	4.7	0.6	0.1	96.0	1.5	1.8	0.7	0.0	0.0	
Contans® WG + Fungicide	0.8	5.3	0.5	0.1	97.5	1.2	0.2	0.6	0.4	0.0	
	Pr>F <sup>5</sup>	0.22	0.07	< 0.01	0.01	0.03	0.35	0.06	0.20	0.69	0.01
	Lsd <sup>5</sup>	NS	5.5*	0.6	0.1	4.3	NS	1.4*	NS	NS	0.6
<b>Hancock, WI</b>											
Untreated	2.0	6.5	0.32	0.04	96.8	1.9	1.3	0.0	0.0	0.0	
Fungicide	0.3	1.4	0.07	0.01	99.0	0.7	0.2	0.0	0.0	0.0	
Contans® WG	1.2	4.0	0.11	0.02	98.0	2.0	0.0	0.0	0.0	0.0	
Contans® WG + Fungicide	0.8	2.3	0.04	0.01	99.5	0.2	0.3	0.0	0.0	0.0	
	Pr>F <sup>5</sup>	< 0.01	< 0.01	0.04	0.06	0.03	0.10	0.25	---	---	---
	Lsd <sup>5</sup>	0.7	2.5	0.19	0.03*	1.8	1.7*	NS	---	---	---
<b>Plover, WI</b>											
Untreated	1.2	2.2	0.04	0.01	99.4	0.6	0.0	0.0	0.0	0.0	
Fungicide	0.2	0.9	0.00	0.00	100.0	0.0	0.0	0.0	0.0	0.0	
Contans® WG	0.5	1.2	0.06	0.01	99.5	0.2	0.3	0.0	0.0	0.0	
Contans® WG + Fungicide	0.3	0.3	0.00	0.00	100.0	0.0	0.0	0.0	0.0	0.0	
	Pr>F <sup>5</sup>	0.07	0.09	0.24	0.22	0.26	0.21	0.09	---	---	---
	Lsd <sup>5</sup>	0.8*	1.5*	NS	NS	NS	NS	0.3*	---	---	---

- 1 Four 5-ft-long sections of row were 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 20 ft of row rated) with any level of infection.
- 3 The total number of infected pods from the 20 ft of row rated, divided by the estimated total number of pods from 20 ft of row (number of plants x avg. number of pods/plant) (multiplied by 100 to express as a percentage).
- 4 The total number of infected pods from the 20 ft of row rated divided by the number of plants rated.
- 5 Analysis of variance was performed on data, and Fisher's protected least significant difference (LSD) was calculated. NS = not significant at  $P = 0.10$ . \* = Differences between treatments were significant at  $P = 0.10$ , but not at  $P = 0.05$ .