IMPLEMENTING A MANAGEMENT PROGRAM FOR *SCLEROTINIA SCLEROTIORUM* IN SNAP BEANS.

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Introduction:

Sclerotinia sclerotiorum white mold can potentially infect 100 percent of the snap bean acreage in New York State. The black seedlike sclerotia residing in the soil are the overwintering and survival structures of *Sclerotinia sclerotiorum*, the causal agent of white mold in snap beans and many other important commercial crops such as dry beans, cabbage, potatoes, alfalfa, and soybeans. If the soil conditions in a sclerotia-infected field are wet for approximately one to two weeks, the sclerotia can germinate to produce mushroom like structures which eject spores. If the spores land on susceptible tissue (bean blossoms in a snap bean field), and the weather remains wet or the field is irrigated, the bean tissue and pods can get infected with white mold. Reducing the number of sclerotia in the field can reduce the amount of inoculum available to infect susceptible crops and ideally reduce disease incidence and severity.

Alternatives to fungicide applications for white mold *Sclerotinia sclerotiorum* is considered a high research priority by the New York processing industry. New biological and biocompatible control measures that look promising in replicated experiments have not been tested in commercial fields. Growers are interested in these products but would also like to know how these products will perform in their field conditions. Common IPM management for control of *Sclerotinia sclerotiorum* is through one and sometimes two foliar applications of a fungicide. The industry standard for NY is Ronilan DF *vinclozolin* to control white mold at flowering stage of growth.

Contans WG, containing the active ingredient *Coniothyrium minitans* strain CON/M/91-08 is now labeled in NYS for the reduction/control of *Sclerotinia sclerotiorum* (white mold) and Sclerotinia minor in agricultural soils. Contans WG is a naturally occurring, nonpathogenic, mycoparasitic soil fungi. The optimum temperature range for fungi germination and growth is at 77 to 86 degrees F. Contans WG is a possible longer-term solution to the white mold problem in vegetables by killing the overwintering sclerotia. Contans WG is applied on soils as a pre-plant treatment, three to four months prior to planting, or as a post harvest treatment to control the common plant pathogens, *Sclerotinia sclerotiorum* and Sclerotinia minor which cause white mold, pink rot and water soft rot.

There has been limited commercial evaluation of Contans WG. The product does show promising results in both Wisconsin and in trials by Helene Dillard at the Geneva Agriculture Research Station.

Objectives:

1) To discuss recommended management practices and include Contans WG as a biological tool to manage white mold in snap beans during a twilight or field day meeting in Western NY.

2) To examine the performance of Contans WG against an industry standard Ronilan in a commercial environment in western New York.

3) To evaluate soil samples from Contans WG treatment.

Methods and Procedures:

Research was conducted in a grower field in western New York on the ability of Contans WG to reduce the number of sclerotia in a commercial snap bean field. After discussing with field men and scouts, a field was selected that had a long history of planting snap beans, frequent problems with white mold, and irrigation available in case of persistent dry conditions. Following spring plowing, a portion of the approximately 50 acre field was divided into a 3.4 acre future Contans-treated section and a 2.3 acre non-Contans treated area with a 1.2 acre buffer zone in between the designated areas. The areas were divided into 96 ft X 50 ft quadrants designated by GPS coordinates. 50 soil samples of 1 liter each were collected from 0 to 4 inch depth from the center of individual quadrants to establish a baseline number of sclerotia before application of Contans WG. In order to collect and count sclerotia the soil samples were wet sieved through stacked #10 and #20 soil screens and the debris collected on the screens. Sclerotia were removed from the debris by using a binocular microscope for identification, a very labor intensive process. For the first 5 samples assayed only 3 of the samples had 1 or more sclerotia per one liter sample so only 60% of the samples contained any sclerotia. Given this low count number, 50 new soil samples were collected on June 13, 2002 after some secondary tillage disking, to more accurately reflect the populations of sclerotia in the top 4 inches of soil. On June 19, Contans WP was sprayed at the rate of 3 lb/acre using Tee Jet XR8004 nozzles (red) at approximately 4 mph ground speed at approximately 20 PSI nozzle pressure giving an application of just over 20 gallons per acre. The sprayer boom is mounted on the front of a double gang disc and the soil surface was treated immediately before being incorporated to a 4 inch depth. Snap beans (variety-Hystyle) were planted on June 28.

Fields were scouted throughout the growing season to evaluate the need for a foliar fungicide treatment in the non-Contans area. Weather conditions were extremely dry in the area. Evan after irrigation, no there was no presence of mold. Consequently, no Ronilan foliar fungicide treatment comparison was made. Likewise, only a few growers saw the site, since there was little mold pressure (mold was the furthest thing from growers minds at that point in the season) and the field location was quite remote.

One day prior to harvest, the center of the quadrant locations were located using GPS to take visual ratings for the presence of white mold. All plants were assessed in a 90 square foot area (3 rows X 12 foot long) on August 20. Samples of white fluffy bean tissue were taken to the Dillard lab for confirmation by culturing the samples on petri dishes containing potato dextrose agar with antibiotics, corn meal agar, and suspending tissue in sterile distilled water. After harvest, central quadrant locations were again identified and 50 more soil samples were collected on September 3 and sent to Dillard's lab for analysis.

Results:

Soil Samples

All soil samples were brought to the Dillard laboratory at the Geneva Agricultural Experiment Station and analyzed for the number of sclerotia present. From soil collected on June 13 from the untreated control area, two samples had 1 or more sclerotia out of 20 samples or 10% of the samples contained sclerotia. The soil samples contained an average of 0.15 sclerotia per liter of soil. In the future Contans-treated location 7 samples out of 30 contained sclerotia or 23.3 %. The soil samples contained an average of 0.3 sclerotia per liter of soil. For the post harvest samples collected on August 27, samples from the control area contained 4 sclerotia in 20 samples so 20% of the samples had sclerotia, and there were 0.2 sclerotia per liter of soil. In the Contans treated area 5 sclerotia were collected from 30 samples for an average of 16.7% of the samples containing sclerotia, and an average of 0.17 sclerotia per liter.

Foliar Samples

In a desperate attempt to find any type of mold, plants were visually assessed where irrigation pipes connected. Only samples of white fluffy mold were found which were evaluated to be a mixture of various common soil inhabitants, but no white mold. From the 8 bags of samples collected on August 20 there were two pods with gray mold (*Botrytis*), two samples with *Rhizoctonia*, and the other samples were a mixture of probable *Pythium*, *Fusarium*, *Alternaria*, nematodes, and various other unidentified microorganisms. No white mold was found.

Conclusions:

The populations of sclerotia were low in this field and there was no white mold disease in the plot area possibly due to the dry weather, so conclusions about the efficacy of Contans from this trial are risky. However, there was a trend in reduction in population of the fungus. Sclerotial populations in the untreated area increased slightly over the course of the experiment from 0.15 to 0.20 sclerotia per liter of soil, whereas populations in the Contans treated area decreased from 0.3 to 0.17 sclerotia per liter over the same time period.

Furthermore, the Contans still looks excellent in reducing the population of sclerotia in a research trial we established at Geneva two years ago. The average number of sclerotia in the Contans treated plot has continued to decline and is currently 7.0% of the control after only one application of Contans applied in 2002. Our results confirm the necessity of an accurate diagnosis of "true" white mold (Sclerotinia) not just a white colored fuzzy mold before a control strategy can be chosen since methods of control for various pathogens often differ.

Current recommendations for using Contans effectively:

1. Accurately identify the disease as white mold caused by *Sclerotinia sclerotiorum.*
2. Apply Contans with excellent coverage since it must come in contact with the sclerotia.
3. Incorporate by mixing soil to about 4 inch depth.
4. Do not turn the soil profile after application of Contans to avoid bringing up untreated soil.
5. Contans needs about 2 to 3 months to effectively colonize and destroy sclerotia.
6. May need to reapply after plowing the following year.
7. Spores can blow in from nearby fields; in-field inoculum probably causes more disease.

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