FINAL REPORT TO THE PENNSYLVANIA VEGETABLE MARKETING AND RESEARCH PROGRAM

PROJECT TITLE:
White Mold Control in Snap Beans without Ronilan

PERSONNEL:
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OBJECTIVE:
Conduct a comprehensive field trial to compare efficacy of registered and non-registered new fungicides for control of white mold caused by *Sclerotinia sclerotiorum* on snap beans.

BACKGROUND:
White mold on snap beans is caused by the fungus *Sclerotinia sclerotiorum*. This fungus is difficult to control and is known to attack over 400 plant species that includes horticultural crops, weeds, trees, and vines. *S. sclerotiorum* is most active when the soil and plants are wet. The fungus produces small black survival structures called sclerotia, which can survive in soil for several years. The sclerotia germinate to produce small mushroom-like structures called apothecia, and the apothecia produce ascospores that are forcibly discharged into the air. When the spores land on host tissue, they germinate and infect the plant. Snap bean blossoms are the preferred food source for this fungus, which means that protecting the blossoms from infection is a top priority. Fungicide applications must coincide with the opening of the bean blossoms in order to be most effective. And the chemical applied must provide control over an extended time period, because not all bean blossoms open at once. For many years, the industry standard was Ronilan, and our goal has been to identify a fungicide replacement of equal efficacy. We conducted a trial in 2012 where we compared 21 treatments for control of white mold in snap beans. Because gray mold, caused by *Botrytis cinerea*, is often a disease problem that occurs simultaneously with white mold, we included this disease in the trial.

RESULTS:
The trial was conducted at the Agricultural Experiment Station in Geneva, NY, in a Honeoye silt loam soil with a pH of 6.6. On May 24, snap beans (variety = Gold Mine) were seeded using a Monosem planter at 8.7 seeds per ft with 30-in. row spacing. Fertilizer (10-10-10 with supplemental manganese and zinc) was banded during planting (300 lb/A). Dual Magnum (1 pt/A) was applied post-plant on May 25.

The fungicide treatments were arranged in a randomized complete block design with four replications. The treatments consisted of single row plots that were 30 ft long with 5 ft of untreated beans as a buffer zone between blocks. The fungicides were applied using a CO_2 backpack single-row sprayer calibrated to deliver 68 gal/A at 50 psi with three 8002 flat fan nozzles. The sprayer was configured with one nozzle over the top of the row and a 9-in. drop nozzle on each side of the row angled into the canopy. Fungicide sprays were applied on July 12 at 38% bloom and July 21 at 100% bloom to pin pod stage. The same CO_2 sprayer configuration was used to apply spores of white and gray molds (*Sclerotinia sclerotiorum* and *Botrytis cinerea*) on July 18 and July 23. Following the spore applications, Aluminet (double-faced aluminum-coated shade cloth with a 40% shade factor) was placed over the entire plot until harvest. The shade cloth was used to keep the plants cool and maintain moisture in the plant canopy to encourage disease development.

Snap bean pods in 10 ft of row were hand harvested and evaluated August 14-16. Pods were categorized as healthy, infected with gray mold or white mold, counted and weighed. Disease incidence and yield were calculated. Mean monthly minimum and maximum temperatures (°F) were 52 and 74 in May, 55 and 74 in June, 64 and 84 in July, and 60 and 81 in August. Total monthly rainfall (in.) was 2.5, 2.6, 2.8 and 2.3 for May, June, July, and August, respectively. To encourage disease development, we irrigated on July 11, 17, 20, 24 & 31, and on August 3 & 6.

Disease incidence was moderate for both gray mold (5.3%) and white mold (6.8%) on the pods in the control plots. Gray mold pod incidence was statistically less than the control in the Fontelis, Quash and Tazz treatments. The Endura, Proline, Propulse, Rovral, Switch, Luna Tranquility, Topsin XTR, Topsin + Meteor and Meteor treatments achieved excellent control (less than 2% incidence) of white mold on pods. No treatments resulted in significantly higher marketable yield or total yield. No phytotoxicity was observed in any of the treatments.

Treatment, rate/A	Gray mold (%)	White mold (%)	Marketable yield (t/A)	Total yield (t/A)
Untreated Control	5.3 abcd *	6.8 a	1.8 ab	1.9 ab
Topsin 4.5FL, 20 fl oz	5.2 abcd	2.6 abcd	2.4 ab	2.4 ab
Endura 70 WDG, 11 oz + 0.125 v/v NIS	4.5 bcde	1.9 bcd	2.7 a	3.0 a
Proline 480 SC, 5.7 fl oz + 0.125 v/v NIS	2.7 cde	1.4 bcd	2.1 ab	2.2 ab
Propulse, SC 8.6 fl oz + 0.125 v/v NIS	5.4 abcd	1.0 cd	2.0 ab	2.1 ab
Quadris F, 15.4 fl oz	3.0 cde	4.5 abcd	2.4 ab	2.6 ab
Cannonball WP, 7 oz	2.1 de	2.3 abcd	1.8 ab	1.9 ab
Polyoxin D SC (CX-10440), 6.5 fl oz	3.5 cde	5.9 ab	2.1 ab	2.2 ab
Polyoxin D SC (CX-10440), 13 fl oz	3.4 cde	4.4 abcd	1.7 ab	1.8 b
Fontelis SC, 30 fl oz	1.9 e	6.7 a	1.9 ab	2.0 ab
Quash WG 4 oz	1.7 e	5.4 abc	2.3 ab	2.5 ab
Rovral 4F, 2 pt	4.4 bcde	0.9 cd	1.4 b	1.5 b
Picoxystrobin SC (Aproach), 12 fl oz + 0.125 v/v NIS	2.8 cde	4.8 abcd	2.5 ab	2.6 ab
Bravo WS, 3 pt	5.3 abcd	5.8 ab	2.3 ab	2.4 ab
Switch WG, 14 oz	2.7 cde	1.4 bcd	2.0 ab	2.1 ab
Luna Tranquility SC, 11.2 fl oz	2.6 cde	0.7 d	2.1 ab	2.2 ab
Cueva F, 2 gal/100gal + DN55 WDG, 3 lb	5.7 abc	3.1 abcd	2.2 ab	2.3 ab
Gavel 75DF, 2 lb	7.5 ab	4.8 abcd	2.3 ab	2.6 ab
Topsin XTR, 30 fl oz	4.8 bcde	1.8 bcd	2.2 ab	2.3 ab
Topsin 4.5FL, 20 fl oz + Meteor F, 1.5 pt	8.3 a	1.9 bcd	1.9 ab	2.1 ab
Meteor F, 2 pt	2.8 cde	1.2 cd	1.6 b	1.7 b
Tazz F, 4 pt	1.8 e	2.3 abcd	2.2 ab	2.3 ab
LSD ($p = 0.05$)	3.2	4.6	1.0	1.1

*Means within a column followed by the same letter are not significantly different according to Fisher's LSD test ($p = 0.05$).

IN CONCLUSION:

Nine treatments (Endura, Proline, Propulse, Rovral, Switch, Luna Tranquility, Topsin XTR, Topsin + Meteor and Meteor) provided very good white mold control in this trial. Ideally we aim for 20% disease on the pods in the control plots. But this year, overall disease incidence was low due to the hot dry conditions during the growing season. Our plan is to repeat this experiment in 2013 hopefully with ‘normal’ temperatures and rainfall. This information will be very useful for obtaining registrations for the new products and will help us develop our recommendations for growers.

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