Snap and Lima Bean Disease Problems in 2013

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SNAP BEANS – WHITE AND GRAY MOLDS

Pod mold control was rated among the highest priorities for research in 2013 by members of the New York State Vegetable Research Council and Association. The primary objective of the 2013 trial was to evaluate and compare current and new fungicide treatments for control of white and gray molds.

White mold is caused by the fungus *Sclerotinia sclerotiorum* and gray mold is caused by the fungus *Botrytis cinerea*. Snap bean blossoms are the preferred food source for both fungi, which means that protecting the blossoms from infection is a top priority. Fungicide applications must coincide with the opening of the blossoms in order to be most effective.

The 2013 trial was conducted at the Agricultural Experiment Station in Geneva, NY, in a Honeoye silt loam soil with a pH of 6.6. The first planting of beans had poor emergence and the field had to be abandoned. Unusually wet spring weather further delayed our second attempt to plant the snap beans. Finally, on June 25, snap beans (variety = Huntington) 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.

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 hip mounted 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 August 5 at 40% bloom and August 12 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 August 6 and August 13. 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 September 11-13. 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 57 and 74 in June, 63 and 81 in July, 58 and 77 in August, and 55 and 76 in September. Total monthly rainfall (in inches) was 5.8, 4.7, 4.0 and 2.0 for June, July, August and September, respectively. To enhance disease development, irrigation was applied on August 16 and 23, and September 9.

Disease incidence was moderate for white mold (13.0%) and low for gray mold (1.9%) on the pods in the inoculated control. White mold incidence was statistically less in the Topsin + Rovral, Topsin XTR, Propulse, Luna Tranquility, Endura, Topsin, Rovral and Proline treatments when compared to the inoculated control. The Topsin + Rovral and Topsin XTR treatments achieved excellent control (less than 2% incidence) of white mold on pods. None of the treatments resulted in statistically less gray mold incidence. Statistically greater marketable yields were achieved in the Topsin + Rovral, Luna Tranquility, Rovral and Topsin treatments. Higher total yield was achieved in the Topsin + Rovral, Luna Tranquility, Topsin, Rovral and Bravo treatments when compared to the untreated control. No phytotoxicity was observed in any of the treatments.

Treatment, rate/A	White mold on pods(%)	Gray mold on pods(%)	Marketable yield (t/A)	Total yield (t/A)
Untreated Control	13.0bcd [z]	1.9cde	5.0de	5.3ef
Topsin 4.5FL, 20 fl oz	4.1ef	5.8b	6.1abc	6.4abc
Endura 70 WDG, 11 oz + 0.125 v/v NIS	3.6ef	0.4e	5.8abcd	6.0abcde
Proline 480 SC, 5.7 fl oz + 0.125 v/v NIS	5.8ef	3.5c	5.1de	5.4def
Propulse FL, 8.6 fl oz + 0.125 v/v NIS	2.5f	2.0cde	5.3cde	5.4def
Cannonball WP, 7 oz	8.2def	2.3cd	5.5bcde	5.8bcde
Fontelis SC, 30 fl oz	20.3a	1.2de	4.8ef	5.3ef
Quash WDG 4 oz	19.0ab	1.9cde	4.1f	4.6f
Rovral 4F, 2 pt	5.5ef	1.3de	6.2abc	6.4abc
Bravo WS, 3 pt	16.5abc	1.6de	5.8abcd	6.3abcd
Switch WDG, 14 oz	13.8abcd	1.5de	5.1de	5.5de
Luna Tranquility SC, 11.2 fl oz	2.7f	1.9cde	6.3ab	6.5ab
Aproach SC, 12 fl oz + 0.125 v/v NIS (1x)	10.4cde	2.7cd	5.1de	5.4def
Aproach SC, 12 fl oz + 0.125 v/v NIS (2x)	16.0abc	2.6cd	5.1de	5.6cde
Topsin XTR FL, 30 fl oz	1.8f	8.7a	5.5bcde	5.8bcde
Topsin 4.5FL, 20 fl oz + Rovral 4F, 2 pt	1.7f	5.8b	6.5a	6.8a
LSD ($P \leq 0.05$)	7.0	1.8	0.9	0.9

[z] Means in the same column with different letters differ significantly according to LSD ($P \leq 0.05$).

Eight treatments (Topsin + Rovral, Topsin XTR, Propulse, Luna Tranquility, Endura, Topsin, Rovral and Proline) provided very good white mold control in this trial. The Topsin + Rovral and Topsin XTR treatments achieved excellent control (less than 2% incidence) of white mold on pods. These results are consistent with the experiment we conducted last year, and broadening our data base for developing disease control recommendations.

LIMA BEANS – A NEW LEAF SPOT DISEASE

A new leaf spot disease developed on plantings of lima beans this year. The symptoms include reddish brown mostly circular lesions on the leaves, which may spread to stems and pods. The lesions begin as small pinpoint spots that enlarge to the size of a dime. Very mature lesions become a lighter tan color in the center and small black spots may develop in the middle of the lesion. The small black spots are actually the fruiting bodies of a fungus.

Several attempts were made by Chris Smart, Holly Lange, Joi Strauss, and Helene Dillard to isolate the fungus on agar media. We recovered several organisms and attempted to produce similar lesions on healthy lima bean plants in the greenhouse by inoculating them with the isolates we had collected. To identify the organisms that produced leaf spots, Joi Strauss worked in Chris Smart's lab and extracted the DNA and sent it out for sequencing. A pathogen that was recovered was identified as *Phoma exigua*.

Although extensive leaf spotting was observed in the field in 2013, it did not appear to significantly reduce yield. Below are pictures of the disease:

LIMA BEANS – WHITE MOLD

We received a few reports of high incidences of white mold on lima beans. White mold is caused by the fungus *Sclerotinia sclerotiorum* and it is known to attack over 400 species of plants, including lima beans. The strategy for disease control in lima beans is similar to the strategy in snap beans…use labeled protectant fungicides to protect the blossoms. The problem is that lima beans are in bloom for a longer period of time. We found that large numbers of spent blossoms collect in the leaf axils along with moisture, which provides the perfect incubation place for the white mold fungus. In addition, the canopy is dense and the stems on which the pods are produced become heavy with the weight of the pods and often fall over and lay on the ground. Pods that are lying on the ground are susceptible to rots caused by many opportunistic pathogens, including *S. sclerotiorum.* We suggest the use of a systemic material like Topsin M to control white mold on lima beans. The table below was compiled by Joi Strauss and shows the registration status for fungicides for use on lima beans.

Fungicide/Chemical	Chemical Company	Federal Registration (Y/N)	NYS Registered (Y/N)	Labeled for:
Actinovate SP (Streptomyces)	**Natural Ind.**	**Y**	**Y**	***Sclerotinia, Phytophthora* & *Pythium spp.***
Blocker 4F (PCNB)	**AMVAC**	**Y**	**Y**	***Sclerotinia* & *Rhizoctonia***
Bravo WS (Chlorothalonil)	**Syngenta**	**Y**	**Y**	***Phytophthora nicotianae* (Root rot), Bean rust, etc.**
Cannonball WP (Fludioxonil)	**Syngenta**	**Y**	**Y**	***Sclerotinia* & *Botrytis***
Champ WG (Copper hydroxide)	**Nufarm**	**Y**	**Y**	**Bacterial blight & Brown spot**
Contans WG (*Coniothyrium minitans*)	**Advan**	**Y**	**Y**	***Sclerotinia spp*.**
DoubleNickel55 (*Bacillus*)	**Certis USA**	**Y**	**Y**	***Sclerotinia* & *Botrytis***
Endura 70 WDG (*Boscalid*)	**BASF**	**Y**	**Y**	***Sclerotinia* & *Botrytis***
Fontelis SC (Penthiopyrad)	**DuPont**	**Y**	**N**	***Sclerotinia* & *Botrytis***
Forum (Dimethomorph)	**BASF**	**Y**	**Y**	***Phytophthora phaseoli* (Downy mildew)**
Headline (Pyraclostrobin)	**BASF**	**Y**	**Y**	***Alternaria*, *Phytophthora nicotianae*, Bean rust, etc. (Dry beans)**
Kocide DF (Copper hydroxide)	**DuPont**	**Y**	**Y**	**Brown spot, Common & Halo blight**
Meteor F (Iprodione)	**UPI**	**Y**	**Y**	***Sclerotinia* & *Botrytis***
Omega 500F (Fluazinam)	**Syngenta**	**Y**	**N**	***Sclerotinia* & *Botrytis***
Phostrol (sodium, potassium & ammonium phosphites)	**Nufarm**	**Y**	**Y**	***Phytophthora phaseoli* and *Pythium spp.***
Proline 480 SC (Prothioconazole)	**Bayer**	**Y**	**Y**	***Sclerotinia* & Bean rust**
ProPhyt (Potassium phosphite)	**Helena**	**Y**	**Y**	***Phytophthora phaseoli***
Propulse SC (Fluopyram + Prothioconazole)	**Bayer**	**Y**	**N**	***Sclerotinia* (Dry beans)**

Fungicide/Chemical	Chemical Company	Federal Registration (Y/N)	NYS Registered (Y/N)	Labeled for:
Quadris F (Azoxystrobin)	**Syngenta**	**Y**	**Y**	***Alternaria*, *Rhizoctonia*, Bean rust, etc.**
Ridomil Gold Copper (Mefenoxam + Copper Hydroxide)	**Syngenta**	**Y**	**Y**	***Phytophthora phaseoli***
Rovral 4F (Iprodione)	**Bayer**	**Y**	**Y**	***Sclerotinia* & *Botrytis***
Sonata (*Bacillus*)	**AgraQuest**	**Y**	**Y**	***Erysiphe spp.* (Powdery mildew) & Rust**
Switch WG (Cyprodinil + Fludioxonil)	**Syngenta**	**Y**	**Y**	***Sclerotinia* & *Botrytis***
Topsin 4.5FL (Thiophanate-methyl)	**UPI**	**Y**	**Y**	***Sclerotinia* & *Botrytis***

Remember to follow all label directions

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I will be leaving Cornell University to take the position of Dean of the College of Agricultural and Environmental Sciences at UC Davis. I sincerely thank the NYS snap bean producers for their steadfast support of my program over many years at Cornell University. I will miss everyone!

Helene Dillard