Impacts of fungicide selection and placement in snap bean disease management



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January 16, 2020– 9:00-9:25AM

Wisconsin Agribusiness Classic – Mendota 1

Alliant Energy Center

Madison, WI

Root Rot & Damping Off Diseases

Early season, stand-reducing diseases result from infection by one or more soilborne pathogens during periods of cool and wet soil

Fungi: *Rhizoctonia solani, Fusarium* spp.
Oomycetes: *Aphanomyces euteiches, Pythium* spp.



Photo Credits L to R: Howard Schwartz, A.M. Varela, T.J. Hughes & C. Grau, CSU Extension

Root Rot & Damping Off Diseases
Management Approaches

Varietal resistance

Crop rotation out of susceptible legume crops for ~3 years

Avoid planting during times when soil will remain consistently <~50°F and wet

Seed-applied or at-plant applied fungicides for reducing disease

Root Rot & Damping Off Diseases
Research Objectives

MWFPA funded project (2018-2020): Investigating at-plant fungicide treatments for improving snap bean stand and crop health

Document the effectiveness of reduced risk fungicides applied as either seed-applied and/or in-furrow applied treatments to limit early season, stand-limiting disease to develop effective management pro
snap beans in WI.

Hancock Research Station
UNIVERSITY OF WISCONSIN-MADISON

Hartung Brothers Incorporated

Del Monte Quality

Root Rot & Damping Off Diseases
In-row Treatment Study 2018

- Location: Hancock ARS 2018
- 2 Varieties: Huntington and Hystyle (no seed treatments)
- Planting Date: 2 July
- Fungicides applied: drench in-row over the top of covered seed
- Data collected: emergence, plant vigor, foliar and root symptoms, and yield
- Harvested: 10 September

Treatment Number				
Huntington	Hystyle	Treatment	rate/1000 rf	Application Timing[z]
1	9	Non-treated Control		NA
2	10	Ridomil Gold	0.42 fl oz	In-furrow
3	11	Ridomil Gold + Quadris	0.42 fl oz + 0.8 fl oz	In-furrow
4	12	Quadris	0.8 fl oz	In-furrow
5	13	Velum Prime	0.45 fl oz	In-furrow
6	14	Serenade	4.4 fl oz	In-furrow
7	15	Regalia	4.4 fl oz	In-furrow
8	16	Double Nickel	2.2 fl oz	In-furrow

Root Rot & Damping Off Diseases
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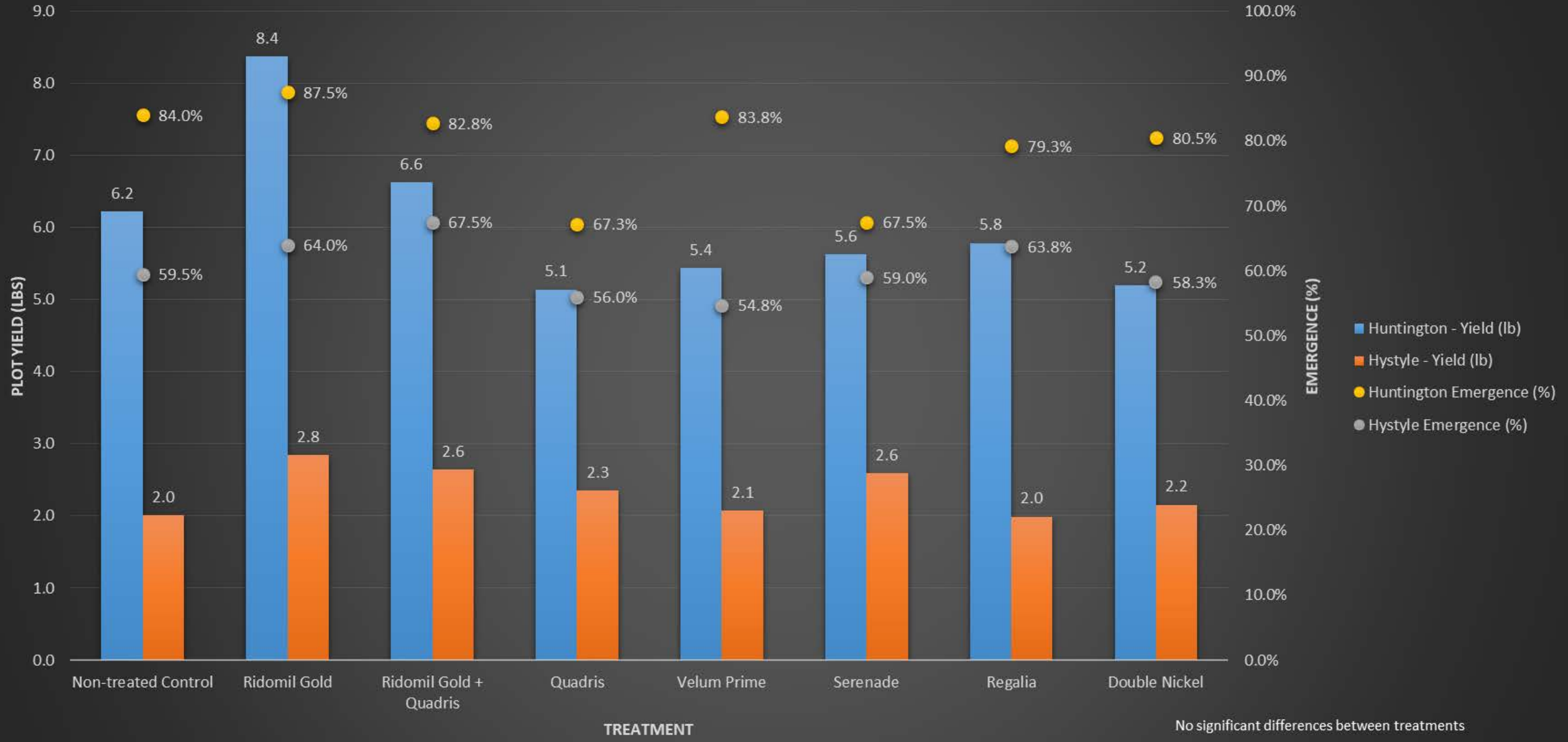
Treatment Number				
Huntington	Hystyle	Treatment	rate/1000 rf	Application Timing[z]
1	9	Non-treated Control		NA
2	10	Ridomil Gold	mefenoxam	
3	11	Ridomil Gold + Quadris	mefenoxam + azoxystrobin	
4	12	Quadris	azoxystrobin	
5	13	Velum Prime	fluopyram	
6	14	Serenade	*Bacillus subtillus*	
7	15	Regalia	Extract of *Reynoutria sachalinensis*	
8	16	Double Nickel	*Bacillus amyloliquefaciens*	

Root Rot & Damping Off Diseases
In-row Treatment Study 2018



No significant differences between treatments

Root Rot & Damping Off Diseases
In-row Treatment Study 2018

- No significant differences in emergence or yield when compared to non-treated control (data shown in graph on previous slide)
- No significant differences in plant vigor or disease when compared to non-treated control (data not shown)
- Relatively low disease pressure
- No phytotoxicity observed for any treatments

Root Rot & Damping Off Diseases
In-row Treatment Study 2019

- Location: Hancock ARS 2019
- 2 Varieties: Huntington and Hystyle
- Planting Date: 29 May
- Fungicides applied as drenches in-row over the top of covered seed
- Seed treatments applied and dried onto seed the morning of the planting
- Data collected: emergence, plant vigor, foliar and root symptoms, and yield
- Mechanically harvested: 14 Aug

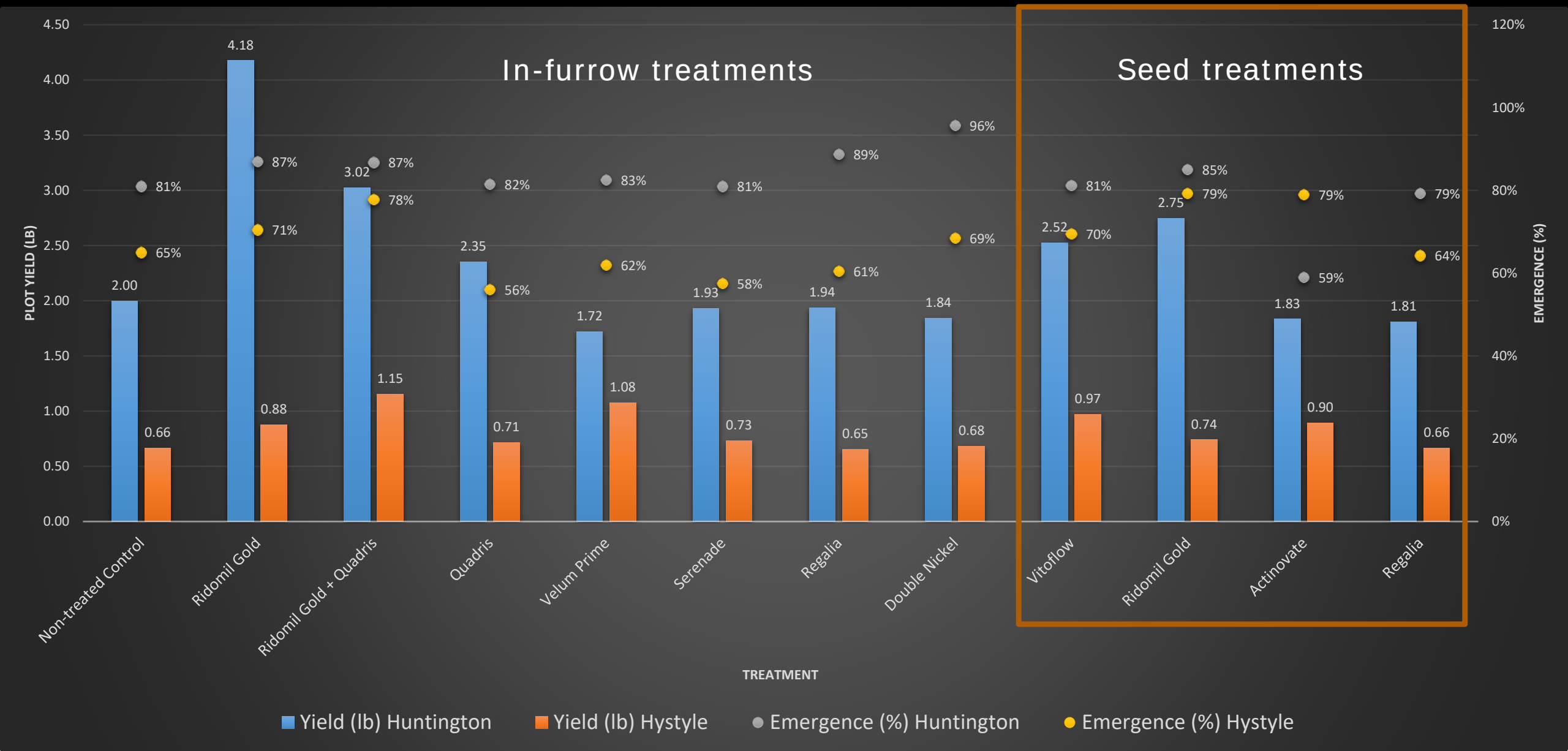
Huntington	High Style	Treatment	rate/1000 rf	Application Timing[z]
1	13	Non-treated Control		NA
2	14	Ridomil Gold	0.42 fl oz	In-furrow
3	15	Ridomil Gold + Quadris	0.42 fl oz + 0.8 fl oz	In-furrow
4	16	Quadris	0.8 fl oz	In-furrow
5	17	Velum Prime	0.45 fl oz	In-furrow
6	18	Serenade	4.4 fl oz	In-furrow
7	19	Regalia	4.4 fl oz	In-furrow
8	20	Double Nickel	2.2 fl oz	In-furrow
9	21	Vitoflow	2.6 ml/kg seed	Seed Treatment
10	22	Ridomil Gold	2.5%v/v	Seed Treatment
11	23	Actinovate	10g/100ml	Seed Treatment
12	24	Regalia	10%v/v	Seed Treatment

Root Rot & Damping Off Diseases
In-row Treatment Study 2019

- Location: Hancock ARS 2019
- 2 Varieties: Huntington and Hystyle
- Planting Date: 29 May
- Fungicides applied as drenches in-row over the top of covered seed
- Seed treatments applied and dried onto seed the morning of the planting
- Data collected: emergence, plant vigor, foliar and root symptoms, and yield
- Mechanically harvested: 14 Aug

Huntington	High Style	Treatment	Active ingredient	Application Timing[z]
1	13	Non-treated Control	NA	NA
2	14	Ridomil Gold	mefenoxam (4)	In-furrow
3	15	Ridomil Gold + Quadris	mefenonxam (4) + azoxystrobin (11)	In-furrow
4	16	Quadris	azoxystrobin (11)	In-furrow
5	17	Velum Prime	fluopyram (7)	In-furrow
6	18	Serenade	*Bacillus subtilis*	In-furrow
7	19	Regalia	Extract *Reynoutria sachalinensis*	In-furrow
8	20	Double Nickel	*Bacillus amyloliequefaciens*	In-furrow
9	21	Vitoflow	carbathiin (7) + thiram (M)	Seed Treatment
10	22	Ridomil Gold	mefenoxam (4)	Seed Treatment
11	23	Actinovate	*Streptomyces lydicus*	Seed Treatment
12	24	Regalia	Extract of *Reynoutria sachalinensis*	Seed Treatment

Root Rot & Damping Off Diseases
In-row Treatment Study 2019



Root Rot & Damping Off Diseases
In-row Treatment Study 2019

- Overall, reduced yield compared to 2018 trial with in-furrow treatments
- Higher emergence (%) and yield with Huntington compared to HyStyle
- Significant differences in emergence
- No significant differences in yield when compared to non-treated control (data shown in graph on previous slide)
- No significant differences in plant vigor or disease when compared to non-treated control (data not shown)
- Relatively low disease pressure
- No phytotoxicity observed for any treatments

White Mold on Snap Beans in 2018

- A favorable year for white mold in bean crops in some locations depending upon rainfall and crop status
- Pathogen continues to be present in many/more fields
- In many cases, by the time symptoms/signs were evident, it was too late for fungicides to be effective

Fungus grows out of senescing tissue onto healthy stems and leaves.

Ascospores germinate and infect senescing petals as they fall to the ground or are trapped in canopy.

Ascospores are trapped by flowers of the first full bloom.

wind

Windborne ascospores, forcibly ejected

The fungus can colonize healthy tissue rapidly producing water soaked lesions and may produce white mold growth depending on conditions.

Infection of plant at soil line

SUMMER

Infected tissue decays leaving sclerotia inside and outside, and stems are hollowed and bleached.

Sclerotia may germinate directly, producing mycelia that infect and colonize neighboring healthy tissue.

Apothecium cross section

Soil temp <65°F
+ hi moisture

SPRING and EARLY SUMMER

Sclerotia germinate producing apothecia.

Fungus overwinters as sclerotia in plant debris and soil.

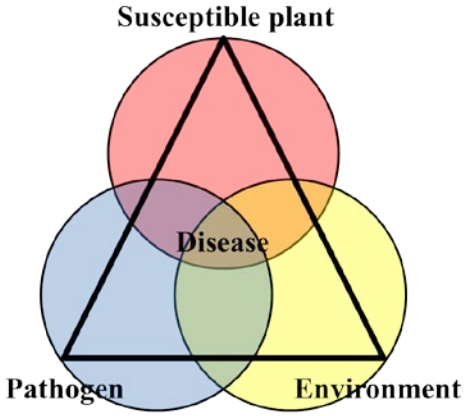
FALL and WINTER

Sclerotia can persist in soil for ≥7 years

White Mold Disease Cycle

White Mold Management Strategies

- Track history of white mold pathogen in fields
- Monitor soil moisture (pathogen requires saturation to field capacity for 10 days to produce apothecia and ascospores)
- Initiate fungicide use just before peak bloom
- Follow cultural practices that promote drying of soil and plant (avoid narrow row spacing)
- Avoid small fields surrounded by dense woods that restrict air circulation
- Plant rows in direction of the prevailing winds
- Avoid highly susceptible and dense varieties
- Plow fields immediately after harvest and rotate crops to reduce inoculum



Snap Bean White Mold Fungicide Efficacy Evaluation

Research Objectives

MWFPA funded project (2018-2020): Evaluating fungicides and their timing for control of white mold in irrigated snap beans

Document the effectiveness of fungicides and timing of their application to control white mold on snap bean in central Wisconsin.

Hancock Research Station
UNIVERSITY OF WISCONSIN-MADISON

Hartung Brothers Incorporated

Del Monte Quality

Snap Bean White Mold Fungicide Evaluation 2018

- Location: Delmonte Research Farm, Plover, Wisconsin
- 3 Varieties: DMF 04-88, Pismo, and Hystyle
- Planting Date: 4 July
- Application: Fungicides applied with a CO2 back pack sprayer at flowering (13 Aug) and 7 days later (20 Aug)
- Data Collected: white mold plant ‘hits’ and yield
- Harvest Date: 11 September

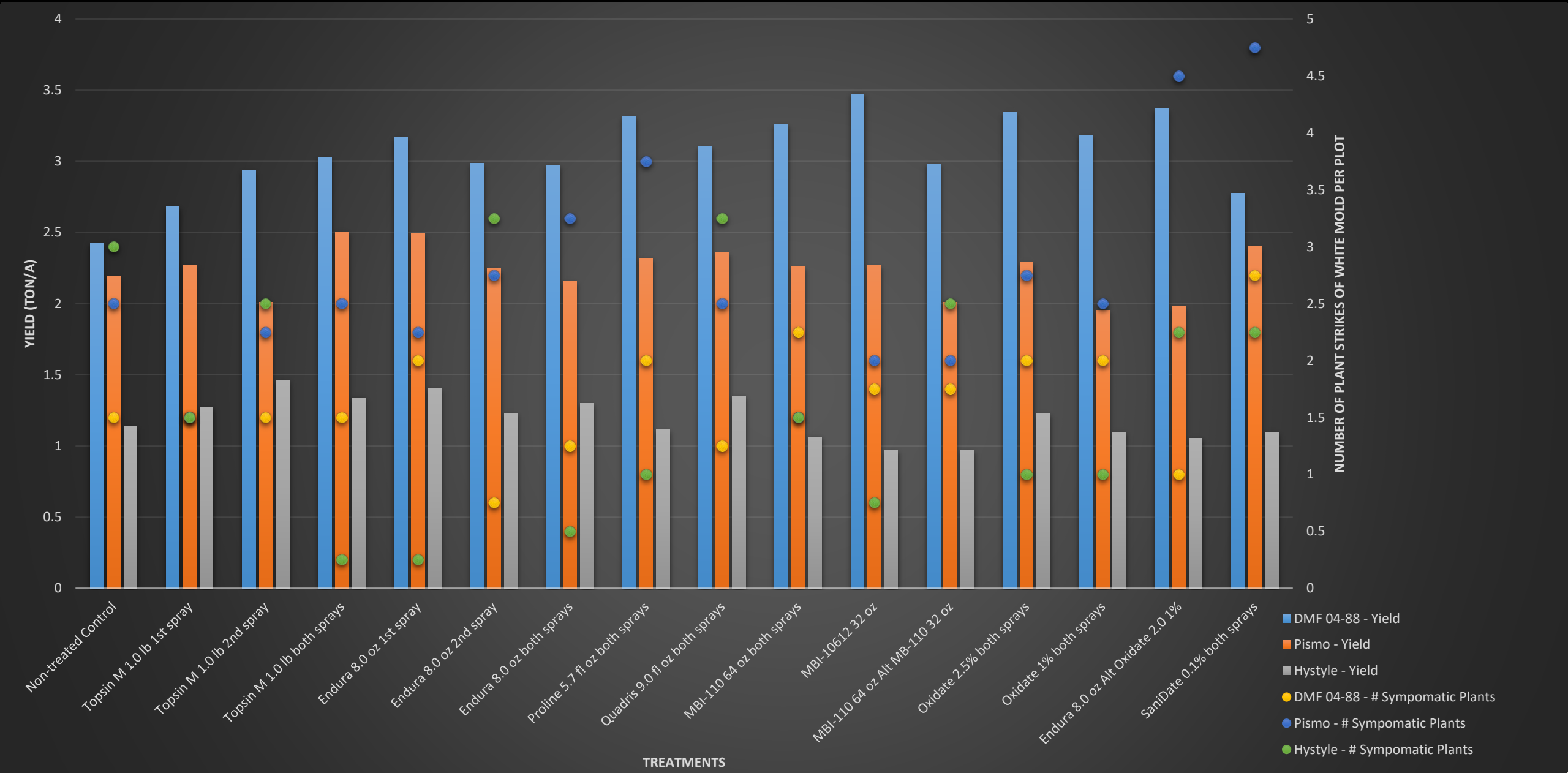
Snap Bean White Mold Fungicide Evaluation 2018

Trt #	Treatment and rate/acre	Application Timing[z]
1	Non-treated Control	NA
2	Topsin M 70WSB 1.0 lb	1
3	Topsin M 70WSB 1.0 lb	2
4	Topsin M 70WSB 1.0 lb	1,2
5	Endura 70WDG 8.0 oz + 0.1%v/v NIS	1
6	Endura 70WDG 8.0 oz + 0.1%v/v NIS	2
7	Endura 70WDG 8.0 oz + 0.1%v/v NIS	1,2
8	Proline 480SC 5.7 fl oz	1,2
9	Quadris 2.08SC 9.0 fl oz	1,2
10	MBI-110 AF5 64 oz	1,2
11	MBI-10612 32 oz	1,2
12	MBI-110 AF5 64 oz MB-110 AF5 32 oz	1 2
13	Oxidate 2.0 2.5% v/v + WetCit 0.25%	1,2
14	Oxidate 2.0 1% v/v + WetCit	1,2
15	Endura 70WDG 8.0 oz + 0.1%v/v NIS Oxidate 2.0 1% v/v + WetCit	1 2
16	SaniDate 12.0 0.1% v/v + WetCit	1,2

Snap Bean White Mold Fungicide Evaluation 2018

Trt #	Treatment and rate/acre	Application Timing[Z]
1	Non-treated Control	NA
2	Topsin M 70WSB 1.0 lb	thiophanate methyl
3	Topsin M 70WSB 1.0 lb	thiophanate methyl
4	Topsin M 70WSB 1.0 lb	thiophanate methyl
5	Endura 70WDG 8.0 oz + 0.1%v/v NIS	boscalid
6	Endura 70WDG 8.0 oz + 0.1%v/v NIS	boscalid
7	Endura 70WDG 8.0 oz + 0.1%v/v NIS	boscalid
8	Proline 480SC 5.7 fl oz	prothioconazole
9	Quadris 2.08SC 9.0 fl oz	azoxystrobin
10	MBI-110 AF5 64 oz	*Bacillus amyloliquefaciens*
11	MBI-10612 32 oz	*Reynoutria sachalinensis* extract
12	MBI-110 AF5 64 oz MB-110 AF5 32 oz	*Bacillus amyloliquefaciens*
13	Oxidate 2.0 2.5% v/v + WetCit 0.25%	hydrogen dioxide + PAA
14	Oxidate 2.0 1% v/v + WetCit	hydrogen dioxide + PAA
15	Endura 70WDG 8.0 oz + 0.1%v/v NIS Oxidate 2.0 1% v/v + WetCit	boscalid + hydrogen dioxide + PAA
16	SaniDate 12.0 0.1% v/v + WetCit	hydrogen dioxide + PAA

Snap Bean White Mold Fungicide Evaluation 2018



Snap Bean White Mold Fungicide Evaluation
2018 Results

- **No significant differences in disease or yield among treatments by variety** (data shown on previous slide)
  - **DMF 04-88** highest yielding variety, lower disease, best white mold control with Endura, Quadris, Endura + OxiDate treatments
  - **Pismo** second highest yielding variety, higher disease, best white mold control with Topsin, Endura, and Marrone biopesticide treatments
  - **Hystyle** lowest yielding variety, low to moderate disease, best control with Topsin, Endura, Reynoutria, and Oxidate treatments
- Relatively low disease pressure and most infections occurred by ground contact, not through flowers
- No phytotoxicity observed for any treatments

Snap Bean White Mold Fungicide Evaluation 2019

- Location: Delmonte Research Farm, Plover, Wisconsin
- 2 Varieties: DMF 04-88, Pismo (Hystyle left out due to root rot concerns)
- Planting Date: End of June
- Application: Fungicides applied with a CO2 back pack sprayer at 10% flowering (30 Jul) and 7 days later (6 Aug)
- Same treatment list as in 2018
- Data Collected: white mold plant ‘hits’ and yield
- Harvest Date: 27 August

Snap Bean White Mold Fungicide Evaluation 2019

Trt #	Treatment and rate/acre	Application Timing[z]
1	Non-treated Control	NA
2	Topsin M 70WSB 1.0 lb	1
3	Topsin M 70WSB 1.0 lb	2
4	Topsin M 70WSB 1.0 lb	1,2
5	Endura 70WDG 8.0 oz + 0.1%v/v NIS	1
6	Endura 70WDG 8.0 oz + 0.1%v/v NIS	2
7	Endura 70WDG 8.0 oz + 0.1%v/v NIS	1,2
8	Proline 480SC 5.7 fl oz	1,2
9	Quadris 2.08SC 9.0 fl oz	1,2
10	MBI-110 AF5 64 oz	1,2
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13	Oxidate 2.0 2.5% v/v + WetCit 0.25%	1,2
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15	Endura 70WDG 8.0 oz + 0.1%v/v NIS Oxidate 2.0 1% v/v + WetCit	1 2
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Snap Bean White Mold Fungicide Evaluation 2019

Trt #	Treatment and rate/acre	Application Timing[z]
1	Non-treated Control	NA
2	Topsin M 70WSB 1.0 lb	thiophanate methyl
3	Topsin M 70WSB 1.0 lb	thiophanate methyl
4	Topsin M 70WSB 1.0 lb	thiophanate methyl
5	Endura 70WDG 8.0 oz + 0.1%v/v NIS	boscalid
6	Endura 70WDG 8.0 oz + 0.1%v/v NIS	boscalid
7	Endura 70WDG 8.0 oz + 0.1%v/v NIS	boscalid
8	Proline 480SC 5.7 fl oz	prothioconazole
9	Quadris 2.08SC 9.0 fl oz	azoxystrobin
10	MBI-110 AF5 64 oz	*Bacillus amyloliquefaciens*
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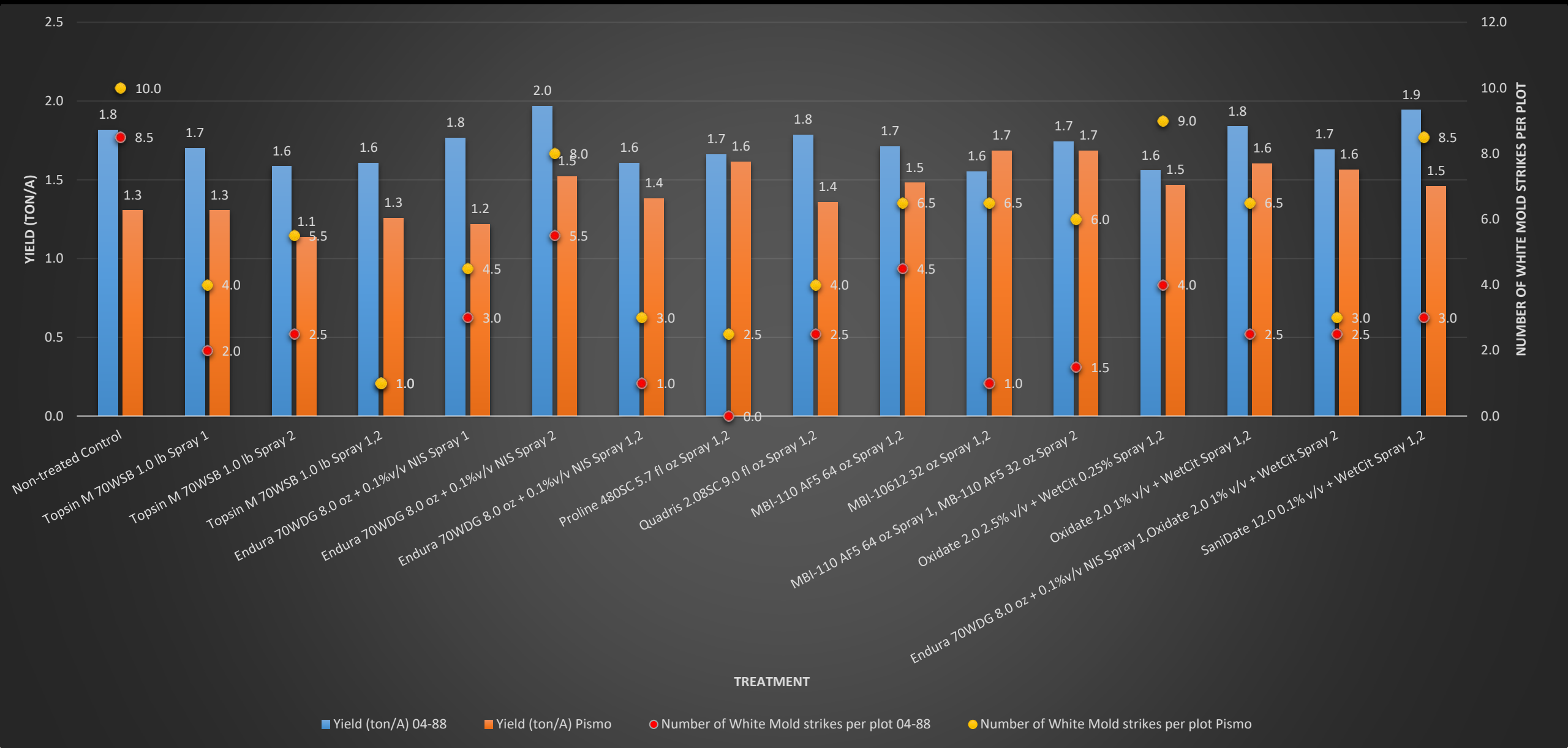
Snap Bean White Mold Fungicide Evaluation 2019



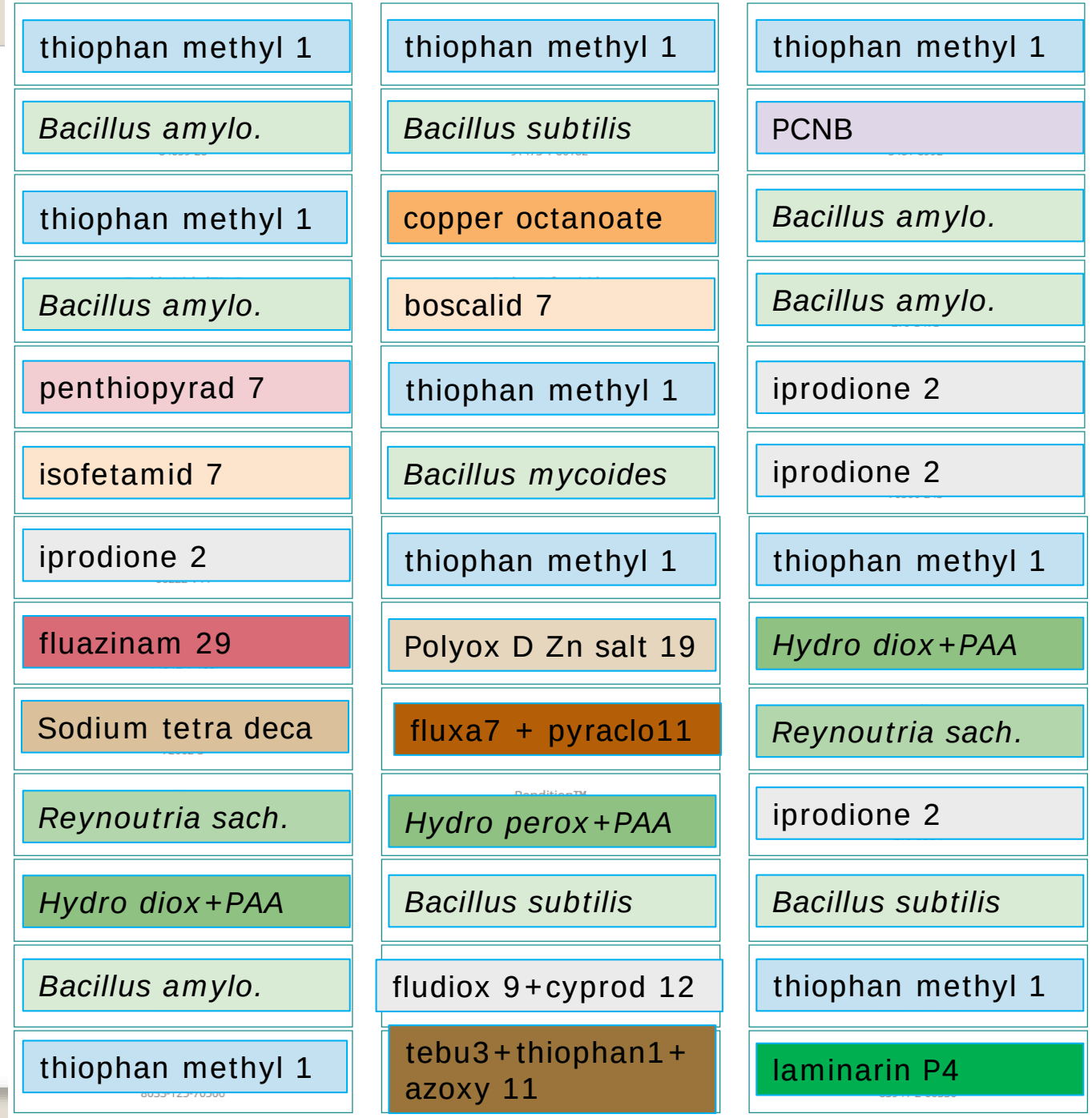
Snap Bean White Mold Fungicide Evaluation
2019 Results

- **No significant differences in yield among treatments by variety**
- 04-88 higher yielding than Pismo
- Pismo greater white mold than 04-88
- All treatments with the exception of #6 (Endura just at spray 2) significantly reduced white mold strikes compared to non-treated control
- Best control in limiting white mold strikes with Proline (2 applications), Topsin (2 applications), Endura (2 applications), and Marrone biopesticides MBI-10612, and MBI-110 AF5 64 oz Alt MB-110 AF5 32 oz
- Low disease pressure and with more blossom strikes than last year
- No phytotoxicity observed for any treatments

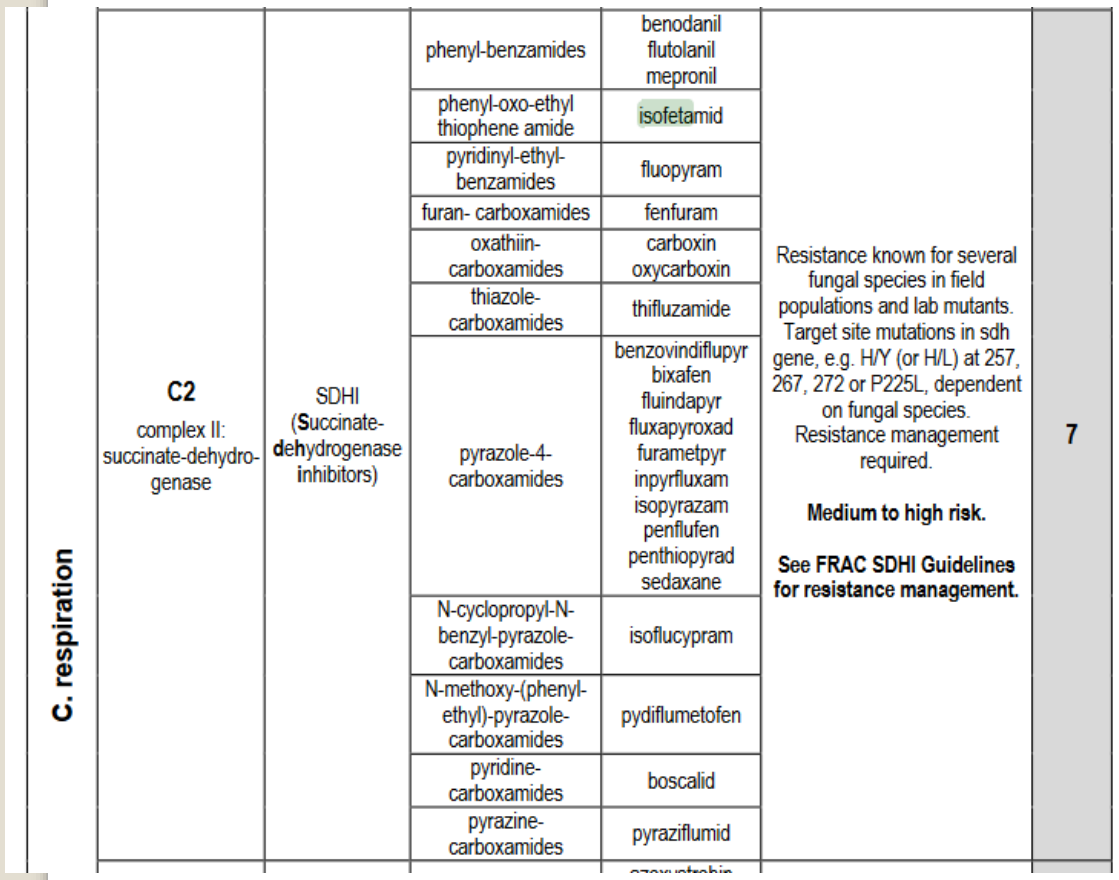
Currently registered fungicides for white mold control in snap/green beans

3336® EG Cleary Chemical LLC 1001-89	3336® F Cleary Chemical LLC 1001-69	3336® WP Cleary Chemical LLC 1001-63
Amplitude™ Marrone Bio Innovations 84059-28	Aviv™ STK bio-ag technologies 91473-1-86182	Blocker® 4F Amvac Chemical Corporation 5481-8992
Cercobin® Fungicide FMC Corporation 8033-129-279	Cueva® Fungicide Concentrate Certis USA, L.L.C. 67702-2-70051	Double Nickel 55™ Certis USA, L.L.C. 70051-108
Double Nickel™ LC Certis USA, L.L.C. 70051-107	Endura® fungicide BASF 7969-197	Ethos® XB Insecticide/Fungicide FMC Corporation 279-3473
Fontelis® DUPONT 352-834	Incognito® 4.5 F ADAMA 66222-134	Iprodione 4L AG Arysta U.S.A. 66330-297
Kenja® 400SC Fungicide Summit Agro USA, LLC 71512-22-88783	LifeGard™ WG Certis USA, L.L.C. 70051-119	Meteor™ Fungicide United Phosphorus Inc. 70506-243
Nevado® 4F ADAMA 66222-144	Nufarm T-Methyl 4.5 F Fungicide Nufarm Agricultural Products 228-652	Nufarm T-Methyl 70 WSB Fungicide Nufarm Agricultural Products 228-655
Omega® 500F Syngenta Crop Protection, LLC. 71512-1-100	OSO™ 5%SC Fungicide Certis USA, L.L.C. 68173-4-70051	OxiDate® 2.0 BioSafe Systems, LLC 70299-12
Prev-Am® Ultra ORO Agri, Inc. 72662-3	Priaxor® Xemium® brand fungicide BASF 7969-311	Regalia® Marrone Bio Innovations 84059-3
Regalia® CG Marrone Bio Innovations 84059-3	Rendition™ Certis USA, L.L.C. 68660-14-70051	Rovral® 4 Flowable Fungicide FMC Corporation 279-9564
SaniDate® 12.0 BioSafe Systems, LLC 70299-18	Serenade® ASO Bayer CropScience 264-1152	Serenade® Opti Bayer CropScience 264-1160
Stargus™ Marrone Bio Innovations 84059-28	Switch® 62.5WG Syngenta Crop Protection, LLC. 100-953	Topsin® 4.5FL Fungicide United Phosphorus Inc. 8033-122-70506
Topsin® M WSB Fungicide United Phosphorus Inc. 8033-125-70506	Trevo™ Packed Innvictis Crop Care, LLC 89168-38-89391	Vacciplant® Arysta U.S.A. 83941-2-66330

Currently registered fungicides for white mold control in snap/green beans



SDHIs – FRAC Group 7



C. respiration					
C2 complex II: succinate-dehydro-genase	SDHI (Succinate-dehydrogenase inhibitors)	phenyl-benzamides	benodanil flutolanil mepronil	Resistance known for several fungal species in field populations and lab mutants. Target site mutations in sdh gene, e.g. H/Y (or H/L) at 257, 267, 272 or P225L, dependent on fungal species. Resistance management required. **Medium to high risk.** **See FRAC SDHI Guidelines for resistance management.**	7
		phenyl-oxo-ethyl thiophene amide	isofetamid		
		pyridinyl-ethyl-benzamides	fluopyram		
		furan- carboxamides	fenfuram		
		oxathiin-carboxamides	carboxin oxycarboxin		
		thiazole-carboxamides	thifluzamide		
		pyrazole-4-carboxamides	benzovindiflupyr bixafen fluindapyr fluxapyroxad furametpyr inpyrfluxam isopyrazam penflufen penthiopyrad sedaxane		
		N-cyclopropyl-N-benzyl-pyrazole-carboxamides	isoflucypram		
		N-methoxy-(phenyl-ethyl)-pyrazole-carboxamides	pydiflumetofen		
		pyridine-carboxamides	boscalid		
		pyrazine-carboxamides	pyraziflumid		

Cross resistance within SDHI category (FRAC 7)?

thiophan methyl 1	thiophan methyl 1	thiophan methyl 1
Bacillus amylo.	*Bacillus subtilis*	PCNB
thiophan methyl 1	copper octanoate	*Bacillus amylo.*
Bacillus amylo.	boscalid 7	*Bacillus amylo.*
penthiopyrad 7	thiophan methyl 1	iprodione 2
isofetamid 7	*Bacillus mycoides*	iprodione 2
iprodione 2	thiophan methyl 1	thiophan methyl 1
fluazinam 29	Polyox D Zn salt 19	*Hydro diox+PAA*
Sodium tetra deca	fluxa7 + pyraclo11	*Reynoutria sach.*
Reynoutria sach.	*Hydro perox+PAA*	iprodione 2
Hydro diox+PAA	*Bacillus subtilis*	*Bacillus subtilis*
Bacillus amylo.	fludiox 9+cyprod 12	thiophan methyl 1
thiophan methyl 1	tebu3+thiophan1+ azoxy 11	laminarin P4

Newly registered

TREVO™ PACKED

GROUP 1 3 11 FUNGICIDE

FUNGICIDE

ACTIVE INGREDIENTS: % BY WT.

Thiophanate-methyl *(dimethyl [1 ,2-phenylene)- bis(iminocarbonothioyl)]* bis[carbamate])* 35.87%

Tebuconazole, alpha-[2-*(4-chlorophenyl)ethyl]- alpha-(1, 1-dimethylethyl)*-1H-1, 2,4-triazole-1-ethanol 7.08%

Azoxystrobin: methyl *(E)-2-[2-[6-(2-cyanophenoxy)* pyrimidin-4-yloxy] phenyl}-3-methoxyacrylate 6.19%

OTHER INGREDIENTS: 50.86%

TOTAL: 100.00%

* Also known as dimethyl 4,4'-o-phenylenebis[3-thioallophanate]

Contains 3.6 pounds thiophanate-methyl per gallon.

Contains 0.7 pounds tebuconazole per gallon.

Contains 0.6 pounds azoxystrobin per gallon.

KEEP OUT OF REACH OF CHILDREN

CAUTION

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle.
(If you **DO NOT** understand the label, find someone to explain it to you in detail.)

EPA Reg. No.: 89168-38-89391

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INNVICTIS CROP CARE, LLC™
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031815R003915

41983_41984

thiophan methyl 1	thiophan methyl 1	thiophan methyl 1
Bacillus amylo.	*Bacillus subtilis*	PCNB
thiophan methyl 1	copper octanoate	*Bacillus amylo.*
Bacillus amylo.	boscalid 7	*Bacillus amylo.*
penthiopyrad 7	thiophan methyl 1	iprodione 2
isofetamid 7	*Bacillus mycoides*	iprodione 2
iprodione 2	thiophan methyl 1	thiophan methyl 1
fluazinam 29	Polyox D Zn salt 19	*Hydro diox+PAA*
Sodium tetra deca	fluxa7 + pyraclo11	*Reynoutria sach.*
Reynoutria sach.	*Hydro perox+PAA*	iprodione 2
Hydro diox+PAA	*Bacillus subtilis*	*Bacillus subtilis*
Bacillus amylo.	fludiox 9+cyprod 12	thiophan methyl 1
thiophan methyl 1	tebu3+thiophan1+ azoxy 11	laminarin P4

Newly registered

TREVC

ACTIVE INGREDIENTS:

Thiophanate-methyl *(dimethyl [1 ,2-phe*
bis[carbamate])* .....
Tebuconazole, alpha-[2-*(4-chlorophenyl*
2,4-triazole-1-ethanol .....
Azoxystrobin: methyl *(E)-2-[2-[6-(2-cya*
phenyl}-3-methoxyacrylate .....

OTHER INGREDIENTS: .....

TOTAL: .....

*** Also known as dimethyl 4,4'-o-phenyl**
Contains 3.6 pounds thiophanate-methy
Contains 0.7 pounds tebuconazole per g
Contains 0.6 pounds azoxystrobin per g

KEEP OU

Si usted no entiende la etiqueta,
(If you **DO NOT** understan

EPA Reg. No.: 89168-38-89391

CROP	DISEASES	RATE FL. OZ *TREVO PACKED* / ACRE	REMARKS
Beans, *(Fresh and dry except succulent shelled)* **DO NOT** enter or allow worker entry into treated areas during the restricted-entry-interval *(REI)* of 24 hours for fresh beans and 3 days for dry beans	Gray Mold *(Botrytis spp.)* Anthracnose *(Colletotrichum spp.)* Rust *(Uromyces appendiculatus)*	25-30	Beans, fresh: **DO NOT** exceed a total application of 2.8 lbs. a.i. thiophanate-methyl, 0.68 lb. a.i. tebuconazole and 1.5 lbs. a.i.azoxystrobin per acre per year from all applications of all products containing these active ingredients. Beans, fresh: Pre-harvest interval *(PHI)*: 14 days In California the Pre-harvest interval *(PHI)* for lima beans is 28 days. Beans, dry: **DO NOT** exceed a total application of 2.8 lbs. a.i. thiophanate-methyl and 0.34 lb. a.i. tebuconazole per acre per year from all applications of all products containing these active ingredients. Beans dry: Pre-harvest interval *(PHI)*: 28 days **DO NOT** graze of feed treated plants or hay to livestock.
			Closely observe bean fields for early disease symptoms especially when conditions favor disease development. Apply *TREVO PACKED* as a preventative spray for best results. Make a second application 14 days later if needed.

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CROP	DISEASES	RATE FL. OZ *TREVO PACKED* / ACRE	REMARKS
Beans *cont'd*	White Mold *(Sclerotinia sclerotiorum)*	30	Bean fields should be observed closely for early disease symptoms especially when conditions favor disease development. Apply *TREVO PACKED* as a preventative spray for best results Apply when 10% to 30% of plants have at least one open bloom and prior to the development of disease for best results. Follow with an application of another white mold fungicide *(excluding products containing a triazole Group 3 Fungicide active ingredient)* 4 to 7 days later. If a third application is required, *TREVO PACKED* can be applied again 14 days after the first *TREVO PACKED* application.

thiophan methyl 1 | thiophan methyl 1 | thiophan methyl 1

Bacillus amylo. | *Bacillus subtilis* | PCNB

Bacillus amylo.

Bacillus amylo.

iprodione 2

iprodione 2

thiophan methyl 1

Hydro diox+PAA

Reynoutria sach.

iprodione 2

Bacillus subtilis

Bacillus amylo. | fludiox 9+cyprod 12 | thiophan methyl 1

thiophan methyl 1 | tebu3+thiophan1+azoxy 11 | laminarin P4

Snap Bean White Mold Control with Fungicides – Summary over past decade of research

Thiophanate methyl, boscalid, and iprodione at 30% flower and 7 days later provided good-excellent control of white mold under low and moderate disease pressure

Strobilurins (Aproach, Quadris) at 30% flower and 7 days later provided outstanding white mold control and high yields in WI and NY under low and moderate disease pressure – ***labeled now for snap bean white mold control in component of Trevo Packed***

Newer Fontelis (penthiopyrad) and Priaxor (fluxapyroxad+ pyraclostrobin) provided excellent control of white mold under low disease pressure

Biopesticides (Regalia, MBI110 reg in 2017) can have a place in the program when alternated with an effective fungicide such as Topsin

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University of Wisconsin Vegetable Disease Website (newsletter access)
http://www.plantpath.wisc.edu/wivegdis/

Plant Pathology
at the University of Wisconsin - Madison

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