LALSTOP CONTANS WG

The only product in the market that reduces the **SOURCE** of white mold

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What Is White Mold?

Photo: msue.anr.msu.edu, Michigan State University Extension

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- One of the most yield-limiting diseases in soybeans, dry beans, carrots, lettuce and other crops
- Caused by the fungus Sclerotinia sclerotiorum
- Not visible until plants are severely infected
- Also known as “stem rot”
- Can result in yield loss of 40-60%
- If untreated, can remain in the soil up to 10 years
- Can return year after year

Infection Factors

Top Photo: msue.anr.msu.edu, Michigan State University Extension

- Sclerotia: small, dark, hard bodies in the soil, in which Sclerotinia can survive season-to-season
- Cool, moist and shaded soil
- Dense canopy during flowering typically associated with:
  - ✓ Early planting
  - ✓ Narrow row width
  - ✓ High plant populations
  - ✓ High soil fertility
  - ✓ Crop/variety susceptibility

Cycle of Disease and Devastation

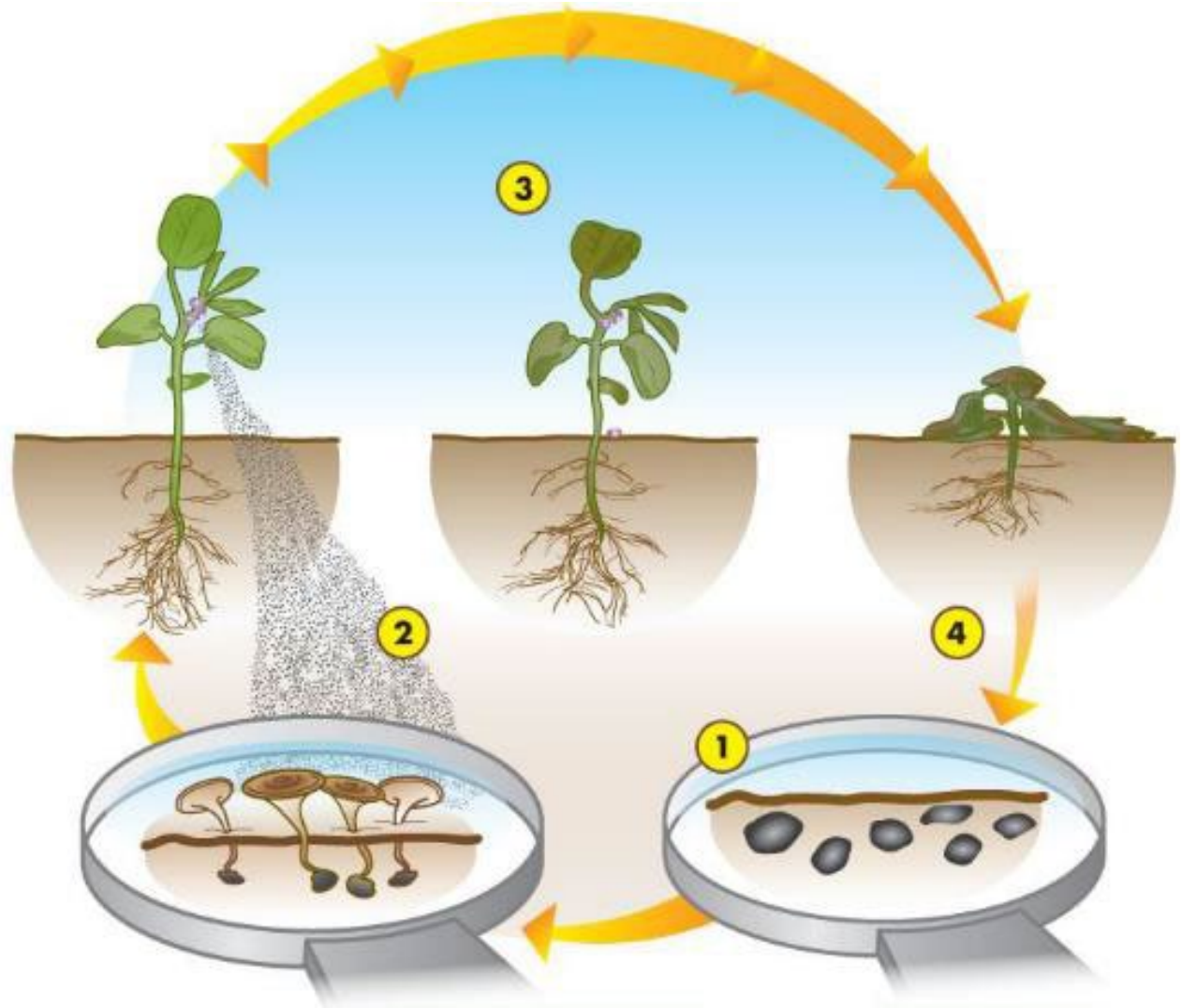
The disease source, sclerotia, can survive in soil for up to 10 years.

Tiny mushrooms, called apothecia, form from sclerotia when environmental conditions are favorable.

Infection sites initially appear as watery lesions that spread rapidly. White moldy growth forms on stems, nodes, pods and petioles.

Apothecia release millions of spores, which settle on non-living or senescent plant parts.

The plant begins to wilt and eventually dies. New sclerotia form and fall back to the soil, building inoculum.



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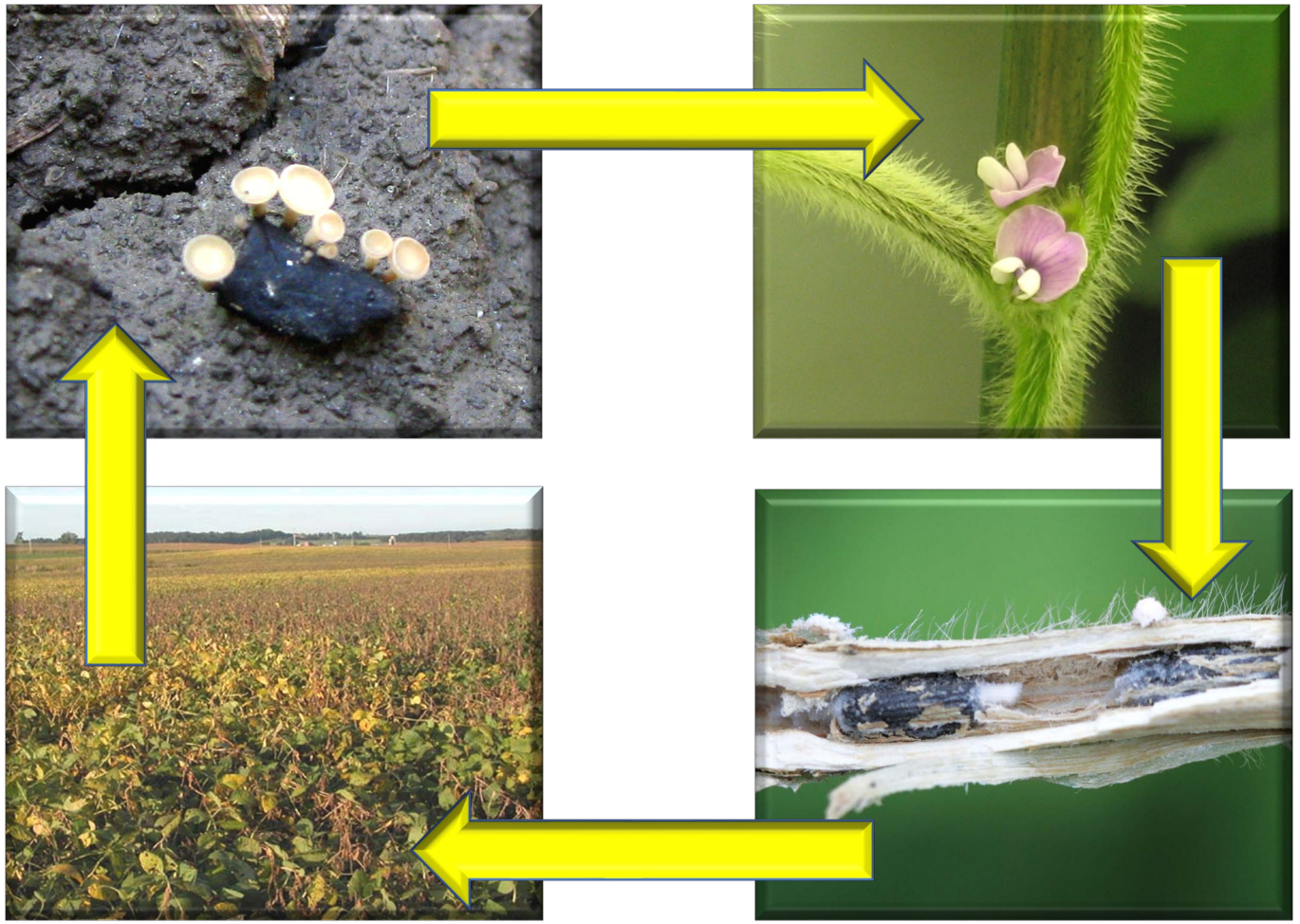
Cycle of Disease and Devastation



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Cycle of Disease and Devastation

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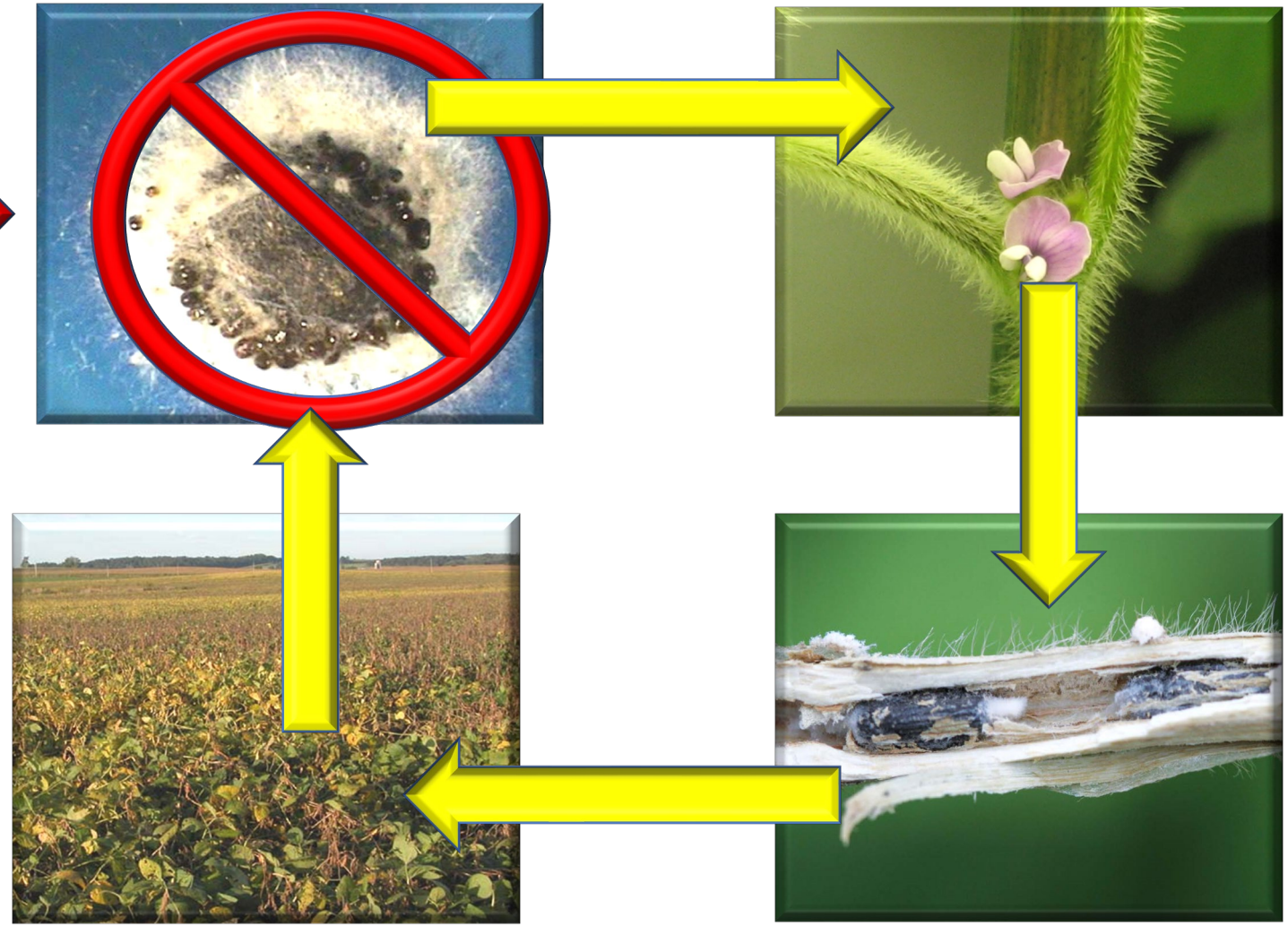

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A Devastating Disease – Not Going Away

Home ▸ Crops ▸ Soybeans

WHY WHITE MOLD WAS SO BOLD IN 2019

ENVIRONMENT, INOCULUM, AND SUSCEPTIBLE SOYBEAN VARIETIES ALL PLAYED A PART

By University of Minnesota
10/7/2019

SDSU Extension

Home

Current Weather Conditions Are Conducive White Mold Development in Soybeans

July in Wisconsin, Time to Think About White Mold Risk In Soybeans

July 1, 2019 / in Soybean, Soybean Diseases, Urgent, White Mold / by damonsmith

Damon Smith, Extension Field Crops Pathologist, Department of Plant Pathology, University of Wisconsin-Madison

Sclerotinia White Mold – A Particular Challenge for Sunflower Growers

Extremely patient, devastating to yields and particularly difficult to manage in sunflowers, Sclerotinia white mold has become a prime foe of growers in the upper Great Plains.

Despite control efforts, the destructive fungus shrugs off rescue treatments, hides in the soil, then reappears years later to wither flower heads and spread inoculant all over again.

Sclerotinia's resilience begins with its ability to create sclerotia, the small, black, rat dropping-like structures that fall from infected plants. Extremely stable, sclerotia may wait in the soil three years or more for timely rains to coincide with flowering. When they do, sclerotia germinate an eraser-sized that releases thousands of spores i the canopy. Sclerotinia can attack than 400 plant species, but broadl flowers, sunflower petals in partic are especially susceptible to white mold infection.

In row crops, wider plant spacin allows sunlight to help break down sclerotia and wind to lower spore density, providing some reduction of inoculant. Among sunflowers,

Detecting White Mold Disease

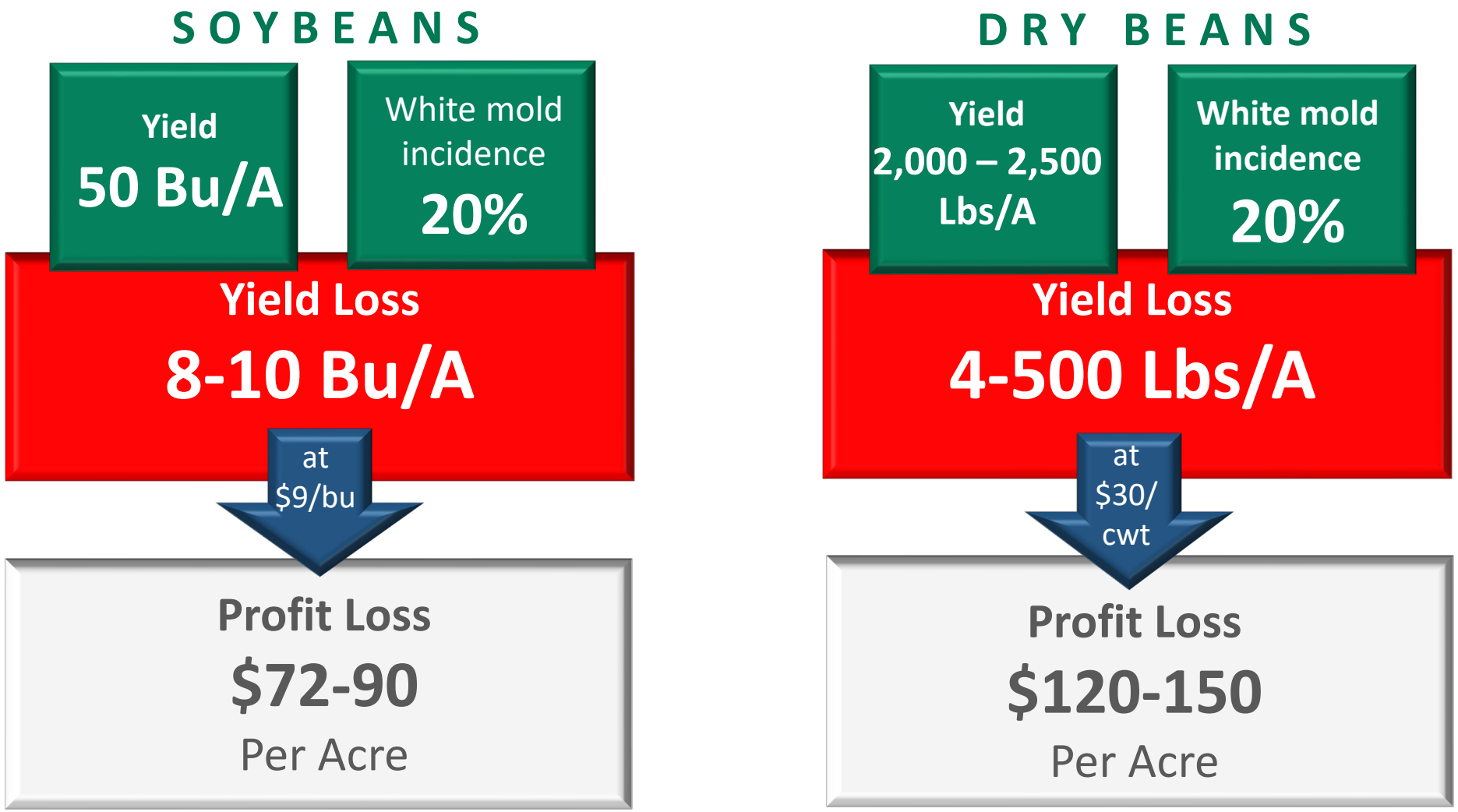
- Very difficult to detect before yields are negatively impacted
- Disease develops well below the canopy and is not readily visible until plants are severely infected
- **Yields are lost before damage is detected**

White Mold and Crop Loss

- Yield loss by reducing seed numbers and weight; seed quality is also affected
- Crop losses from white mold in edible beans **average 30% with individual field losses as high as 92%** — even when disease pressure appears minimal*
- In general, in beans, for every 10% increase in the incidence of white mold observed, the expected yield loss is 8% to 10%

* Crop Science, Sept-Oct, 2013

White Mold and Crop Loss



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Traditional Methods Of Managing White Mold

Note: White mold cannot be eliminated with these methods, but the effects can be minimized, particularly when using multiple management strategies.

Mgt Practice	Effectiveness	Reason
Record keeping	Low	Tracking disease levels by season, crop and field provides opportunity to assess future disease potential based on the volume of sclerotia in the soil
Crop Rotation	Low to Medium	Sclerotia can remain viable in the soil for as long as 10 years; a minimum of two to three years of non-host crops is recommended, but often impractical

Traditional Methods Of Managing White Mold

Note: White mold cannot be eliminated with these methods, but the effects can be minimized, particularly when using multiple management strategies.

Mgt Practice	Effectiveness	Reason
Tillage	Inconclusive	Deep tillage can remove sclerotia from upper soil layer which can temporarily reduce the incidence of the disease; however, subsequent tillage can re-introduce the inoculum in top two inches of the soil profile; some studies indicate lower levels of infection with no-till practices
Canopy Management	Low	Later planting, wider rows, lower plant populations and soil fertility can reduce the rate of white mold infection; however, these practices typically reduce yields

Traditional Methods Of Managing White Mold

Note: White mold cannot be eliminated with these methods, but the effects can be minimized, particularly when using multiple management strategies.

Mgt Practice	Effectiveness	Reason
Irrigation Management	Medium to High	Lower soil moisture during flowering can significantly reduce infection potential; in years with rainfall and cool temperatures prior to and during flowering, it is exceptionally difficult to control spore production and, ultimately, infection
Seed selection	Medium	There are no edible bean or soybean varieties that are completely resistant to white mold; if sclerotia are in the soil and environmental conditions are favorable, the disease will develop; however, some varieties are less susceptible than others

Traditional Methods Of Managing White Mold

Note: White mold cannot be eliminated with these methods, but the effects can be minimized, particularly when using multiple management strategies.

Mgt Practice	Effectiveness	Reason
Foliar fungicides and herbicides	Low to Medium	While several foliar applied products show efficacy against white mold, their effectiveness is limited based on the location of the disease on the plant; white mold infects stems, pods and petioles *below the leaf canopy*. *Current fungicides cannot translocate from the leaves to lower parts of the plant!* Therefore, it is critical to apply products deep in the canopy. R1 applications are typically more effective than R3 applications; however, symptoms of the disease are often not readily visible in the field until R3 or later. Complete control of white mold using foliar fungicides or herbicides is not possible; they should be considered as part of a broader white mold management strategy.

Cleaning Your Soil is Not a One and Done Proposition

- Ridding your soil of sclerotia bodies is a multi-year resolution
- Contans applications are akin to a soil amendment
    - Sulfur/Lime applications do not work over night – continual process to achieve desired results
- Even a small amount of sclerotia can devastate a crop
- It is recommended to treat fields every year
    - Not just prior to a white mold prone crop, like soybeans

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Minimum Till / No-Till Practices Only Compounds the Problem

Minimum/No Till

- Year over year accumulation of sclerotia in top 2” of soil posing increasing risks for white mold infections

Deep/Med Tillage

- Buries sclerotia bodies at a depth which is not able to convert to white mold
- But is also brings sclerotia resting bodies from previous crops to the surface which can convert to white mold

How to Apply Contans

- Soil-applied applications
  - **Spring**
  - **Fall**
  - **At or before planting**
- Rate: 1- 2 pounds / acre
- Tank Mix with most pre/post emergent herbicides
- NO fertilizer/fungicides
- Post Harvest allows for no incorporation since fresh sclerotia is at soil surface on crop residue

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Expectations for Contans

Factors that may have affected Contans WG performance

- Spring Applications – if low rates were used to save cost
  - Was the majority of sclerotia covered with the Contans A.I. ?
  - May need to evaluate the next white mold prone crop to see the total benefits realized
    - ✓ Was there enough time for the Contans WG to fully work by bloom time?
- Was the product properly stored?
  - Approx. 2 weeks shelf life during cool spring/fall temperatures (below 59 deg)
- Applications made to extremely dry soils – soil erosion
  - The Contans spores will blow away with topsoil in windy conditions
  - Ensure soil has moisture before application is made

Expectations for Contans (Continued)

Factors that may have affected Contans WG performance

- Treating parts of the field that have historical white mold issues
  - If your neighbor's field has white mold conditions, most likely to get spores onto your field during the right conditions

- After Contans application, did the top 2" of soil get disturbed?
  - This can bring previously buried sclerotia to the surface

Expectations for Contans (Continued)

Factors that may have affected Contans WG performance

- Treating parts of the field that have historical white mold issues
    - If your neighbor's field has white mold conditions, you're most likely to get spores onto your field with the right conditions

- After Contans application, did the top 2" of soil get disturbed?
    - This can bring previously buried sclerotia to the surface

Recommended White Mold Strategy

Spring Applied

- Apply 1.5 lbs / A
  - Pre-emerge herbicide
  - Incorporate lightly
  - Prior to rain event
- Apply Foliar Fungicide just prior to / at 1st bloom

Fall Applied

- Apply 1-1.5 lbs / A
  - Apply to crop residue
  - No incorporation needed
  - Apply to white mold zones of infection
  - Suggest higher rates for minimum till acres which have built up populations of sclerotia

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Proven Results, Year over Year!

Field Trial Results

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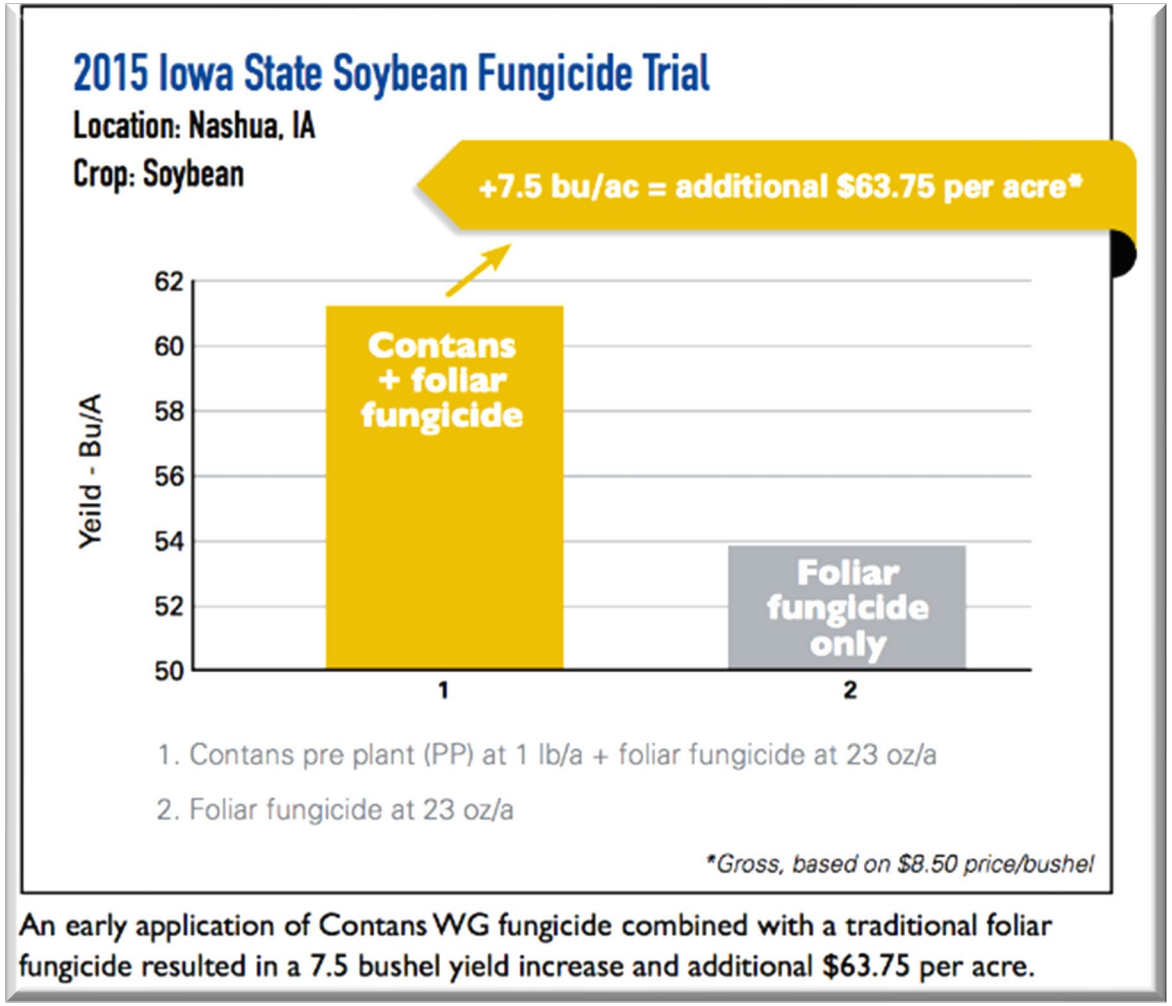
2015 Iowa State Trial: Contans WG With Traditional Foliar Fungicide



An early application of Contans WG fungicide combined with a traditional foliar fungicide resulted in a 7.5 bushel yield increase and additional $63.75 per acre.

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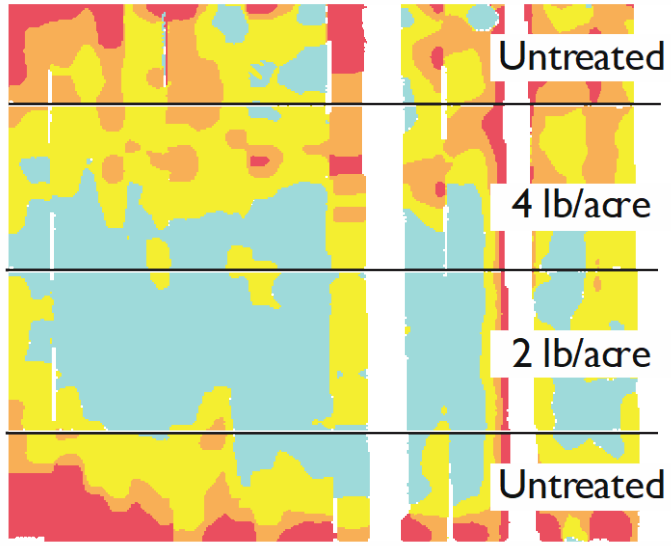
2011 North Dakota Grower: 8X ROI



Units = cwt/ac

- Greater than 28.85
- 20.42–28.85
- 9.47–20.42
- Less than 9.47

Dry Bean Variety: Black Turtle.

Contans Performance Over Untreated in Dry Beans

+450 - 550 Lbs/A

+52% Lbs/A

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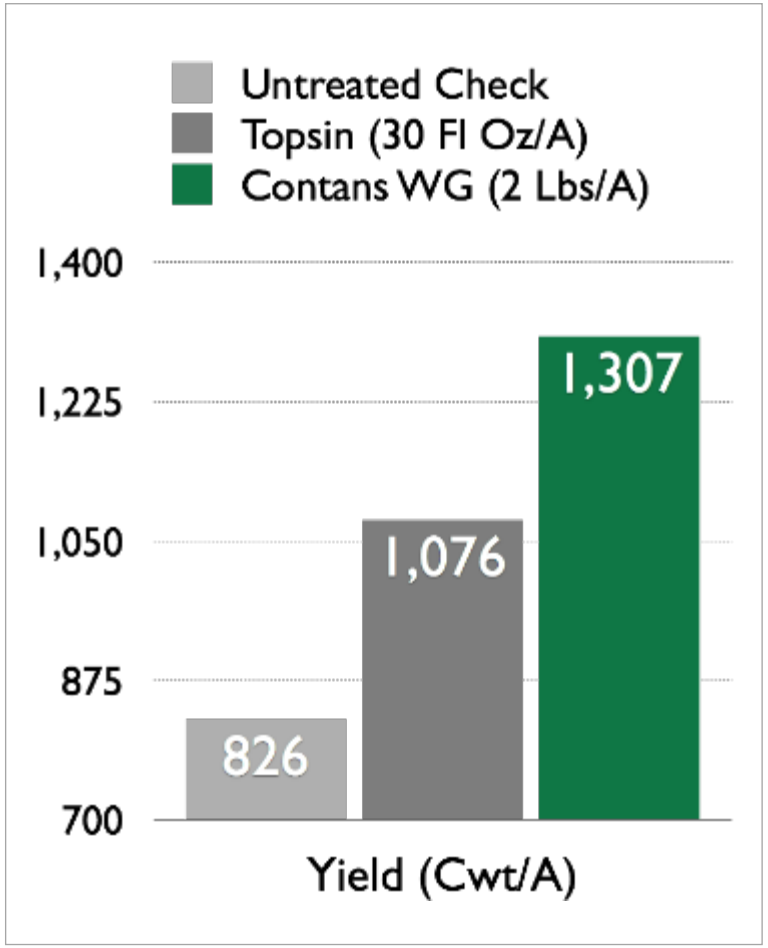
2013 Michigan State Bean Trial: 6X ROI



Contans Performance Over Untreated in Dry Beans

+481 Lbs/A

+58% Lbs/A

ROI **6X**

Dry Bean Variety in this trial: Navy Bean. ROI Assumption: dry bean price of $50/Cwt

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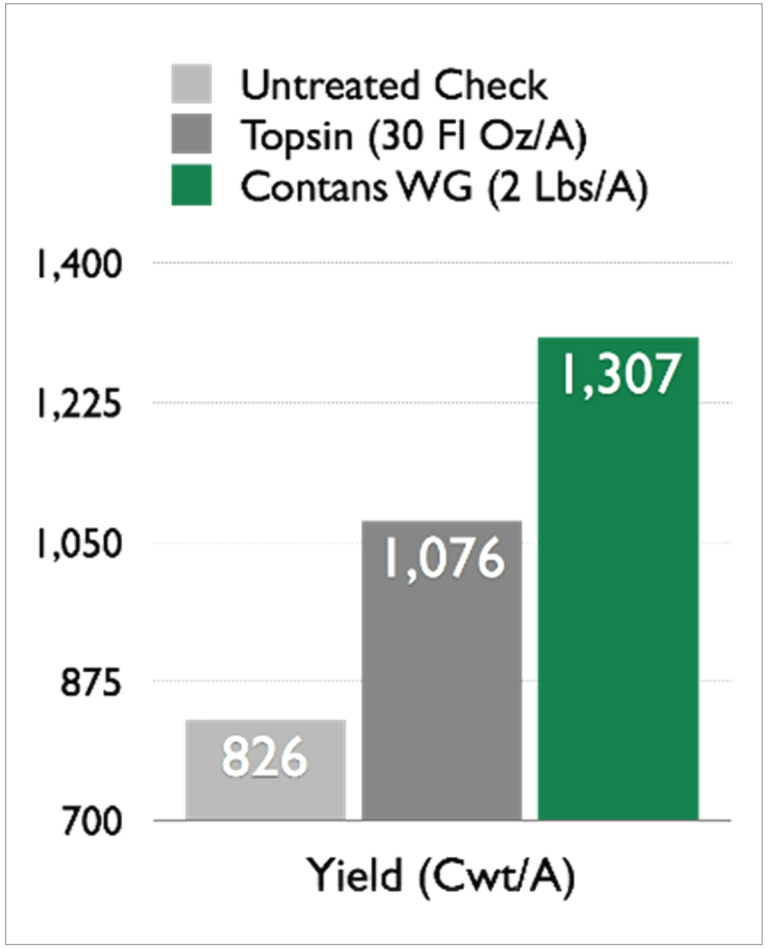
2013 Michigan State Bean Trial: 6X ROI



Contans Performance Over Untreated in Dry Beans

+481 Lbs/A

+58% Lbs/A

ROI **6X**

Dry Bean Variety in this trial: Navy Bean. ROI Assumption: dry bean price of $50/Cwt

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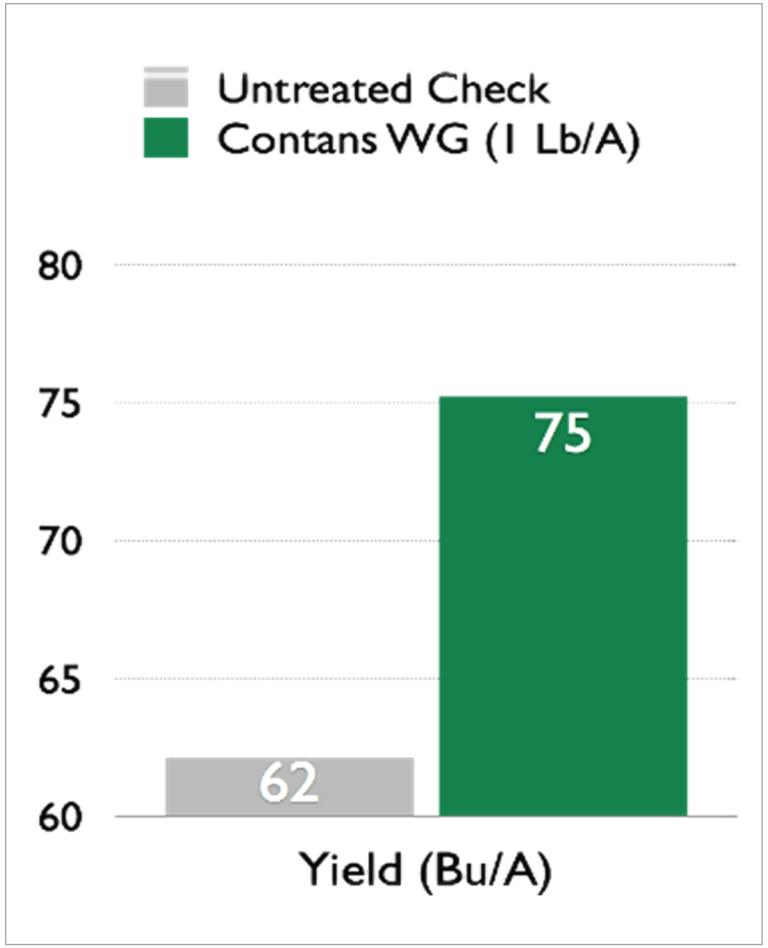
2013 Michigan State Soybean Trial: 7.8X ROI



Contans Performance Over Untreated in Soybeans

+13 Bu/A

+21% Bu/A

ROI **7.8X**

Return On Investment Assumption: soybean price of $12/Bu

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2015 Alan Peterson – Santiago, MN

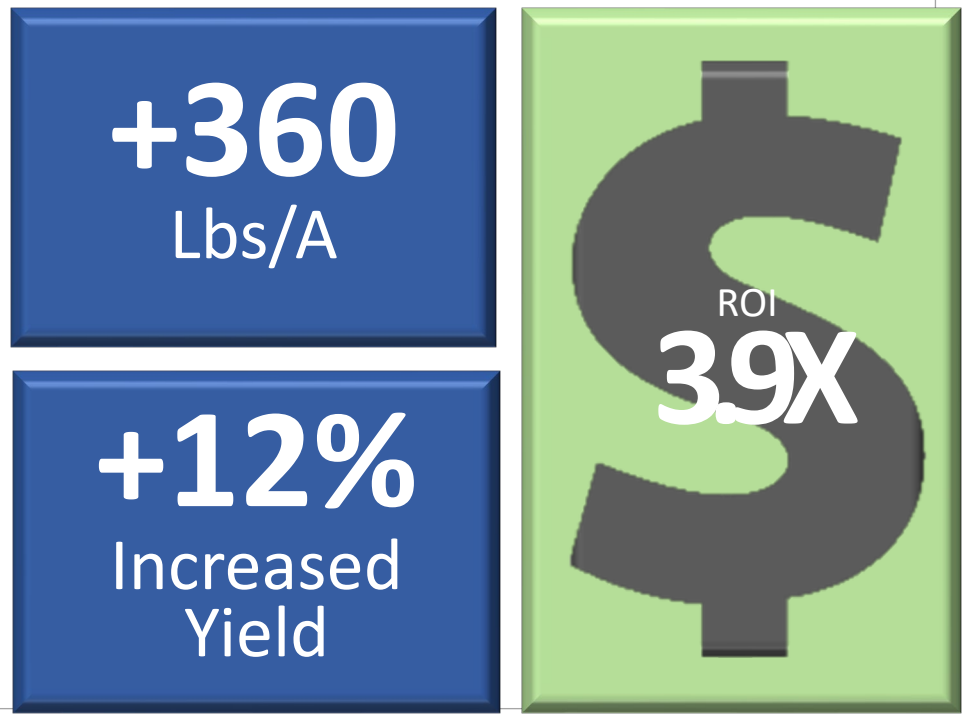
2015 Trial Minnesota

Crop: Dark red kidney beans
Rate: 2 lbs spring applied (5/29)
Treated area: 3060/lbs acre
Untreated area: 2700/lbs acre

Yield increase of 360/lbs acre
Contans Cost: Approx $42/ac
Application cost: Approx $8/ac
Contracted price $.54=$194.40
Less Contans+app=
$144.40 net profit beans

Field infestation levels light to moderate.

Contans Performance over untreated in Dark Red Kidney Beans



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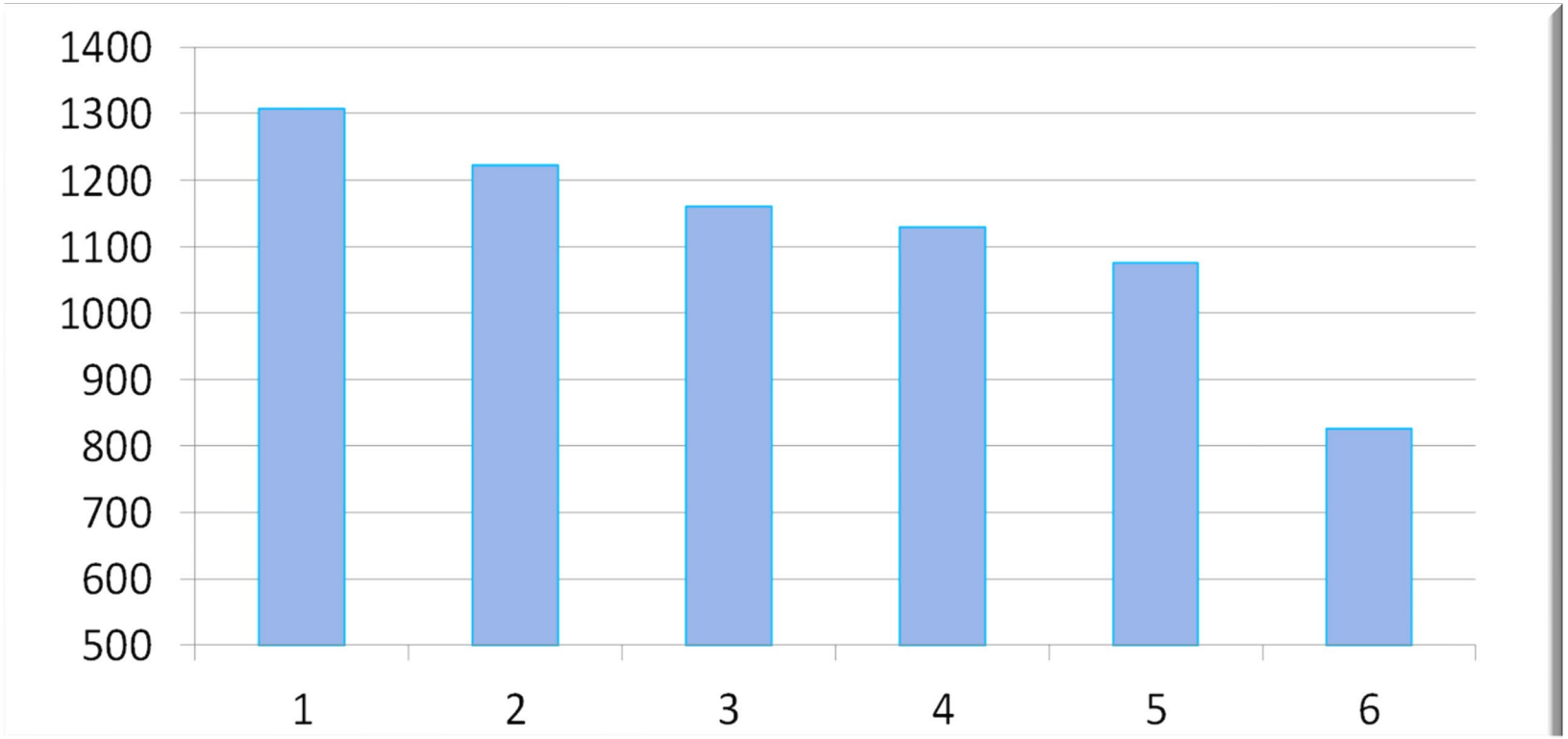
2013-3-MI Michigan State University

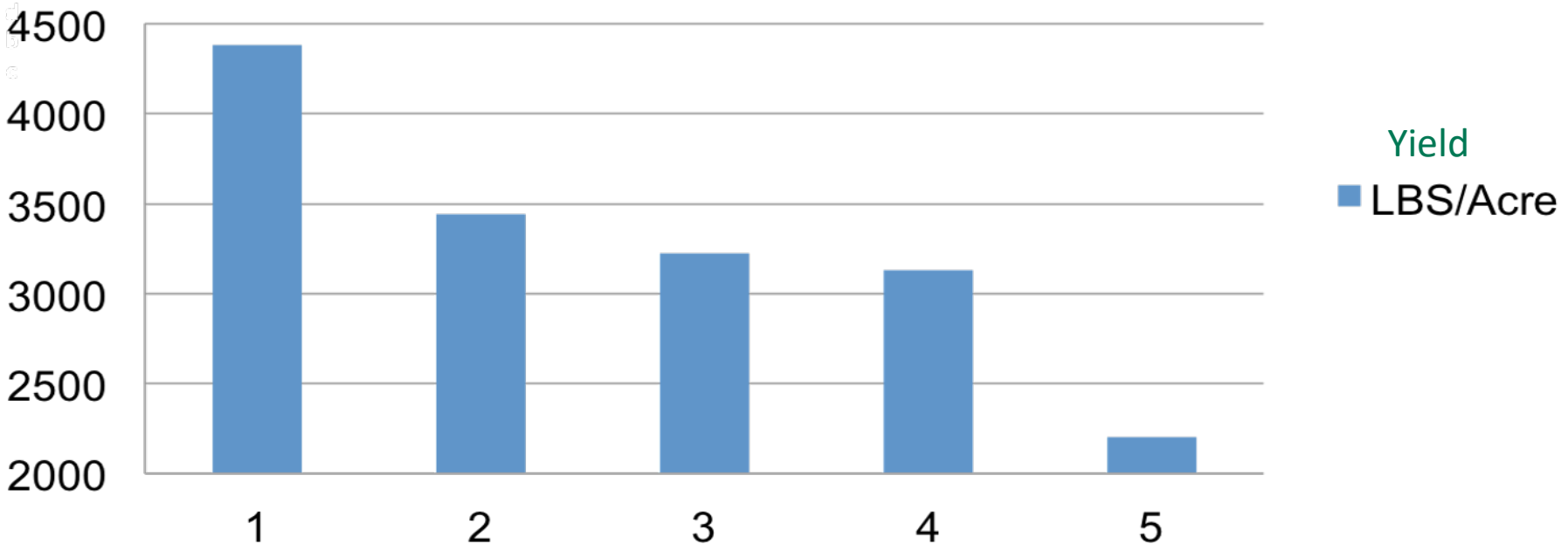
Dry Bean (Great Northern Dry Bean)White Mold Fungicide Trial Yield (lbs/A)



1. Contans 2 #/A
2. Contans 2 # /A fb Topsin 30 fl oz/A
3. Cadet 0.5 fl oz/A
4. Headline 6 fl oz/A
5. Topsin 30 fl oz/A
6. Untreated Check

2016-3-MI: MSU Dry Bean Fungicides White Mold Trial – Yield

DeWitt, MI



1. Contans 2 #/ A Applied Pre-Plant fb Andiamo 5 oz
2. Proline 5 oz/A
3. Headline 6 oz
4. Andiamo 5 oz/A
5. Untreated Check

White Mold - Pressure Heavy (86.6%); Dry Bean Variety – “Black Bean”

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Contans – Your Takeaways

- Destroys the sclerotia fungus that causes white mold
- Reduces sclerotia in the soil up to 80-85% each year it is used
- Breaks the disease cycle
- Applied pre-plant, at planting, after cultivation, or post-harvest
- Fits both conventional and organic production — OMRI Listed®
- **Increases yield and improves ROI**

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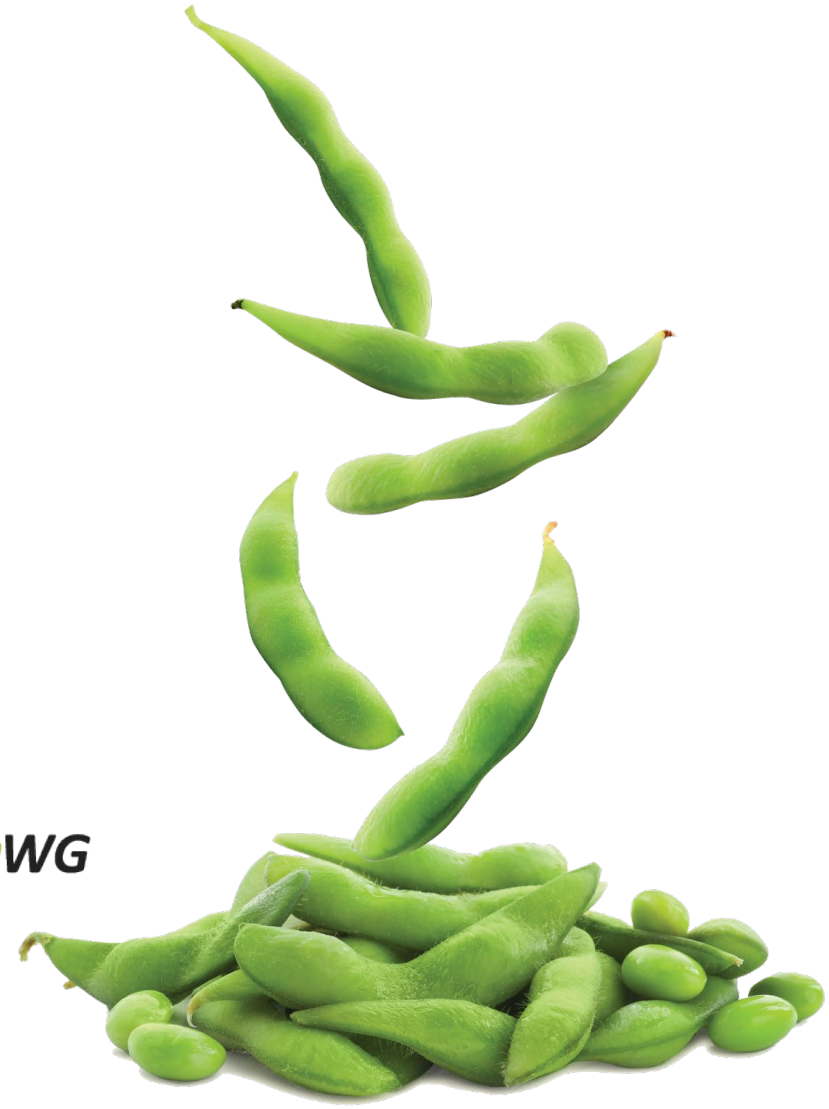

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