

2018 Great Plains Growers Conference, Vegetable IPM Track

Managing Foliar Diseases on Watermelon and Other Cucurbits with Fungicides

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My Approach to Vegetable Disease Management Recommendations

☐ Outcome-based

- “More of what works, less of what doesn’t”
- Is the treatment better than the non-treated/non-sprayed control?

☐ Replicated, repeated field experiments

☐ Rigorous statistical analysis

- 99% confidence intervals

Today's Outline



Gummy stem blight



Anthrachnose



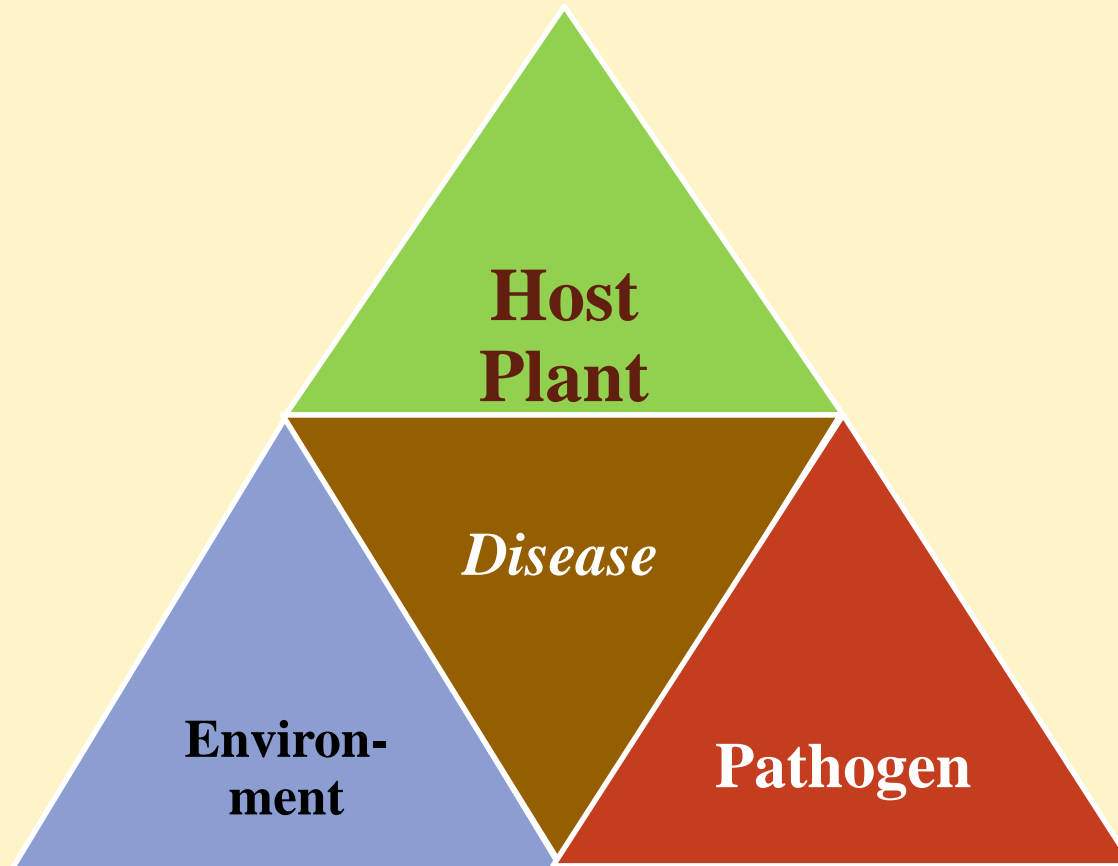
Brief comments

- Alternaria leaf blight
- Bacterial fruit blotch



Fungicides

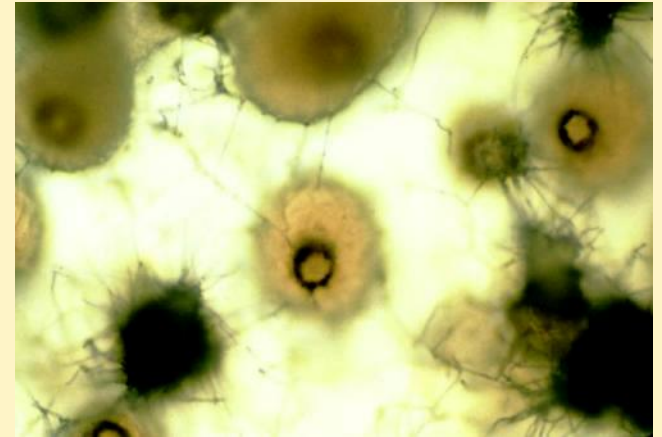
The Disease Triangle: Disease Is An Interaction



The Disease Triangle for Gummy Stem Blight



Watermelon



Stagonosporopsis
(fungus)



Environment

Gummy Stem Blight on Watermelon and Muskmelon



One SC Watermelon Field, Two Outcomes

Spring 2016

- ❑ 2014: corn
- ❑ 2015: soybean
- ❑ 2016: watermelon

39%

of diseased leaves
had gummy stem
blight

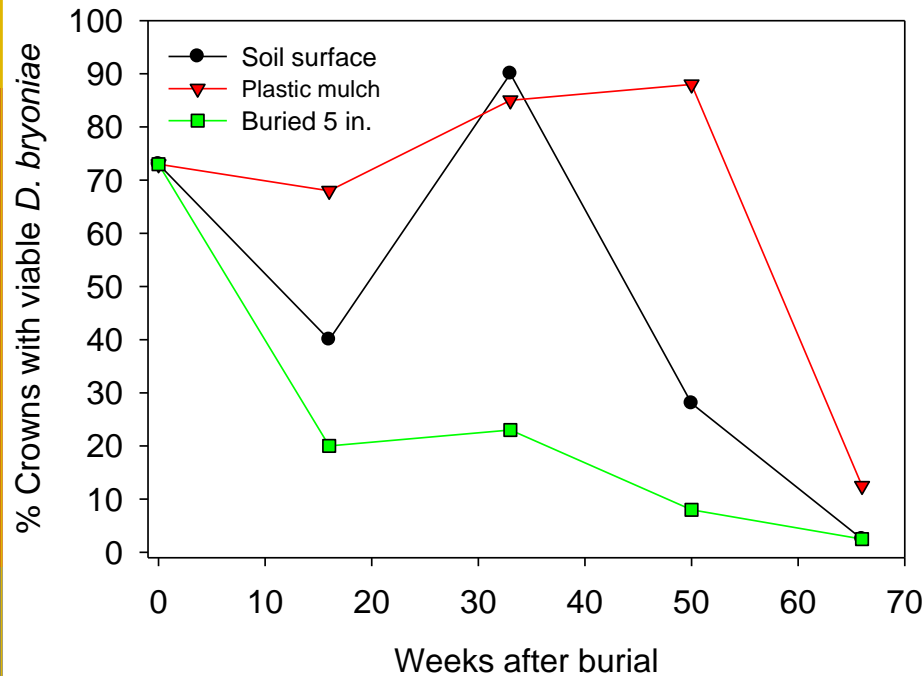
Fall 2016

- ❑ Spring 2016: watermelon
- ❑ Fall 2016: watermelon

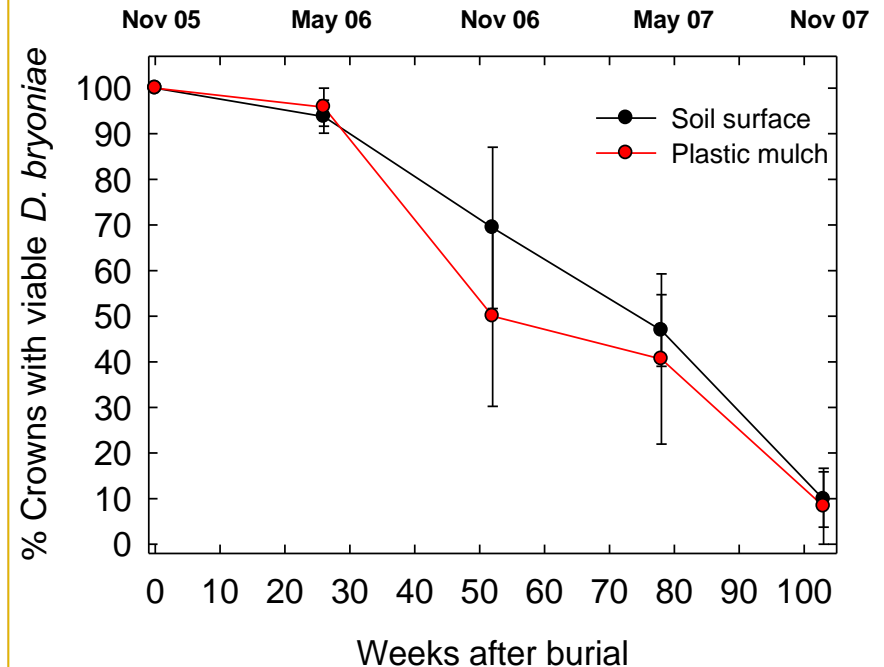
100%

of diseased leaves had
gummy stem blight

GSB Fungus Survives in Muskmelon Crowns



July 2004 to Oct 2005

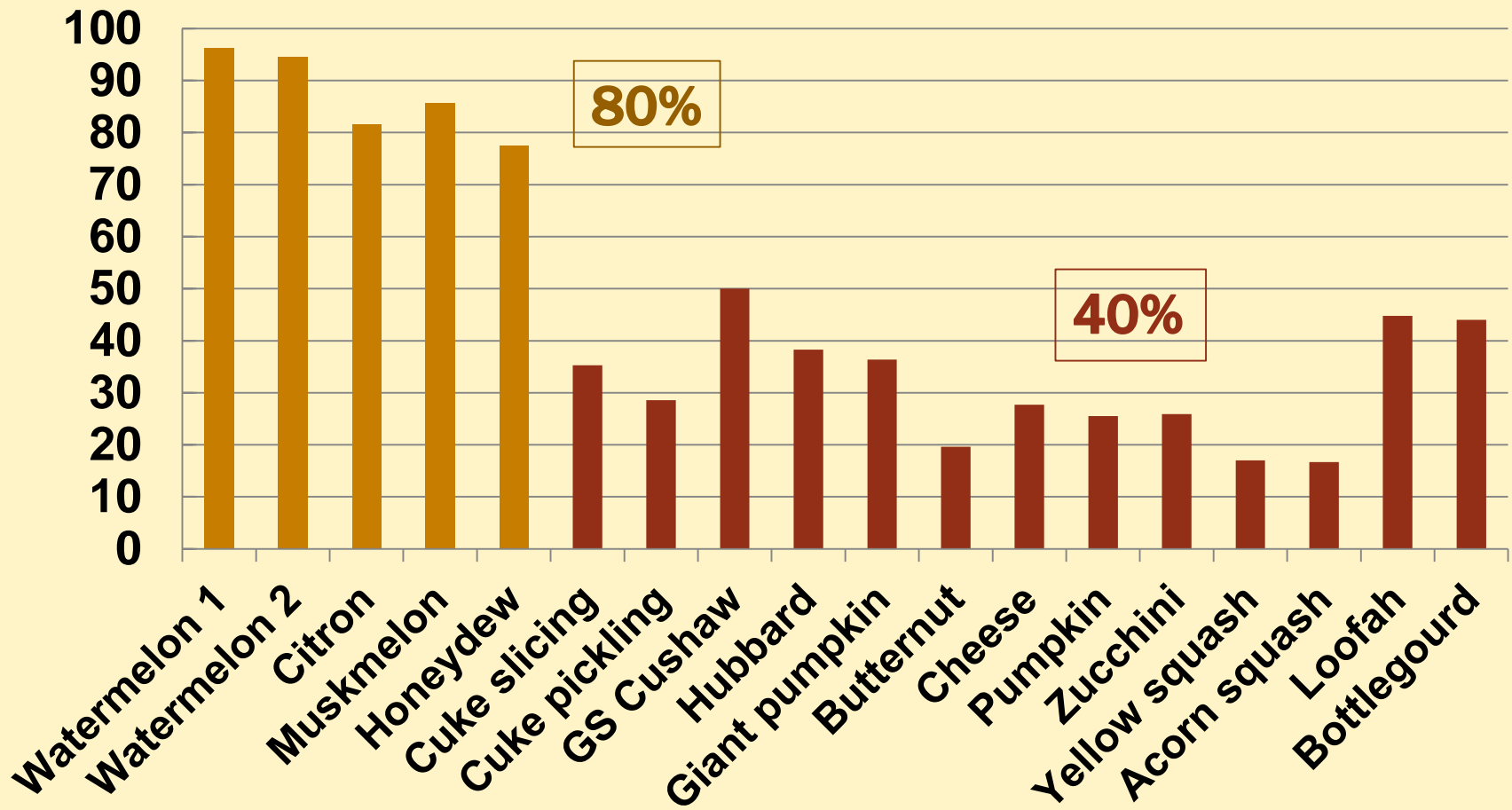


Nov 2005 to Nov 2007



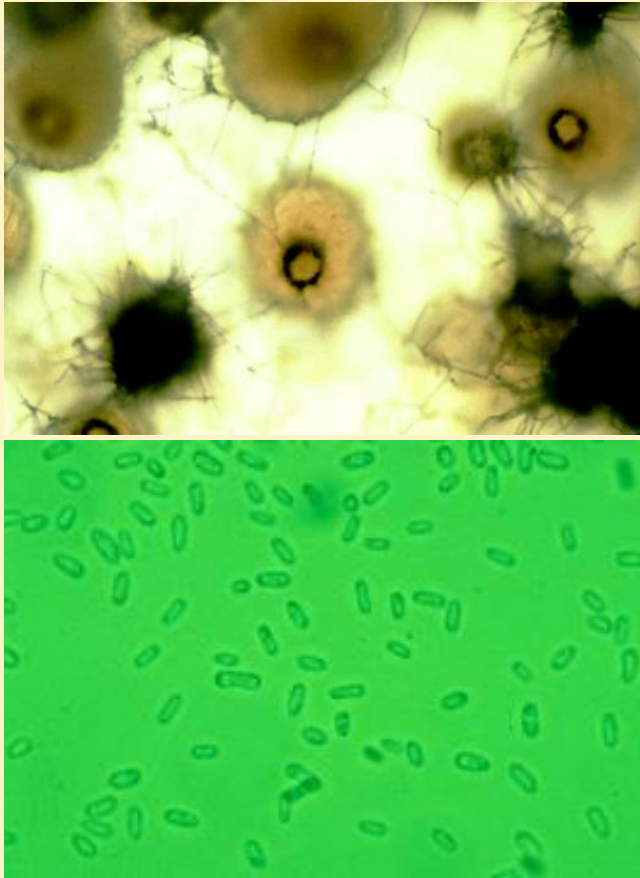
Average fruiting bodies per square inch:
3015

The GSB Fungus Reproduces on Diseased Leaves of Watermelon and Muskmelon



Two Types of Spores of GSB Fungus

Conidia, Spread by Rain

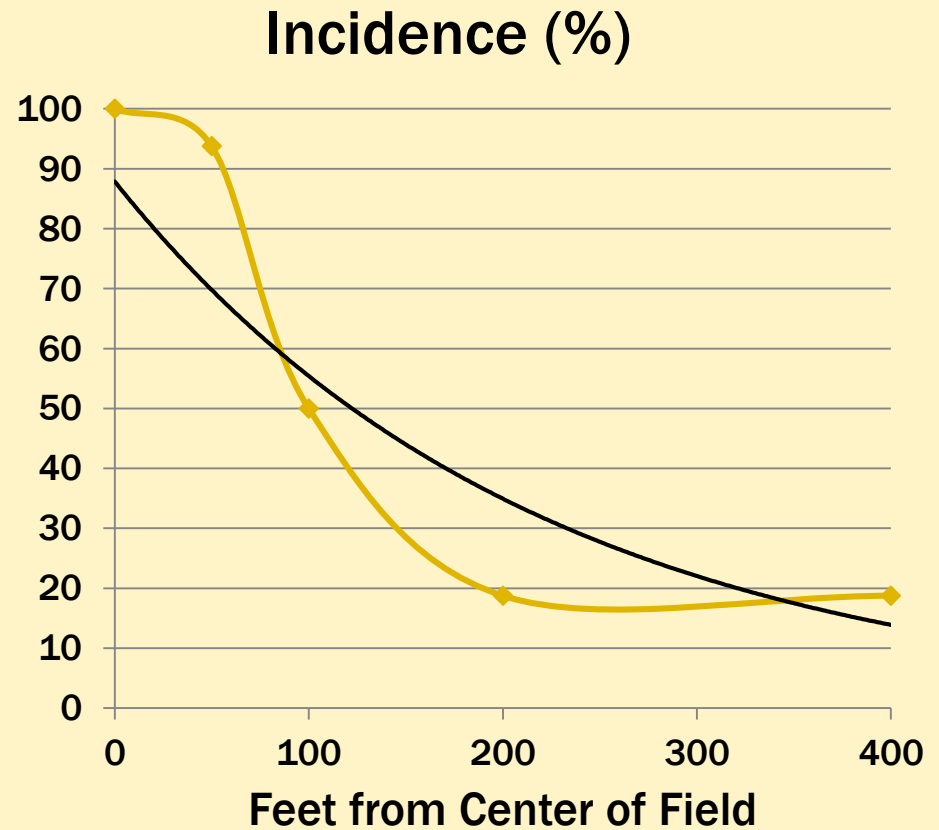


Ascospores, Spread by Wind

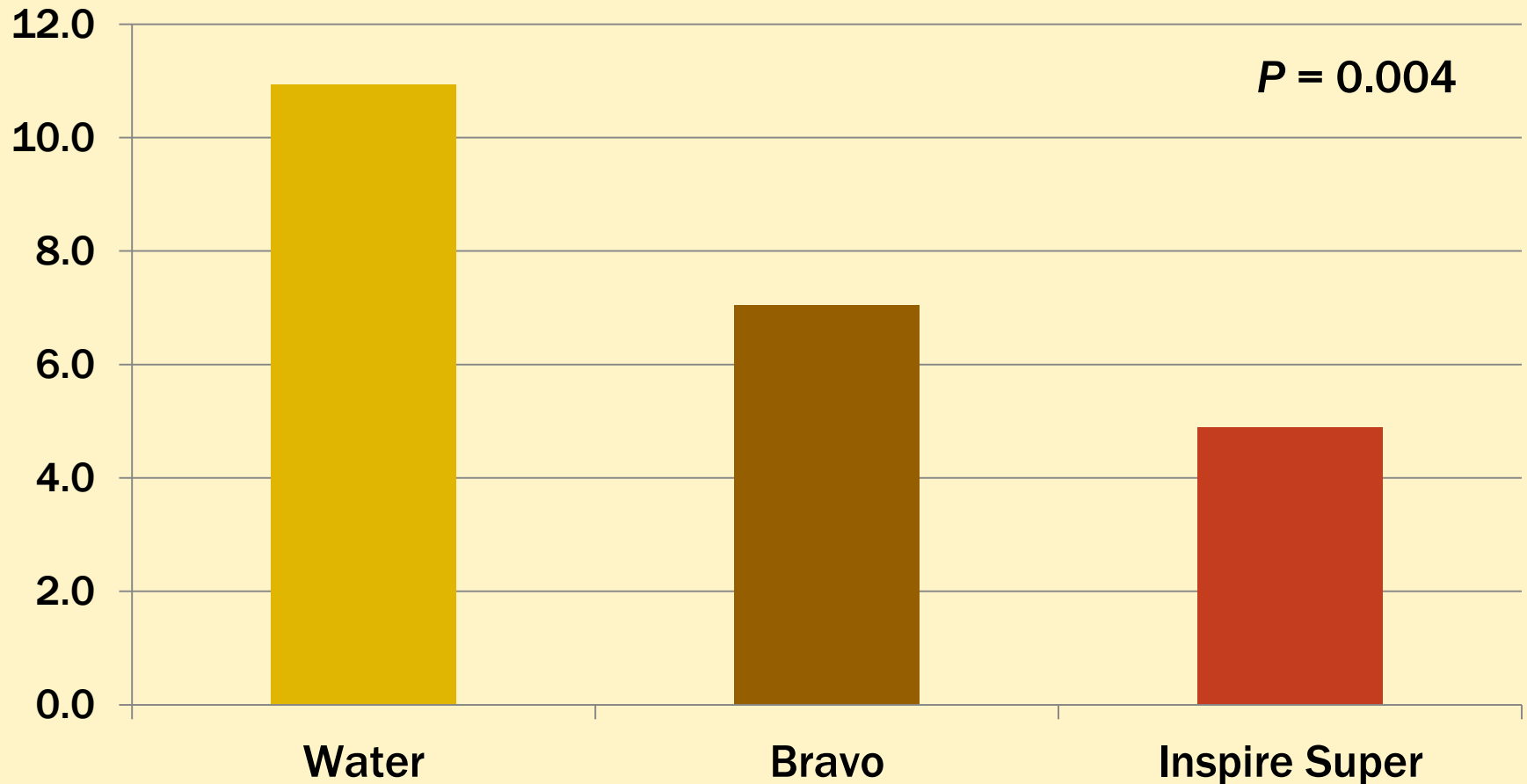


T. A. Zitter, Cornell Univ.

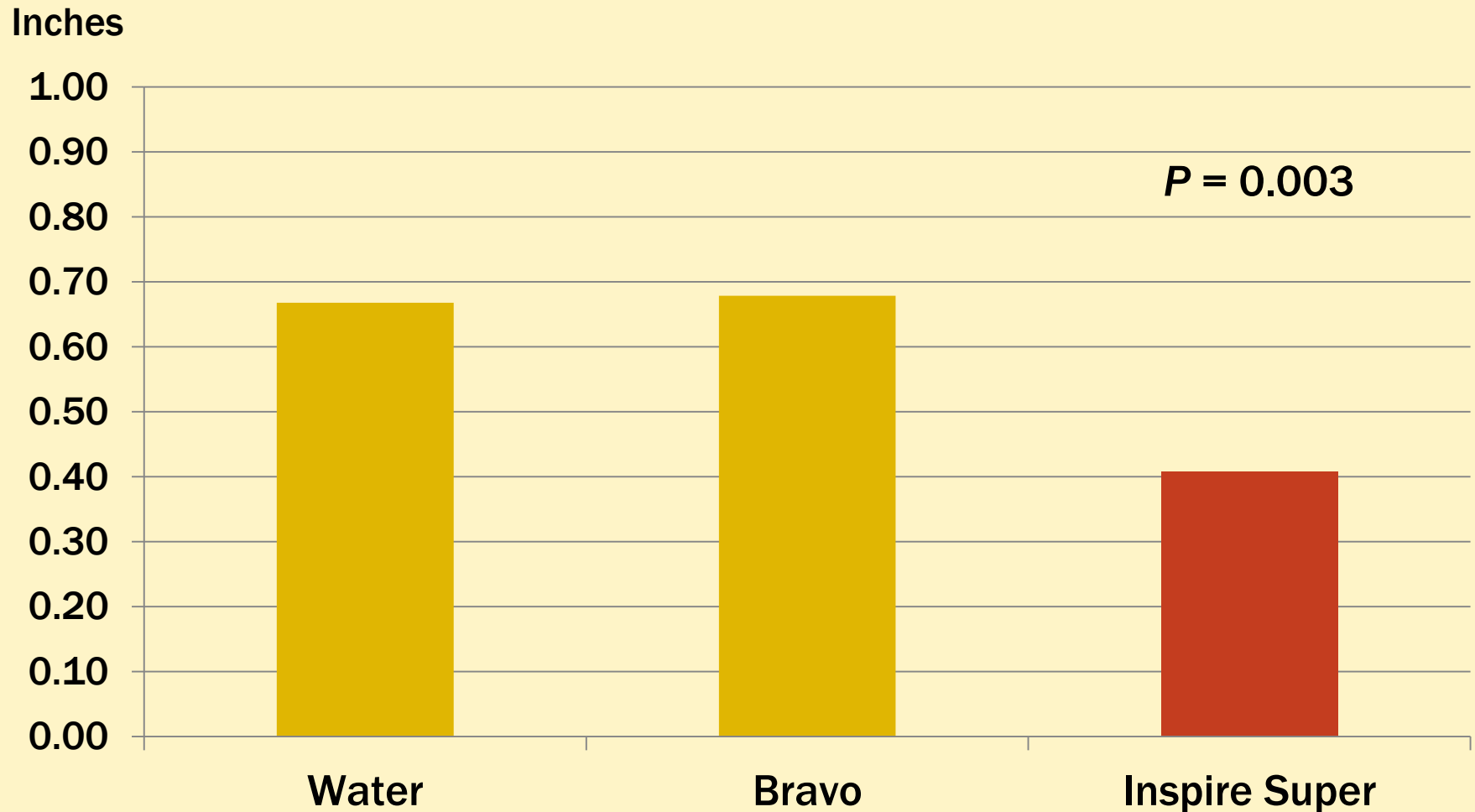
Spread of Ascospores from Watermelon Debris with GSB, Fall 2016



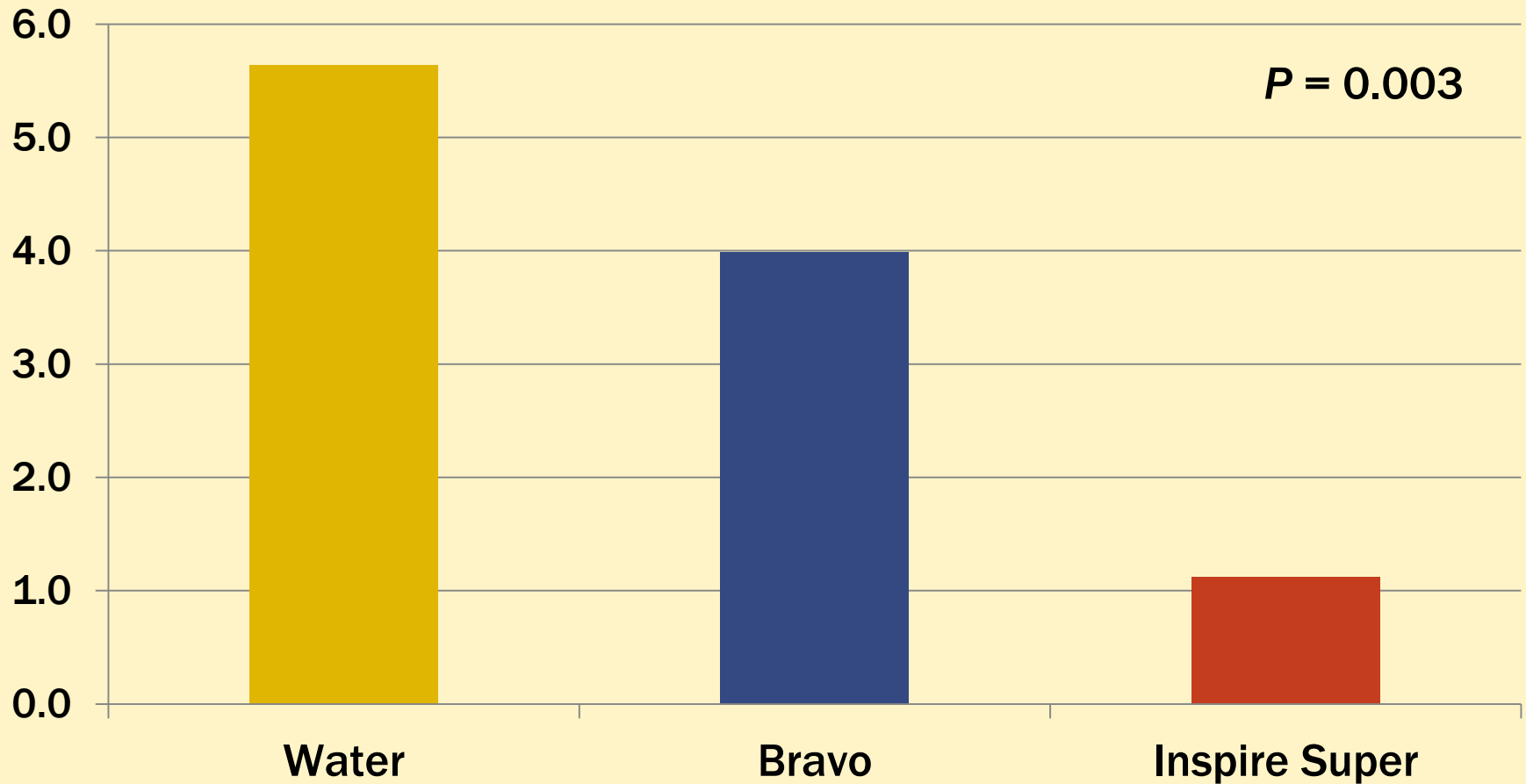
Inspire Super Reduced the Number of Leaf Spots per Leaf (average 2016 & 2017)



Inspire Super Reduced the Size of GSB Leaf Spots (average 2016 & 2017)



Fungicides Reduced the Number of GSB Leaf Spots with Fruiting Bodies (average 2016 & 2017)



Controlling Gummy Stem Blight and Anthracnose



Rotate for 2-3 years

- Summer squash in 2nd year



Plant early



Disease-free transplants



Never reuse plastic mulch



Disk fields to bury debris as soon as possible after harvest

Fungicides Recommended Against Gummy Stem Blight

Best

- ❑ Inspire Super
- ❑ Switch
- ❑ Luna Experience
- ❑ Aprovia Top

Avoid

- ❑ Fontelis (resistant)

Useful Protectants/Contacts

- ❑ Chlorothalonil
 - High temperatures
 - Intense sunlight
- ❑ Mancozeb
 - Use close to harvest
- ❑ Tebuconazole
 - Popular in Southeast

Anthracnose on Cucurbit Foliage and Fruit

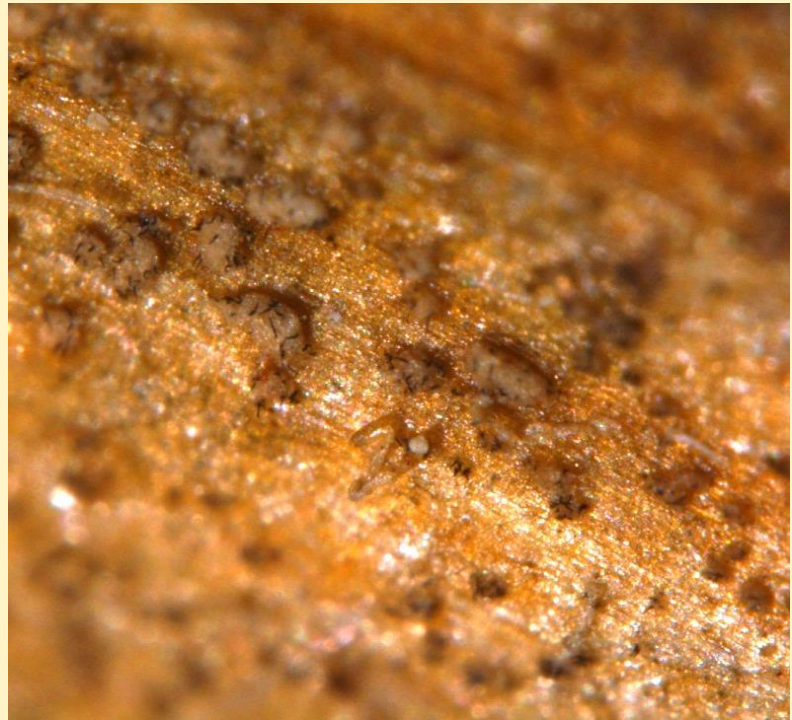


Anthracnose Symptoms on Watermelon

- ❑ Small, angular spots on leaves
- ❑ “Spindle-shaped” spots on vines
- ❑ Fruit spots on watermelon, bottle gourd, pumpkin
- ❑ More common in South last 6 years because of drier spring weather



Anthracnose Fungus Produces Spores on Watermelon Vines and Leaves



Severe Yield Loss to Anthracnose is Possible without the Right Fungicides

	Fall 2013
Best Fung.	38 cwt
None	1 cwt
Diff	37 cwt
Value/A	\$740
Fungicide Applications	6
Fungicide + Appl. Cost/A	\$139
Return/A*	\$601
Return per \$1 on Fungicide	\$4.33

*on yield above no fungicide yield



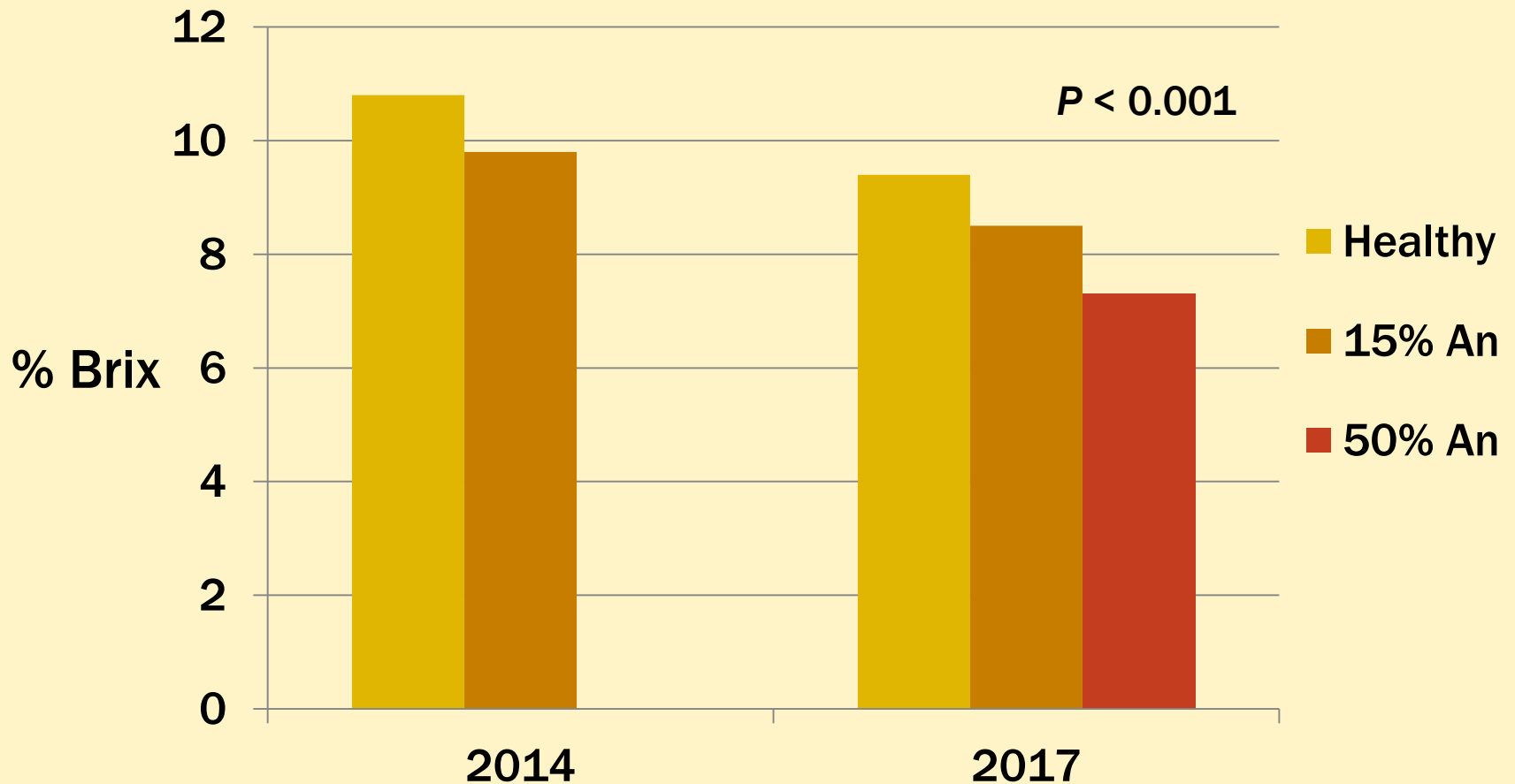
Severe Yield Loss to Anthracnose is Possible without the Right Fungicides

	Fall 2013	Spring 2014	Spring 2017
Best Fung.	38 cwt	186 cwt	100 cwt
None	1 cwt	50 cwt	24 cwt
Diff	37 cwt	136 cwt	76 cwt
Value/A	\$740	\$1904	\$1518
Fungicide Applications	6	3	4
Fungicide + Appl. Cost/A	\$139	\$90 (39-158)	\$110 (45-210)
Return/A*	\$601	\$1814	\$1407
Return per \$1 on Fungicide	\$4.33	\$20.09	\$12.73

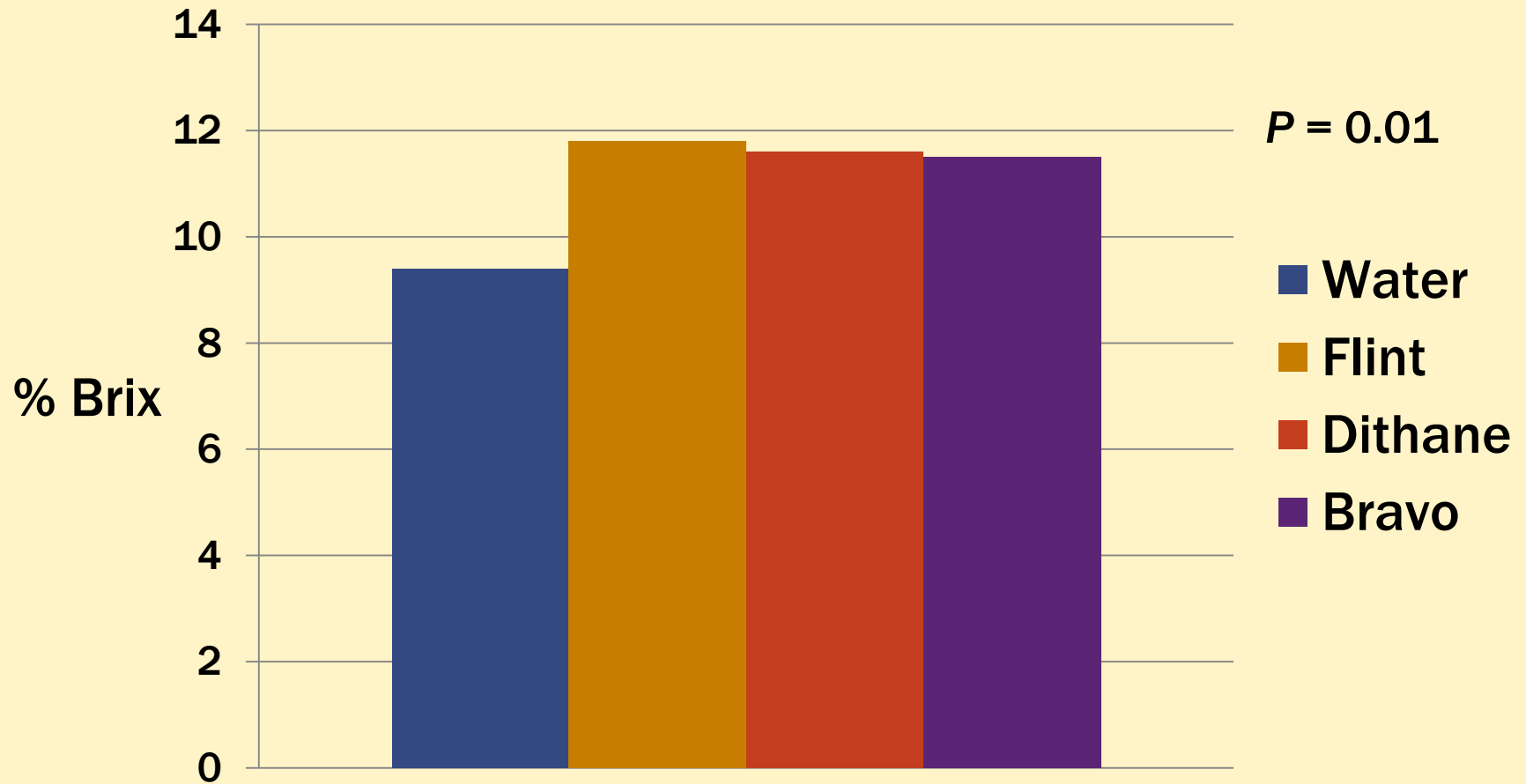


*on yield above no fungicide yield

Anthracnose Reduces Sugar Content of Diseased Fruit



3 Fungicides Increased Sugar Content of Healthy Fruit in 2014 (but not 2017)



Recommended Fungicides to Manage Anthracnose

Fungicide	Disease Severity	Marketable Yield	Cost (\$/A) of 4 sprays
mancozeb	Lowest	High	\$63
chlorothalonil	Low	High	\$52
Flint	Low	High	\$211
Cabrio	Low	High	\$159
Quadris	Low	High	\$119
Topsin-M	Low	Not as High (High in 2017)	\$45

Fungicides That Did NOT Control Anthracnose on Watermelon (Race 2) in SC

- ☐ Curzate
- ☐ Tanos
- ☐ Endura (and likely Fontelis)
- ☐ Luna Experience
- ☐ Inspire Super
- ☐ Switch

Fungicides effective against gummy stem blight do not control anthracnose

Alternaria Leaf Blight on Muskmelon



- ❑ Uncommon in SC
 - Need 20 h leaf wetness at 82 F.
 - Need 11 h leaf wetness at 75 F.
- ❑ FRAC Code 11 fungicides
- ❑ Consider Quadris Opti (Quadris + Bravo) to minimize resistance risk
 - Or alternate Group 11 with chlorothalonil

“All crop protection materials are too expensive. But not having a crop to sell is more expensive.”

**Russ Shlagel,
Shlagel Farms,
Waldorf, Maryland**

When Is It OK to Not Spray?

Some growers stop spraying when:

- 1.** Daytime temperatures are above 95 F.
- 2.** Weather is dry with no rain for a week.
- 3.** Only harvesting a field one more time.

Don't forget what happens at night:

- 1.** Night temperatures in **70's** are favorable for disease.
- 2.** **Dew** forms almost every night in the summer.
- 3.** Downy and powdery mildew spread rapidly within a week.

Fungicides ≠ Plant Medicines



Fungicides PREVENT disease

- They do not “cure” disease like human antibiotics



Spray fungicides before you see disease

- After disease appears, check/switch fungicides



Invest \$\$ up front to get best return on \$\$ spent on fungicides



Step-by-Step Guide for Spraying Fungicides

1. Start with contact fungicides (chlorothalonil, mancozeb) to protect crop against foliar fungal diseases
 - a. The first spray is the most critical
 - b. In a dry year, protectants may be “good enough”



Step-by-Step Fungicide Guide

- 2. Choose follow-up fungicides that work best for disease(s) most likely to cut yields**
 - a. These must be identified at regional or state level**



Caution: Fungicide Resistance

- ❑ Pay attention to FRAC Codes
- ❑ Be sure that fungicides used in rotation or sequence do not have the same FRAC Codes
 - This includes all components of mixtures
- ❑ NEVER rotate
 - Luna Sensation (7 + 11) with
 - Pristine (7 + 11)
 - even though from different companies
 - even though different active ingredients
 - OK with different fungicide in between

Managing Bacterial Fruit Blotch on Watermelon

- ❑ Seed/Greenhouse/Transplant problem
- ❑ Check transplants for water-soaking on cotyledons and hypocotyls
- ❑ Apply copper hydroxide
 - 0.5 lb/A (ex. Kocide 3000)
 - 6 weekly applications
 - Start 2 weeks before female flowers open
- ❑ Actigard at 0.5 oz/A



Summary Recommendations

- ❑ Rotate fields away from cucurbits for 2 years
- ❑ Start with broad-spectrum, protectant fungicides early in the season
- ❑ Switch to more specific, systemic fungicides after disease appears
- ❑ Rotate all specific, systemic fungicides
 - Use FRAC Codes as guide

Clemson Coastal REC Plant Pathology Crew 2017

