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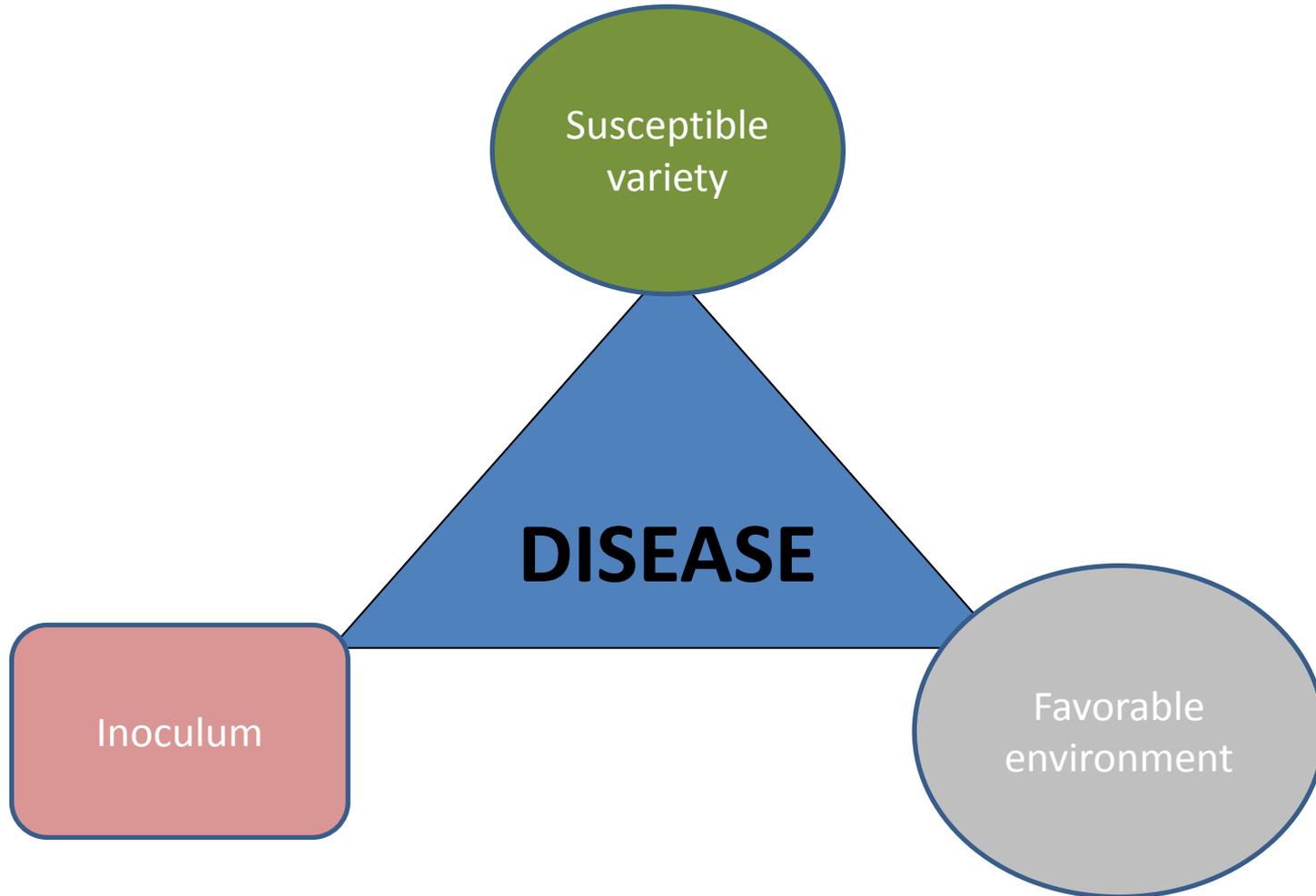
COLLEGE OF FOOD, AGRICULTURAL,
AND ENVIRONMENTAL SCIENCES

**Foliar Fungicides for Soybeans – best
environmental conditions for that return on
investment**

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Professor Plant Pathology



Disease Triangle





What foliar diseases occur in Ohio ?



- Brown Spot
 - *Septoria glycines*
- Frogeye Leaf Spot
 - *Cercospora sojina*
- Downy Mildew
 - *Pernospora manshurica*

- Bacterial pustule
 - *Xanthomonas axonopodis* pv. *glycines*
- Bacterial Leaf Spot/Blight
 - *Pseudomonas savastanoi* pv. *glycinea*

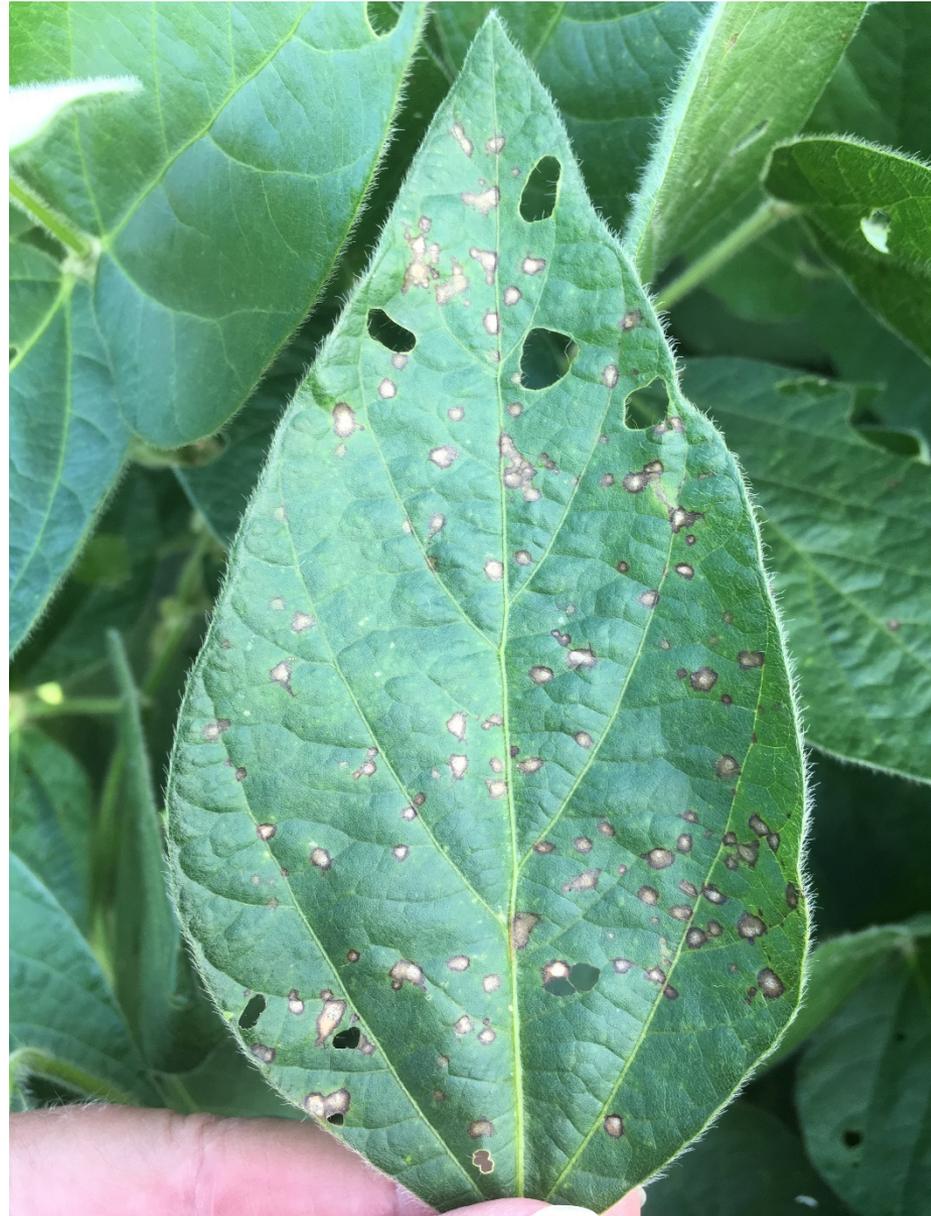


Frogeye leaf spot- symptoms developed early (V3-V4) very widespread in Ohio during 2018





Frogeye leaf spot



- 10 years ago, completed studies that indicated this pathogen can overwinter in Ohio
 - Cruz et al. 2009. Plant Health Progress doi:10.1094/PHP-2009-0512-03-RS
- Pathogen is now resistant to strobilurin fungicides and widespread
 - Zhang et al. 2017. Plant Health Progress doi:10.1094/PHP-2009-0512-03-RS
- Favored by cool (70s) and spread by rain splash and moved long distances with large storms



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Survey For Resistance (R)/ Sensitivity (S) to strobilurin fungicides- (G143A)



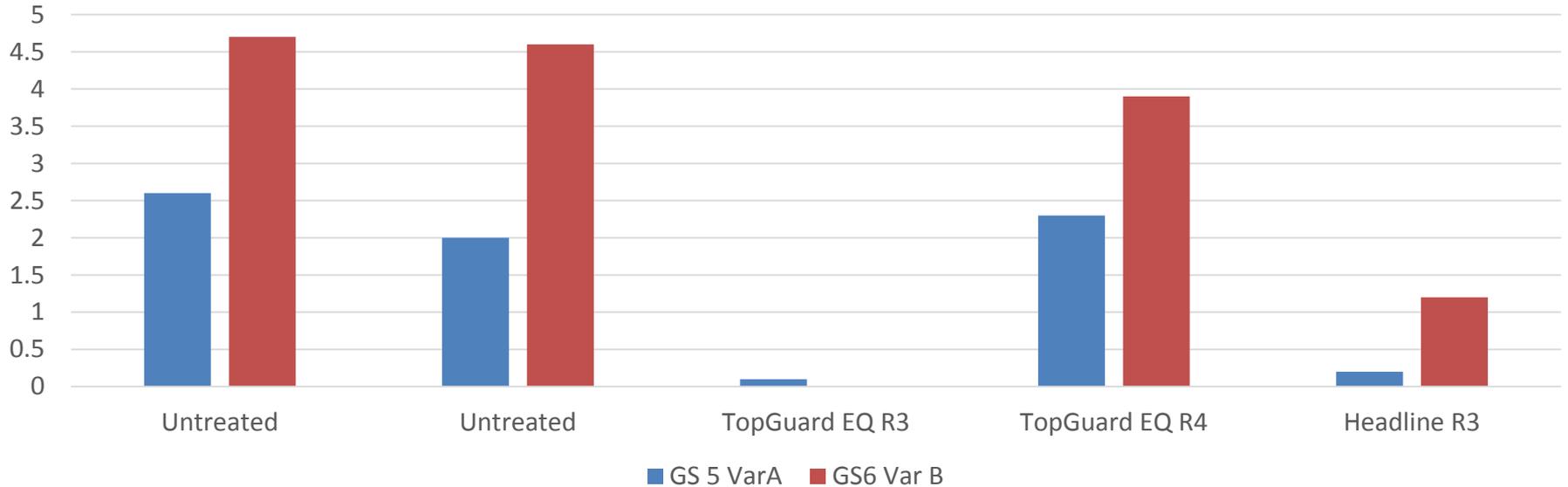
2015 – 9/10 locations were sensitive

County	2016	2017	2018
Auglaize- WC	R/S	R	R
Brown		R	R
Clark-WC	R		R
Champaign		R	R/S
Clinton		R	R/S
Darke-W	S	R/S	R
Fulton	R/S		--
Highland	--	--	R
Jefferson/Harrison-E	R/S		--
Mercer		R	--
Montgomery-SW	S		--
Paulding	--	--	R
Pickaway	R/S	R/S	S
Preble-SW	R/S		--
Tuscarawas		R/S	R/S
Wayne		R	S



FMC- Western 2017

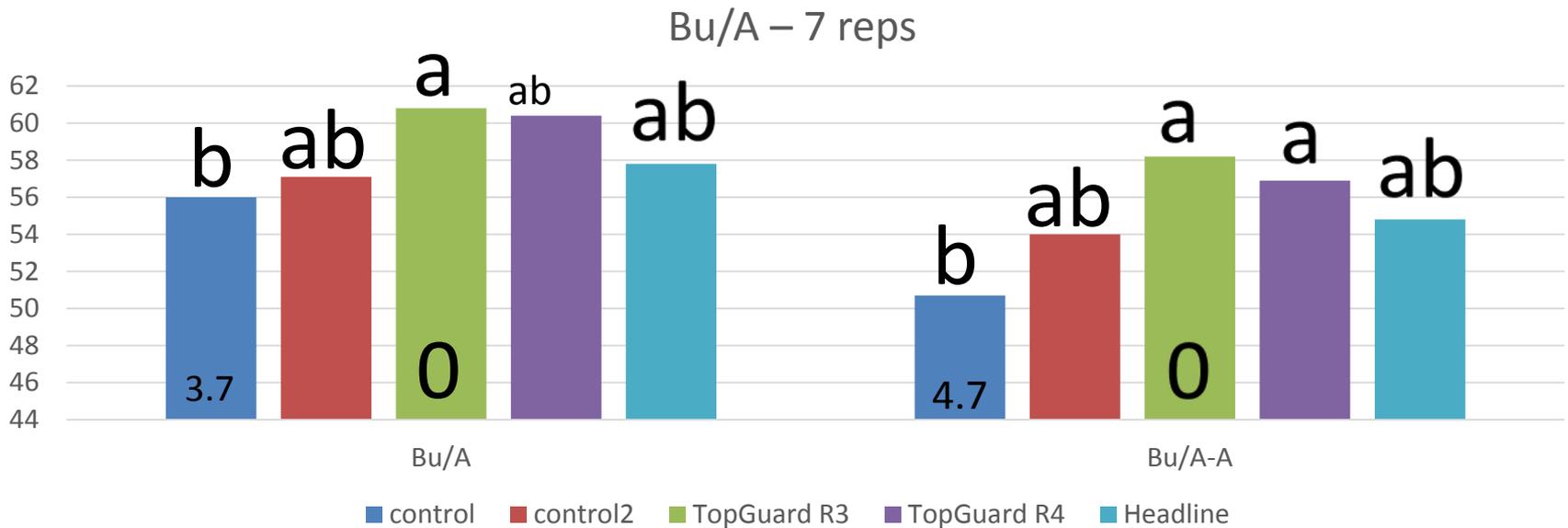
% Leaf area affected



Timing of fungicides was important for protectants



Yield – Western 2017 - Frogeye



4 bu/8 bu

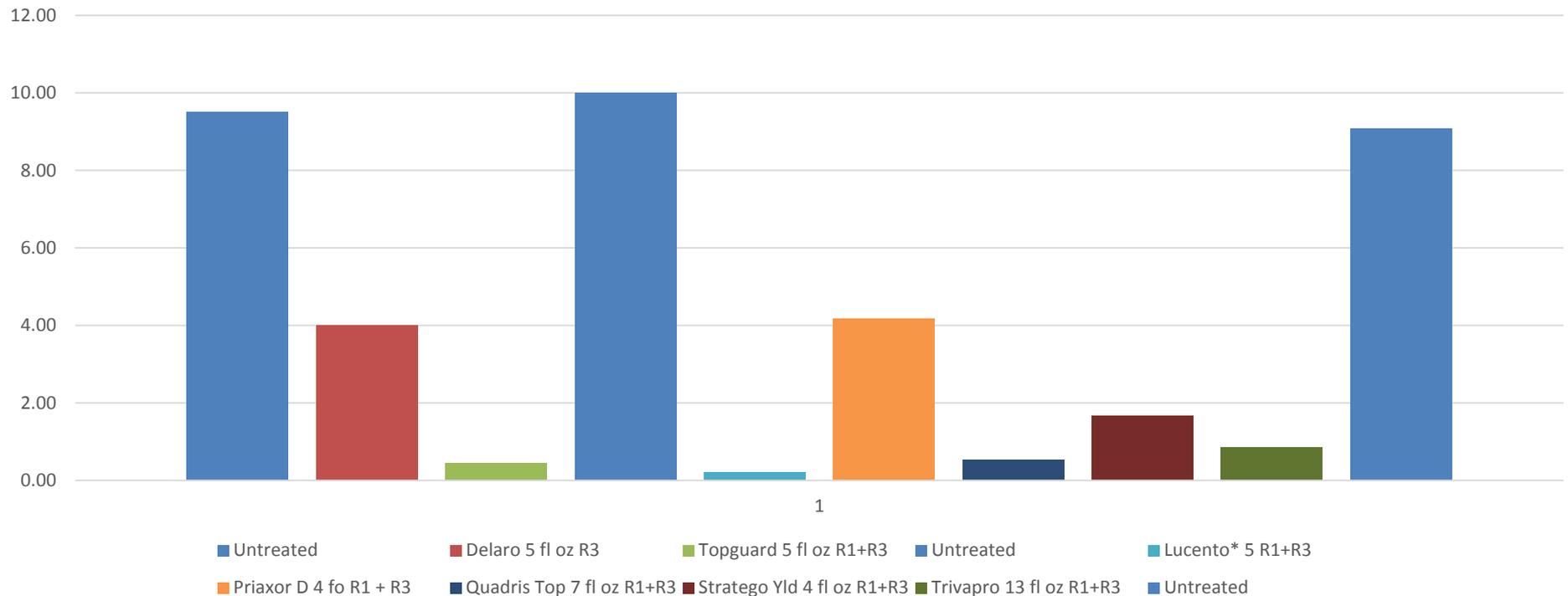
P value (Fungicides) 0.0023

FMC: Topguard[®] EQ, Azoxystrobin & flutriafol



Mean % leaf area affected FE – S variety

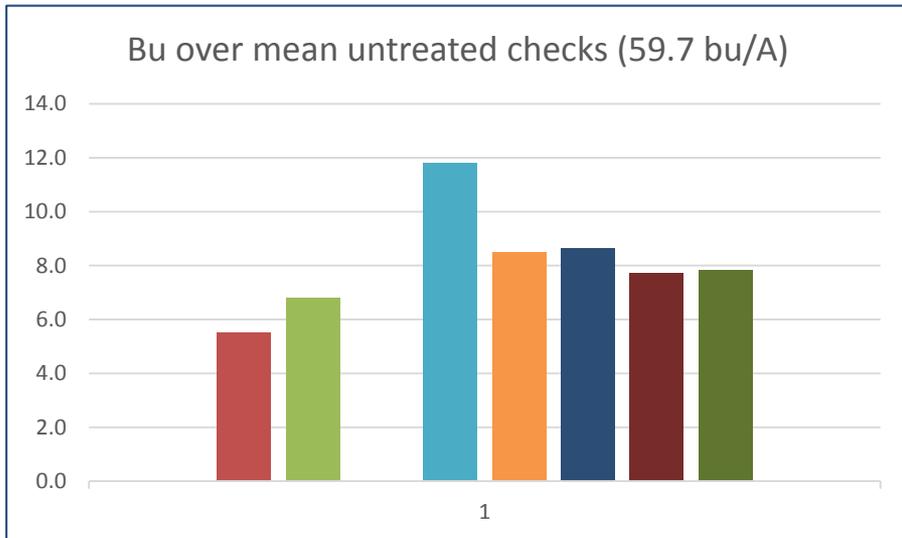
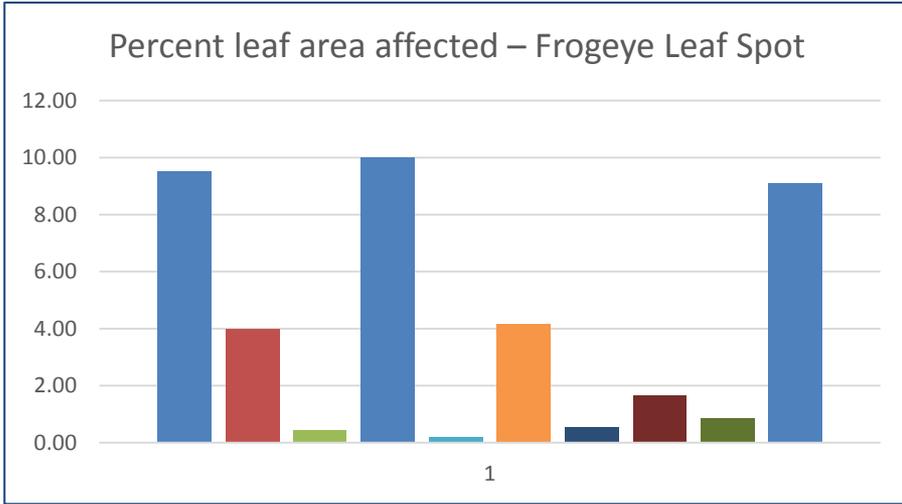
Western Fungicide Efficacy 2018



Delora applied below recommended rate of 8 fl oz; Lucento (FMC) pending registration 2019



Susceptible Variety



- Untreated
- Delaro* 5 fl oz R3
- Topguard 5 fl oz R1+R3
- Untreated
- Lucento* 5 R1+R3
- Priaxor D 4 fo R1 + R3
- Quadris Top 7 fl oz R1+R3
- Stratego Yld 4 fl oz R1+R3
- Trivapro 13 fl oz R1+R3
- Untreated

Delaro below recommended rate which is 8 fl oz
Lucento (FMC) pending registration 2019

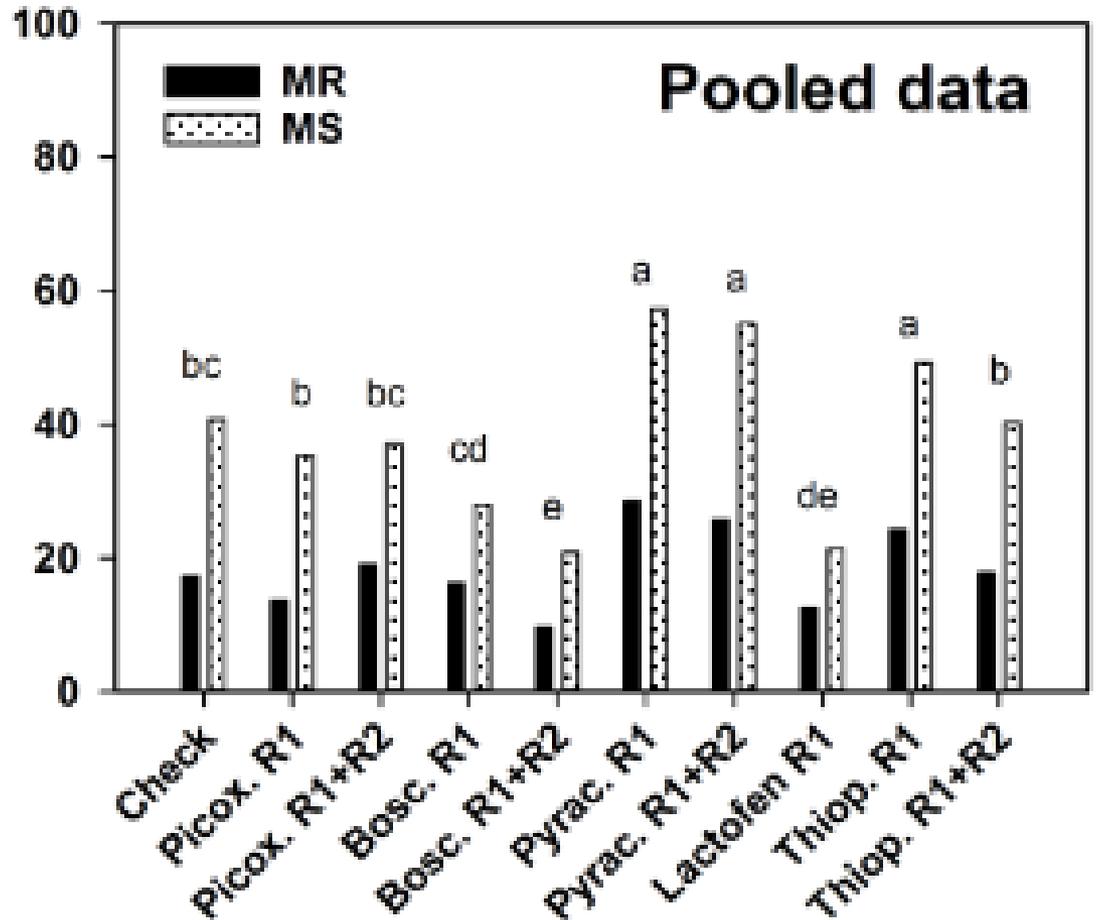
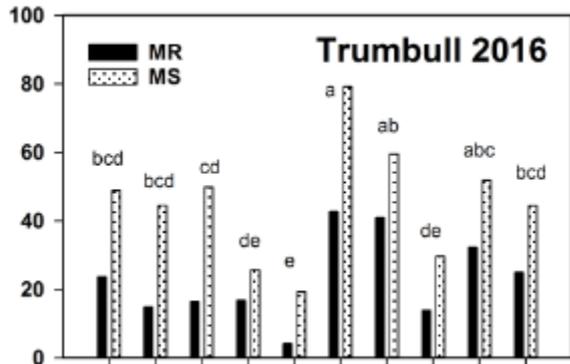
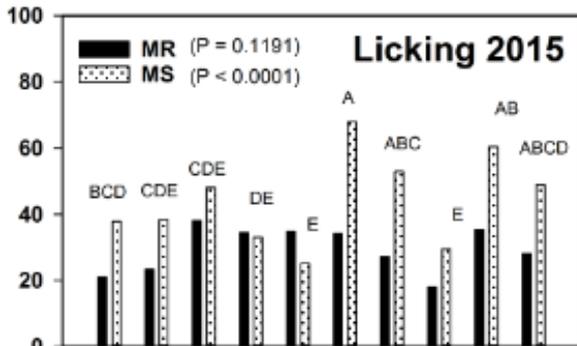
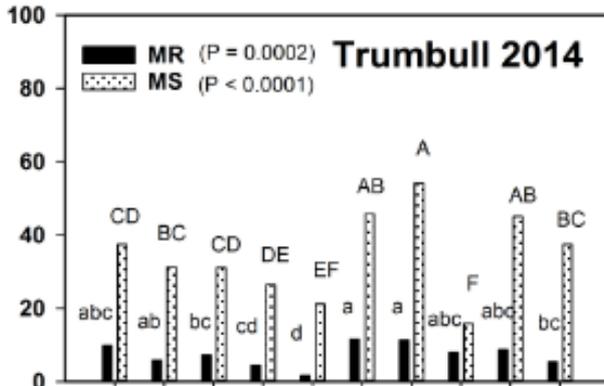
Sclerotinia stem rot





Sclerotinia Stem Rot/White mold





Approach, Endura, Headline, Phoenix, TopsinM

Huzar-Novakowski et al., 2017 Phytopathology 107:937-949

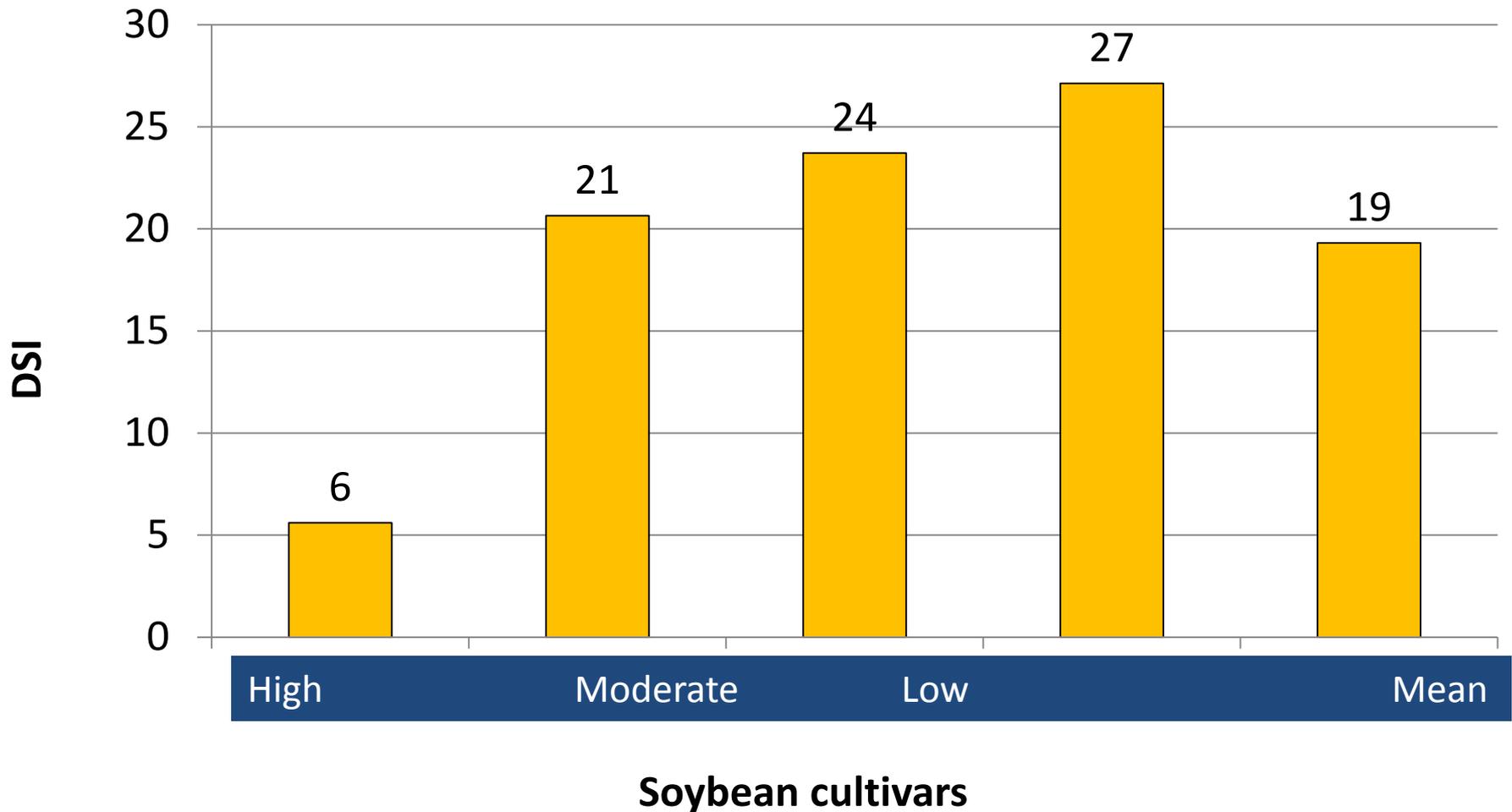


Fields without disease



Effect	Environment ^a						Pooled data ^c
	Wayne 2014 ^b	Ashtabula 2015	Tuscarawas 2015	Knox 2016	Tuscarawas 2016	Wayne 2016	
COV ^d	...	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
CULT	0.2932	0.0555	0.8253	0.8690	0.2910	0.1725	0.0828
TRT	0.3626	0.6432	0.5342	0.3623	0.2309	0.0063	0.0619
CULT x TRT	0.2696	0.8107	0.5446	0.9008	0.3367	0.5596	0.8798

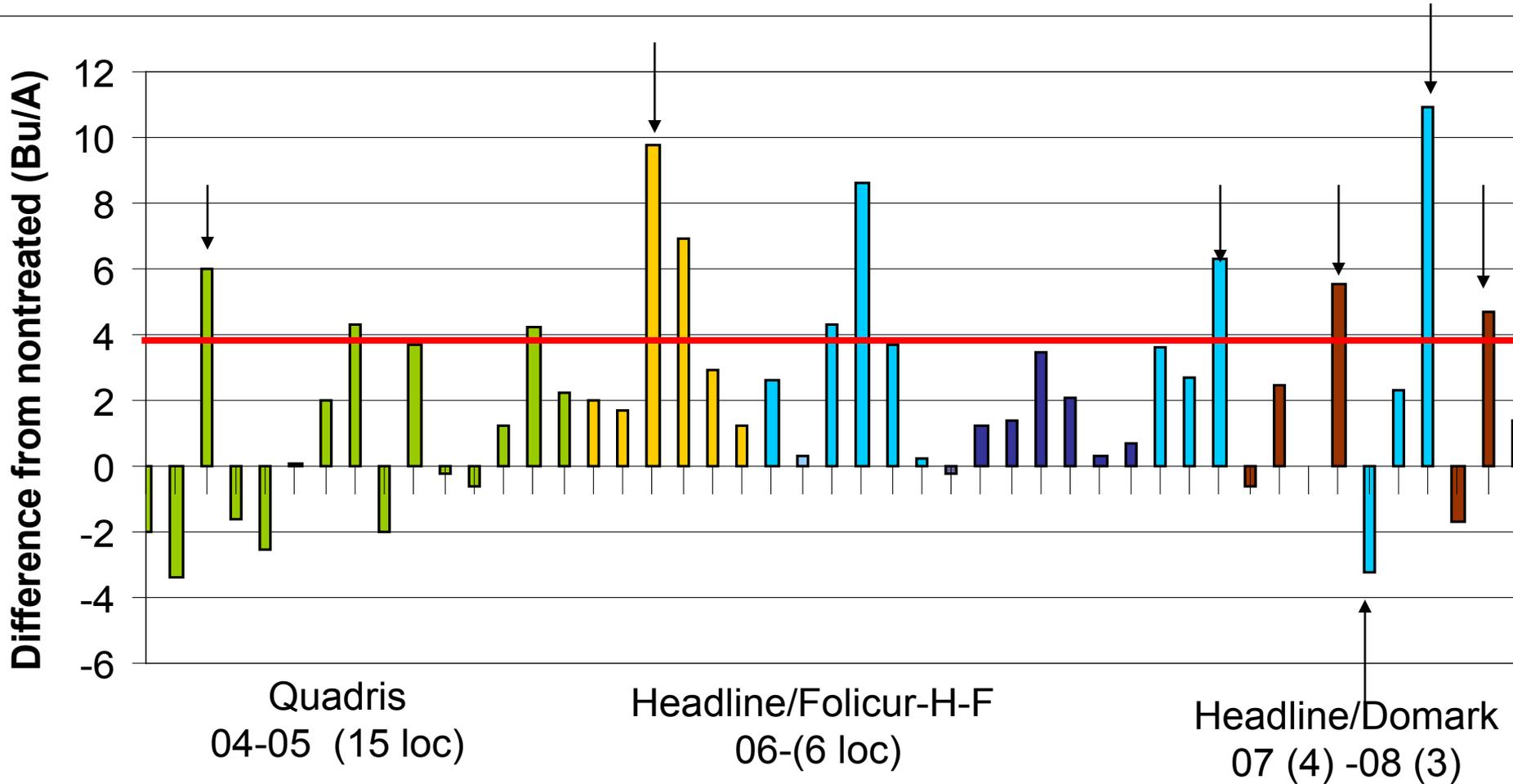
Disease severity index (DSI)





Economics for Fungicide Applications

\$/bu	\$4	\$5	\$6	\$7	\$8	\$10	\$12	\$14
+2 bu	\$8	\$10	\$12	\$14		\$20	\$24	\$28
+3 bu	\$12	\$15	\$18	\$21	\$24	\$30	\$36	\$42
+4 bu	\$16	\$20	\$24	\$28	\$32	\$40	\$48	\$56
+5 bu	\$20	\$25	\$30	\$35	\$40	\$50	\$60	\$70



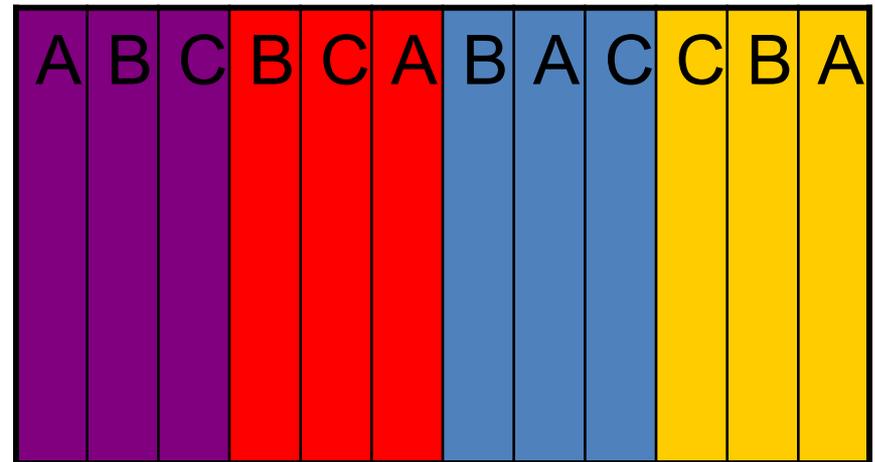
Summary – On Farm Foliar Fungicide Trials

3 out of 28 producers recovered costs of application



Protocol

- Large scale size REPLICATED studies
- Producer/dealer apply fungicides
 - Wider than the combine
- Producer takes yields, measures the area of EACH STRIP
- OSU – assessed disease and insect incidence/severity
 - Statistical analyses





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OHIO SOYBEAN
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Thank you!

CAPS



OARDC Research Farms
Producer/Cooperators

Bayer, BASF, DuPont, FMC, Valent, Syngenta
Pioneer Seeds & Monsanto-Asgrow



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