

The Concept of Soybean Plant Health



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Optimizing success – Assessing Risk

- What are you treating/protecting?
 - Yield building canopy
 - Diseases
 - Other effects?



In the absence of apparent diseases...

- What should you expect?



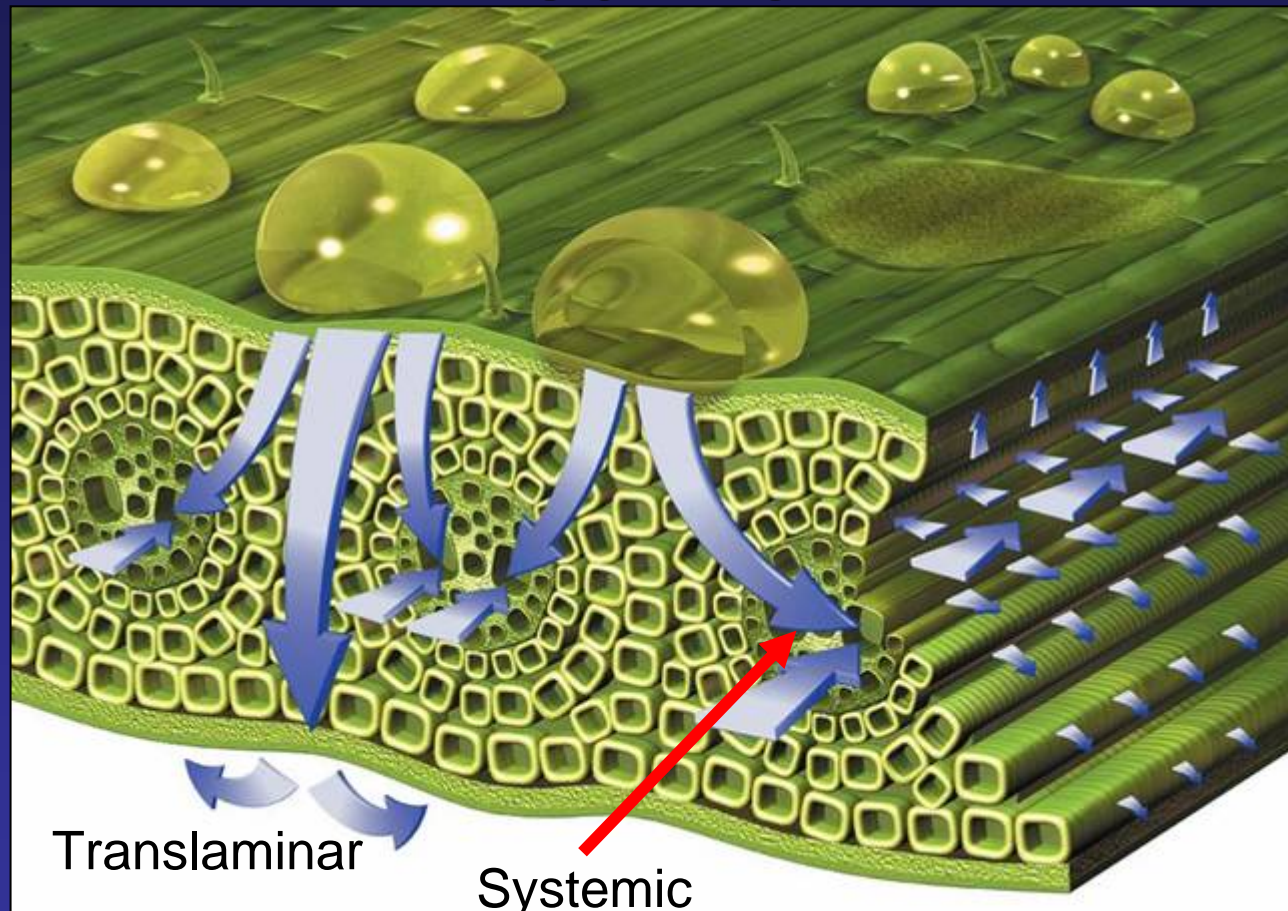
What causes response in soybean?

- Considerations
 - Fungicide timing and Residual
 - Vegetative vs. Reproductive
 - Disease pressure
 - Foliar vs. Stem vs. Root
 - Fungicide chemistry
 - Strobilurin vs. Triazole vs. true protectants

What causes response in soybean?

- Two theories for strobilurin success
 - Disease theory
 - Response is due to...
 - Controlling seen diseases
 - Suppressing unseen, underlying diseases (nibblers)
 - Disease⁺ theory
 - Response is due to...
 - Controlling seen diseases
 - Physiological effects
 - » Reducing ethylene accumulation
 - » Reducing nitrogen oxide (see above)

All strobilurins are NOT the same



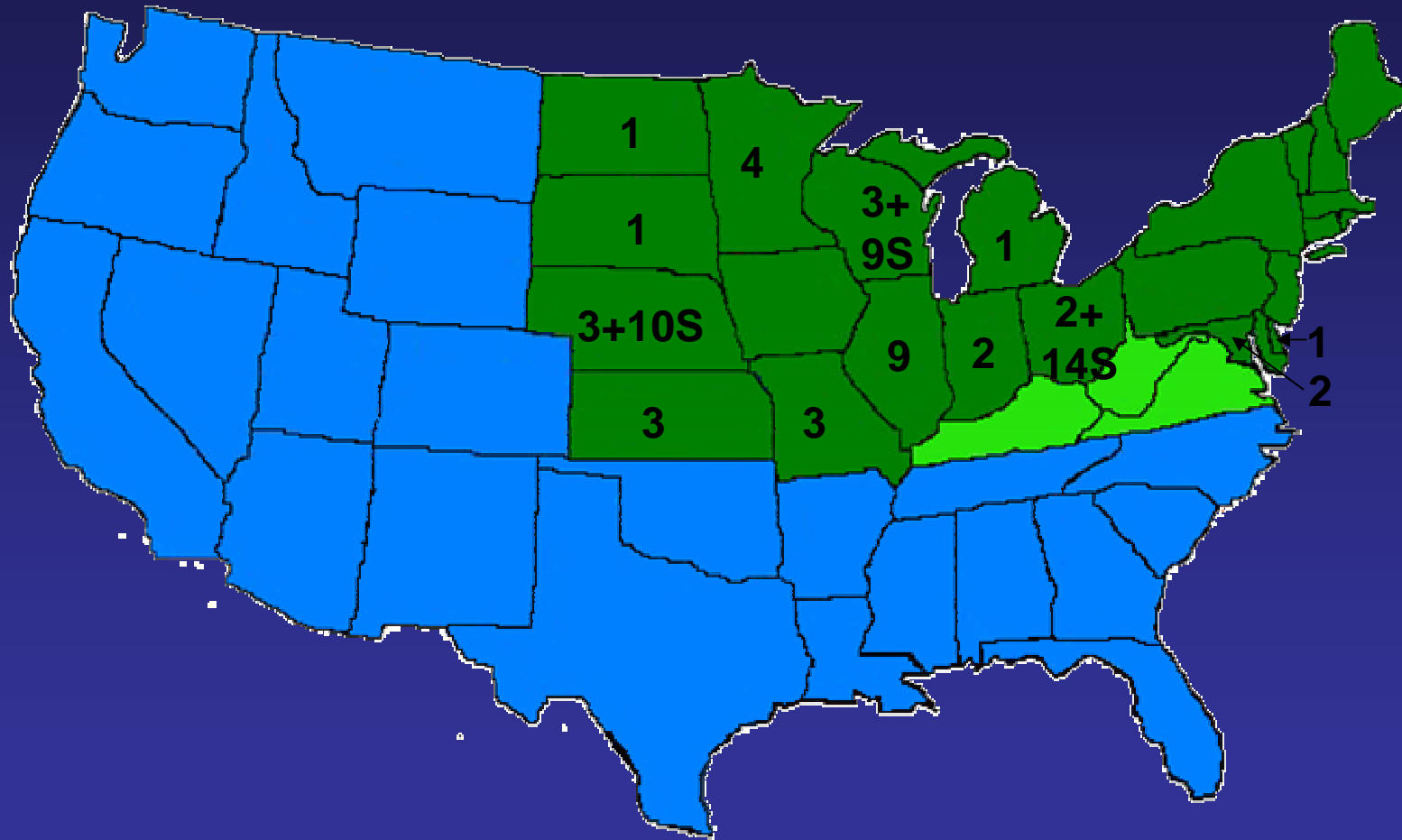
What causes response in soybean?

- Southern experience
 - Strobilurins provide consistent yield response
 - Normal disease pressure from...
 - Rhizoctonia aerial blight
 - Frogeye leaf spot
 - Other late season diseases
 - Long season maturities

What causes response in soybean?

- Northern experience
 - Strobilurins inconsistent in north
 - Significant leaf diseases are rare
 - Stress relief may be implicated, but poorly defined
 - Short season maturities

Northern Region 'Defined'



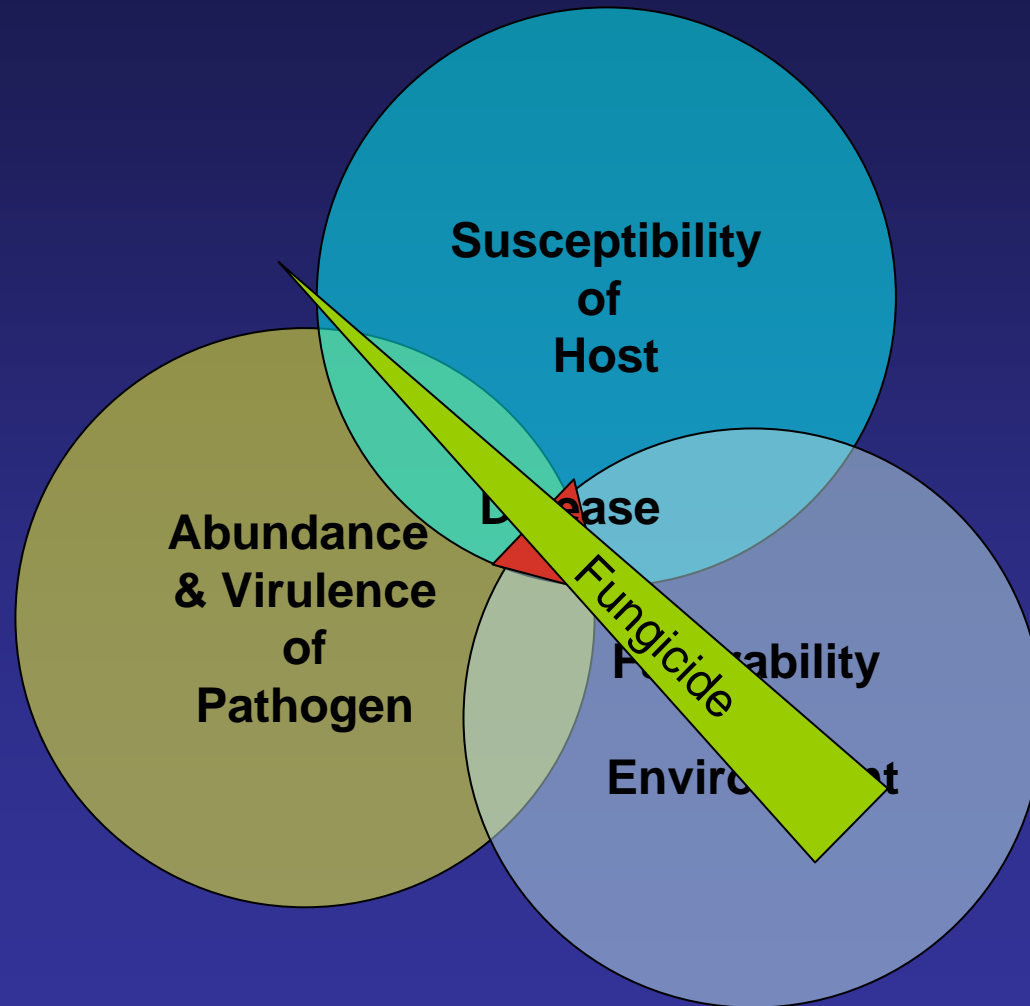
Northern Region 'Results'

- 13 states provided data
- 65 trial locations
- Small plot and strip trials
- Crop response in the absence of rust
 - Strobilurins
 - Triazoles
 - Combination products
 - Multiple treatments

Variability Across Northern Trials

- Maturity groups
 - RM 00
 - RM 0
 - RM I
 - RM II
 - RM III
 - RM IV
- Genotypic interactions
- Environments
 - Drought in 2005
- Confounding from foliar and stem disease

Crop Diseases

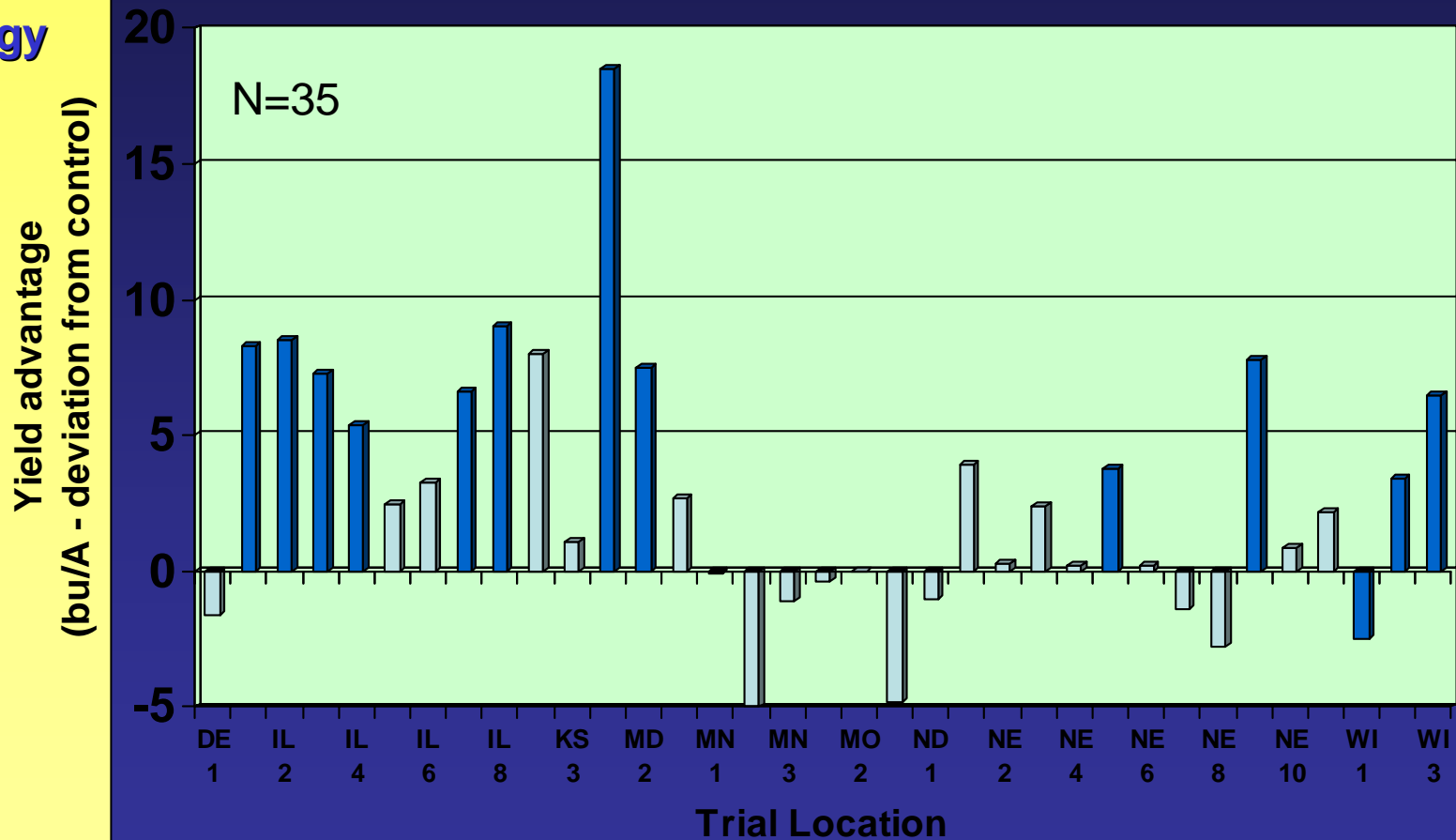


Disease Control

- Rust was not reported from any Northern trial site
- Brown spot, Bacterial blight and Bacterial pustule were most commonly reported
- Frogeye leafspot and Anthracnose in some locations
- Disease data not available from all sites
- Most sites had only minor leaf disease

Yield Response by Location

Strobilurin - Headline



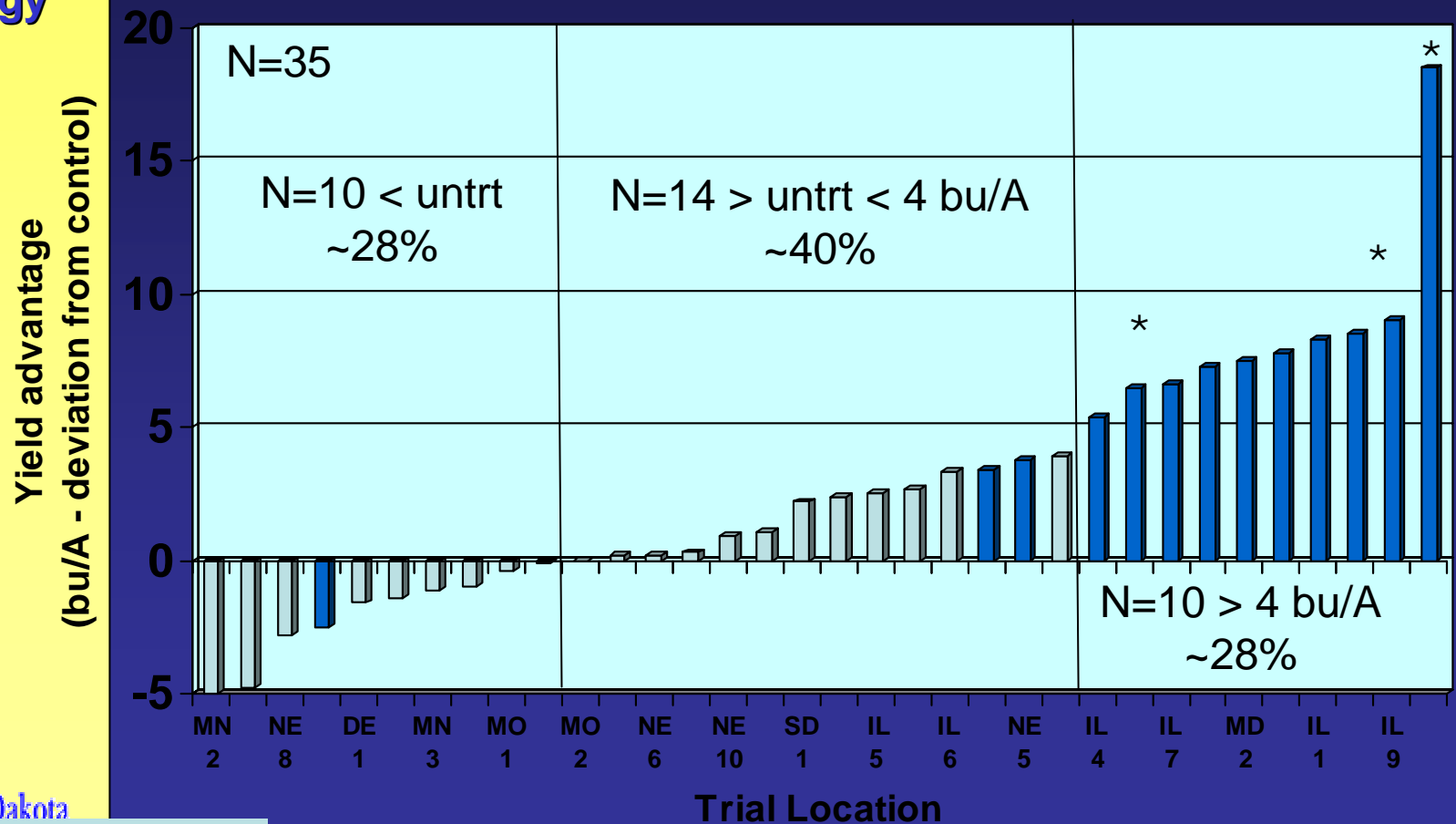
Relative advantage of treatment
Absence of soybean rust

Assumes \$5.00/bu - \$12.00/A product - \$7.00/A application

Wisconsin Fertilizer, Agrilime and Pest Management Conference
January 17-19, 2006

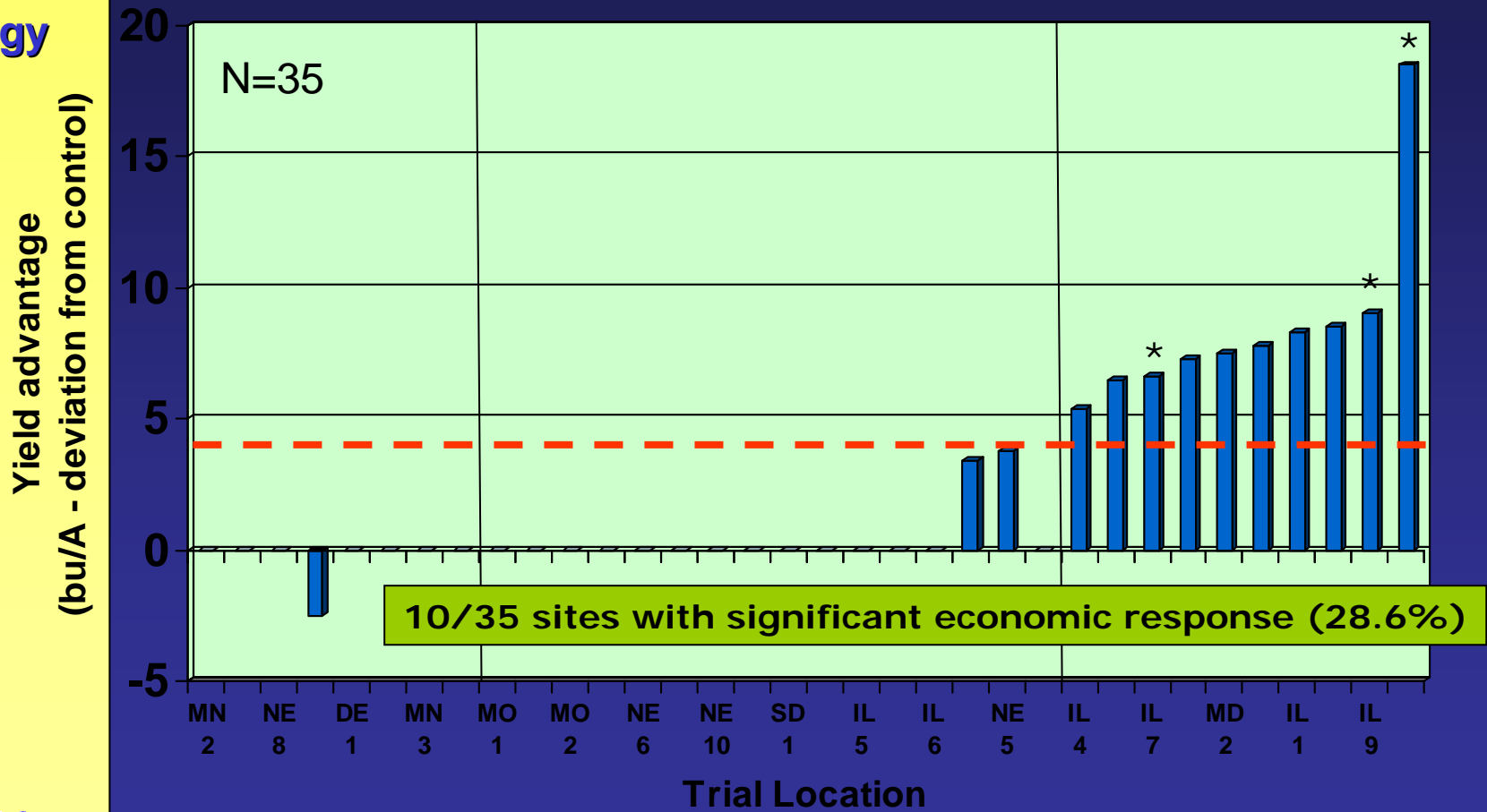
Yield Response by Location

Strobilurin - Headline



Yield Response by Location

Strobilurin - Headline



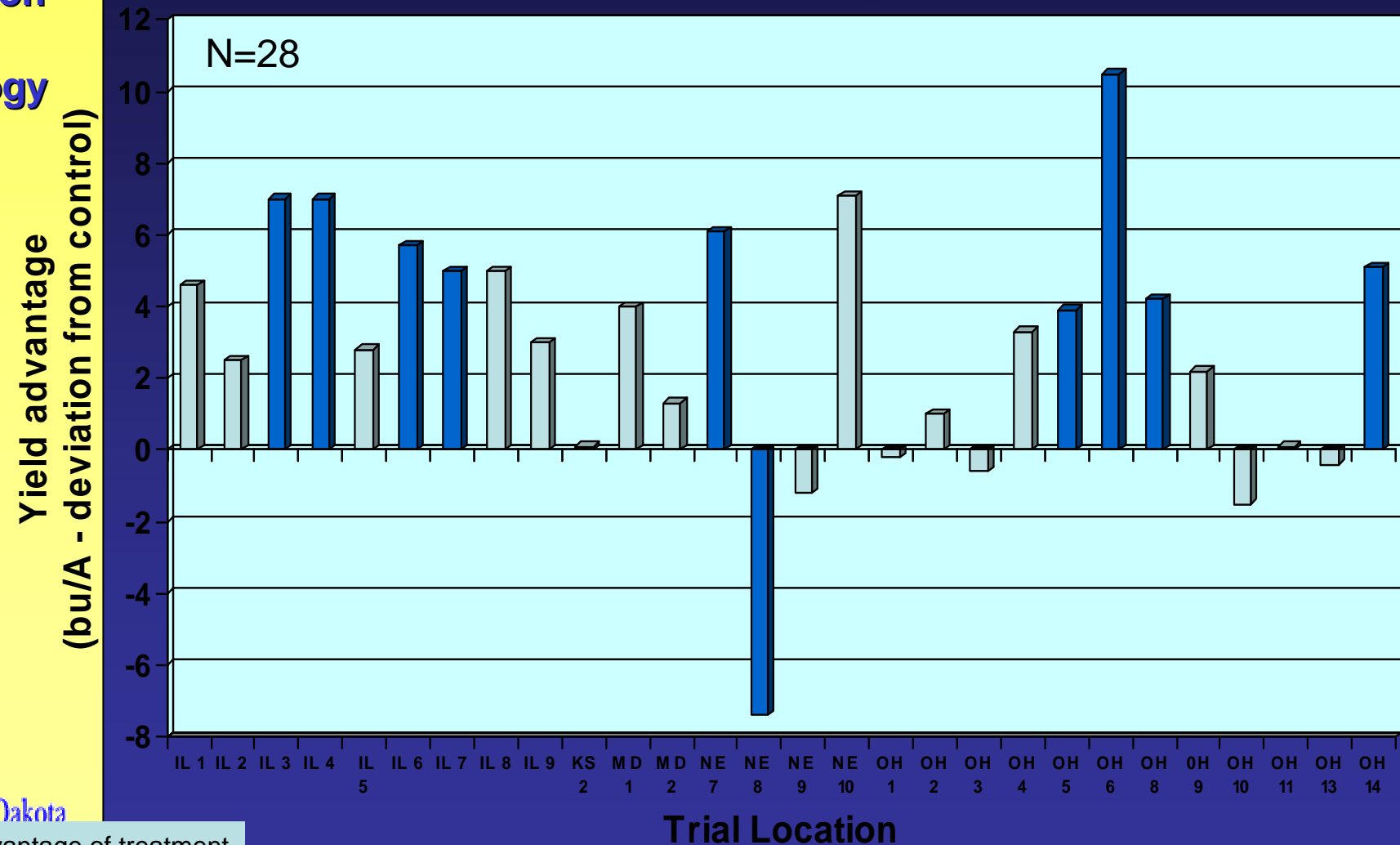
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Yield Response by Location

Strobilurin - Quadris



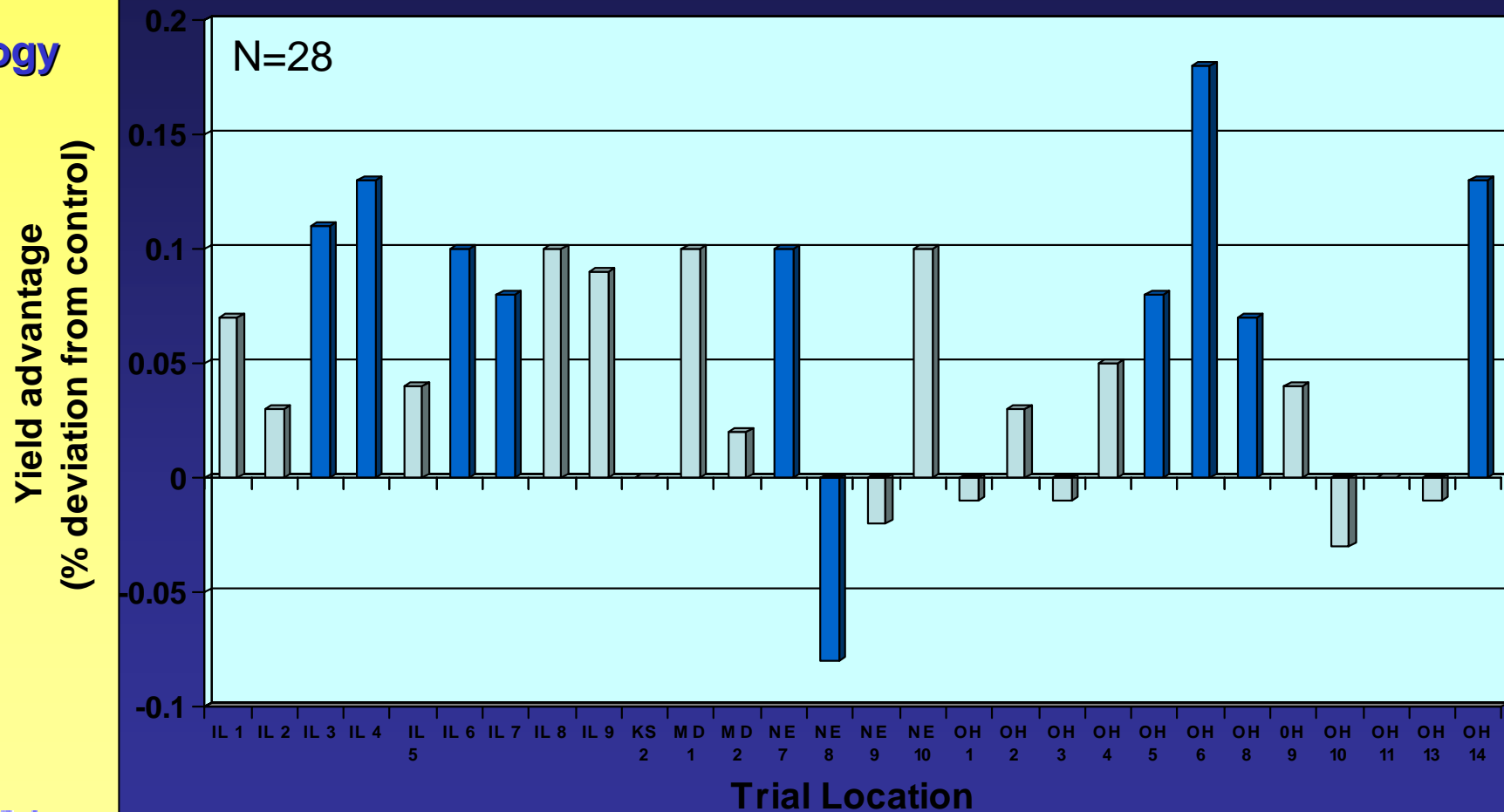
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Yield Response by Location

Strobilurin - Quadris

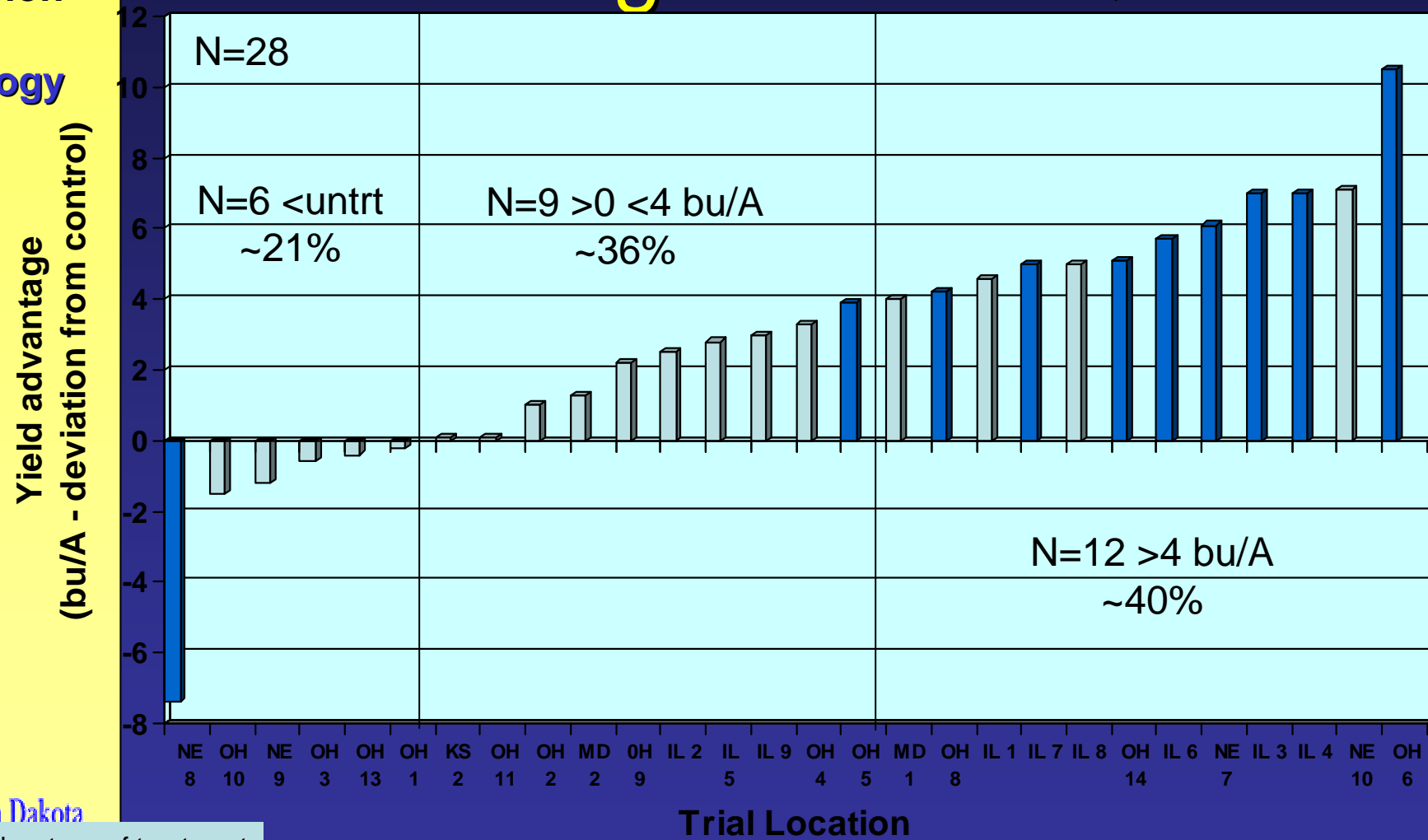


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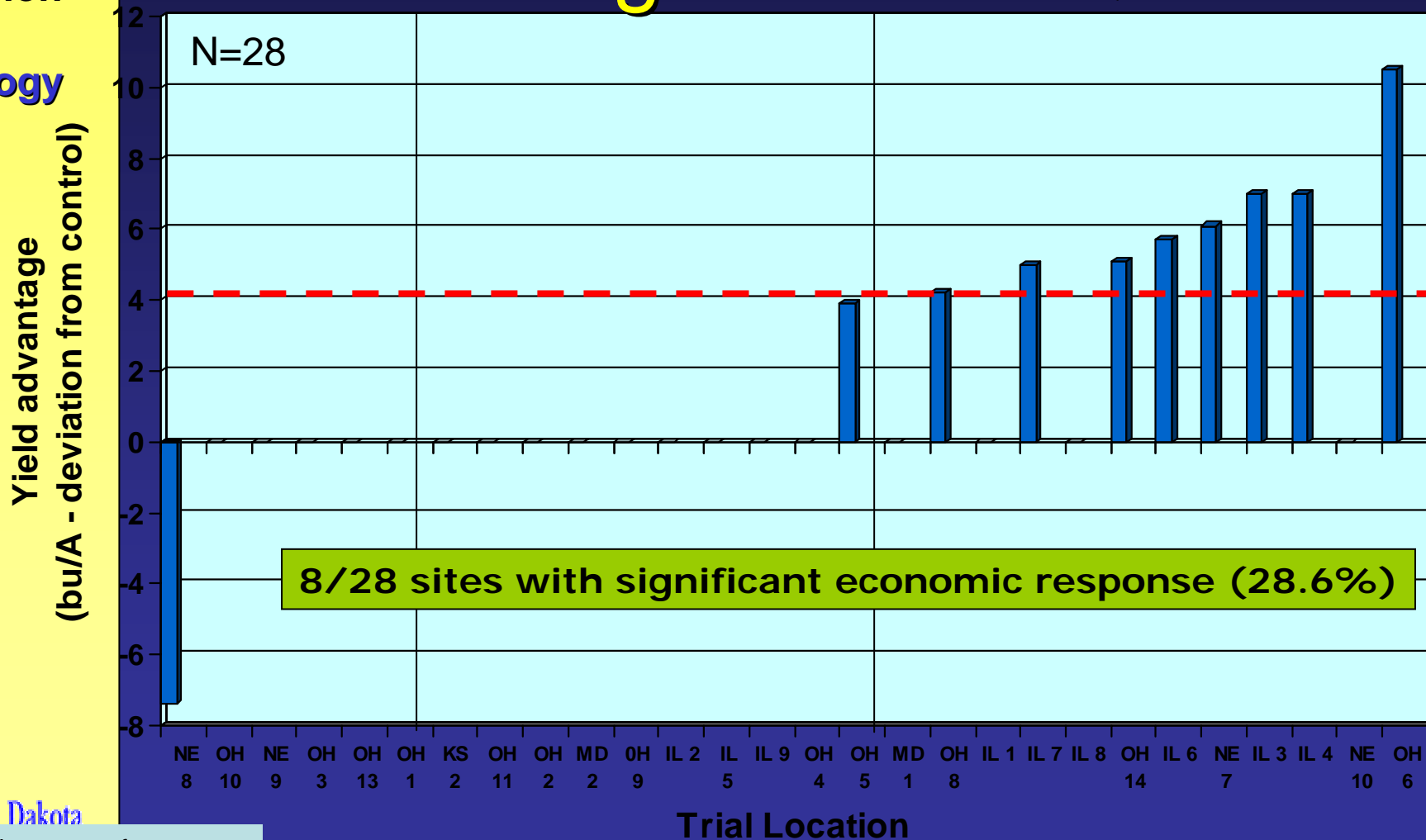
Yield Response by Location - Ascending Strobilurin - Quadris



Relative advantage of treatment
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Yield Response by Location – Ascending Strobilurin - Quadris



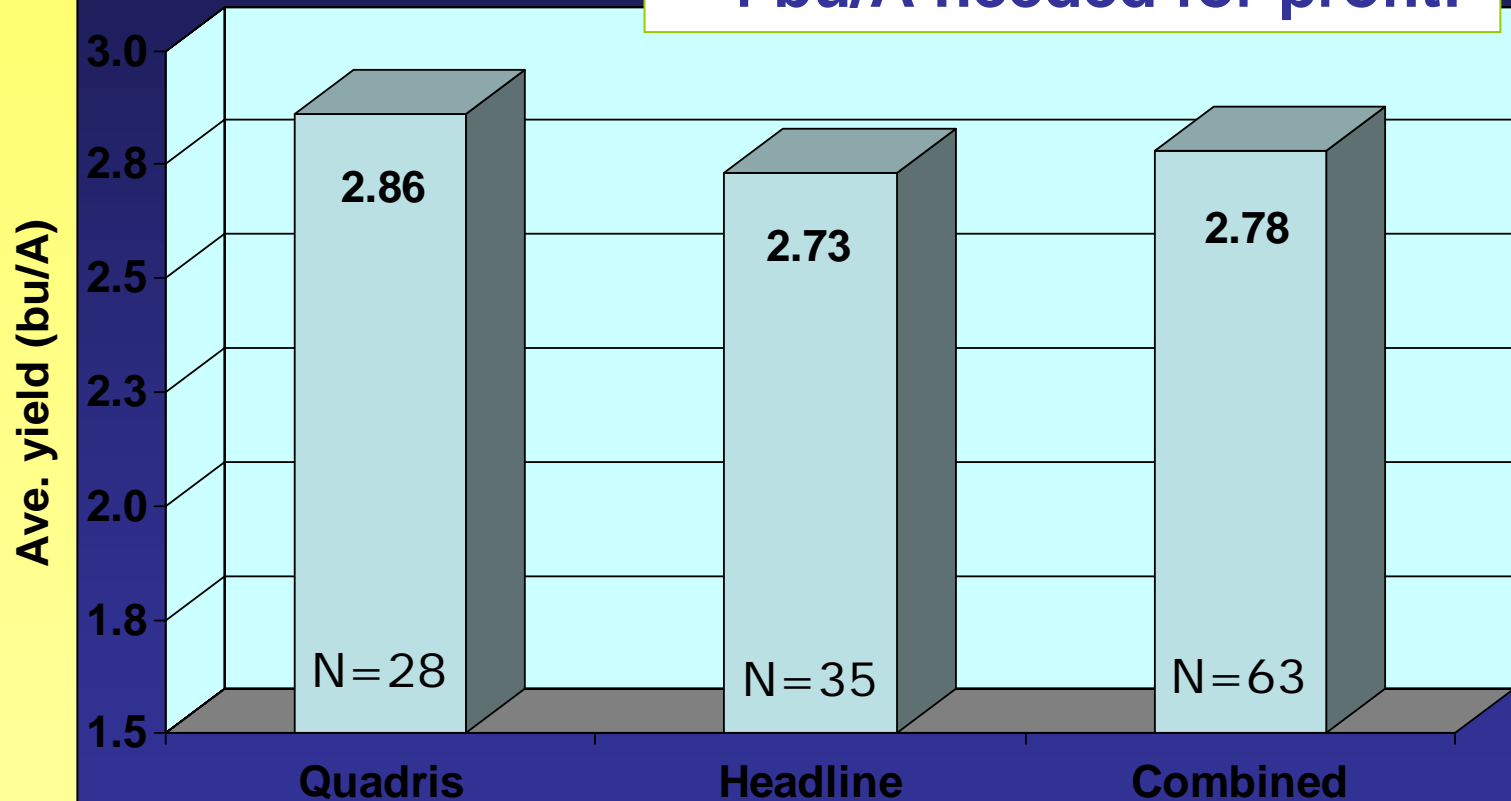
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Yield Response to Strobilurin Across Locations

~ 4 bu/A needed for profit!

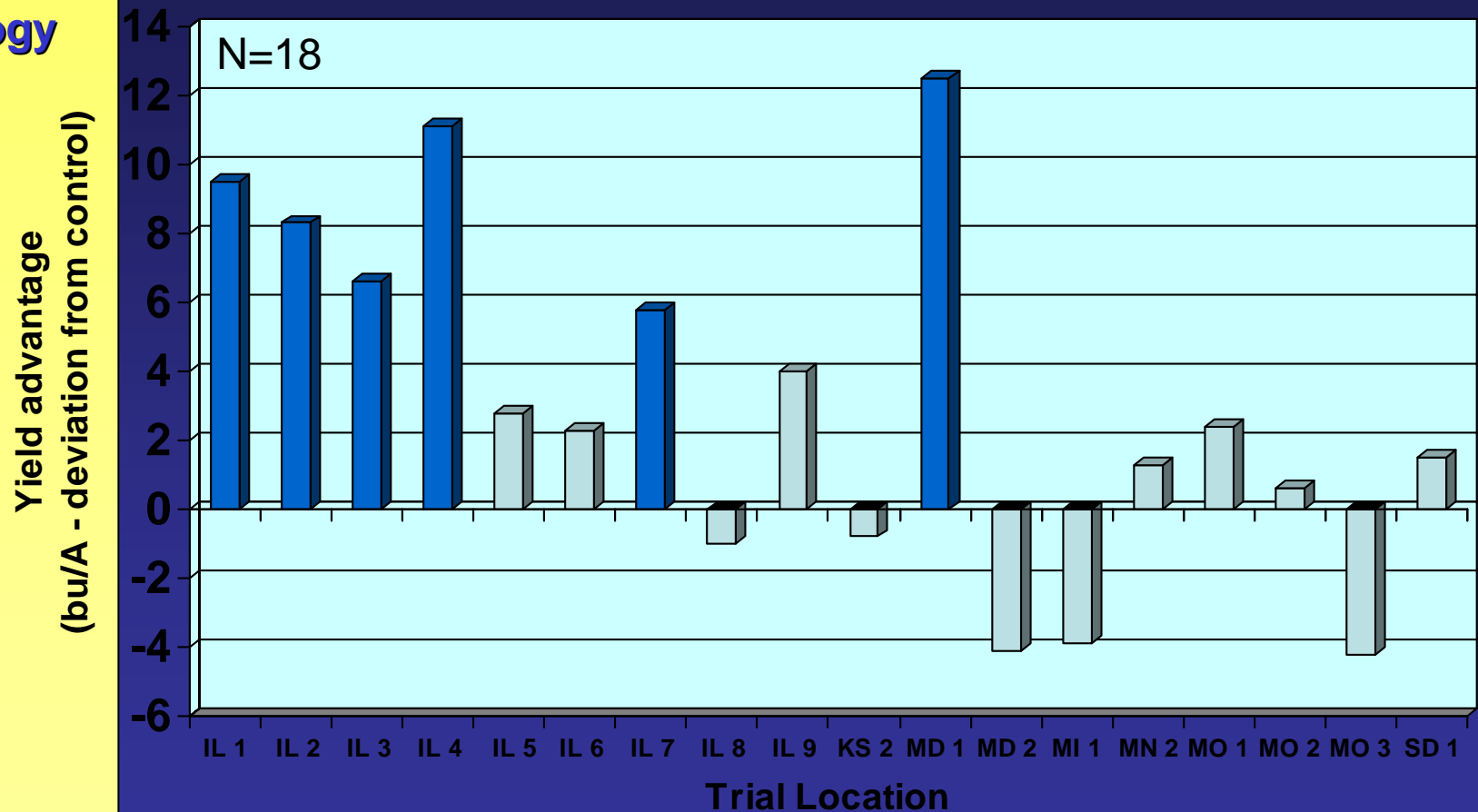


Conclusions & Concerns

- Strobilurin products provide excellent, broad spectrum disease control
- Something is happening in the absence of disease!
- Inconsistent
- How do we optimize the response?
- Separating influencing factors?

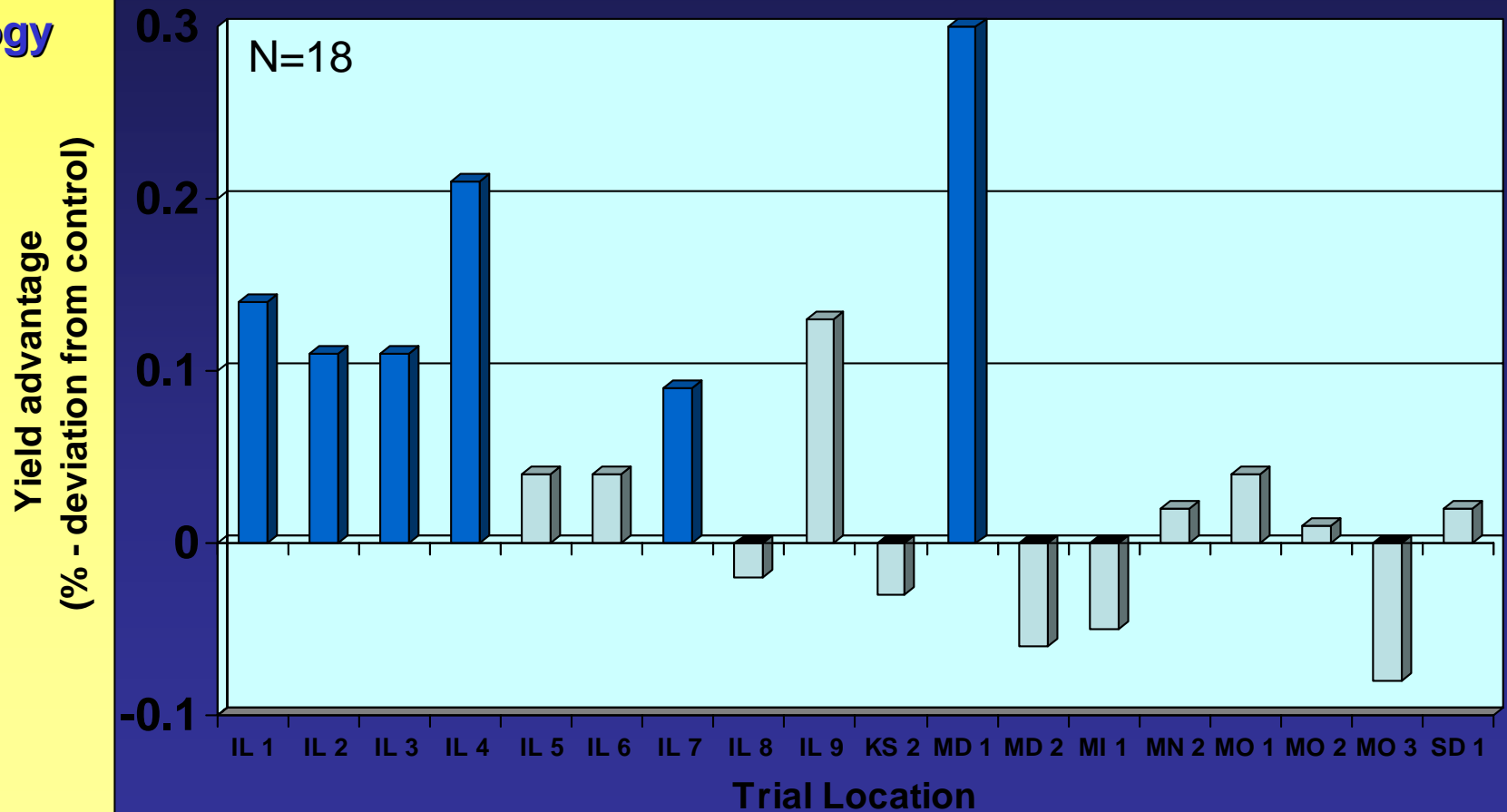
Yield Response by Location

Strobilurin/Triazole - Quilt



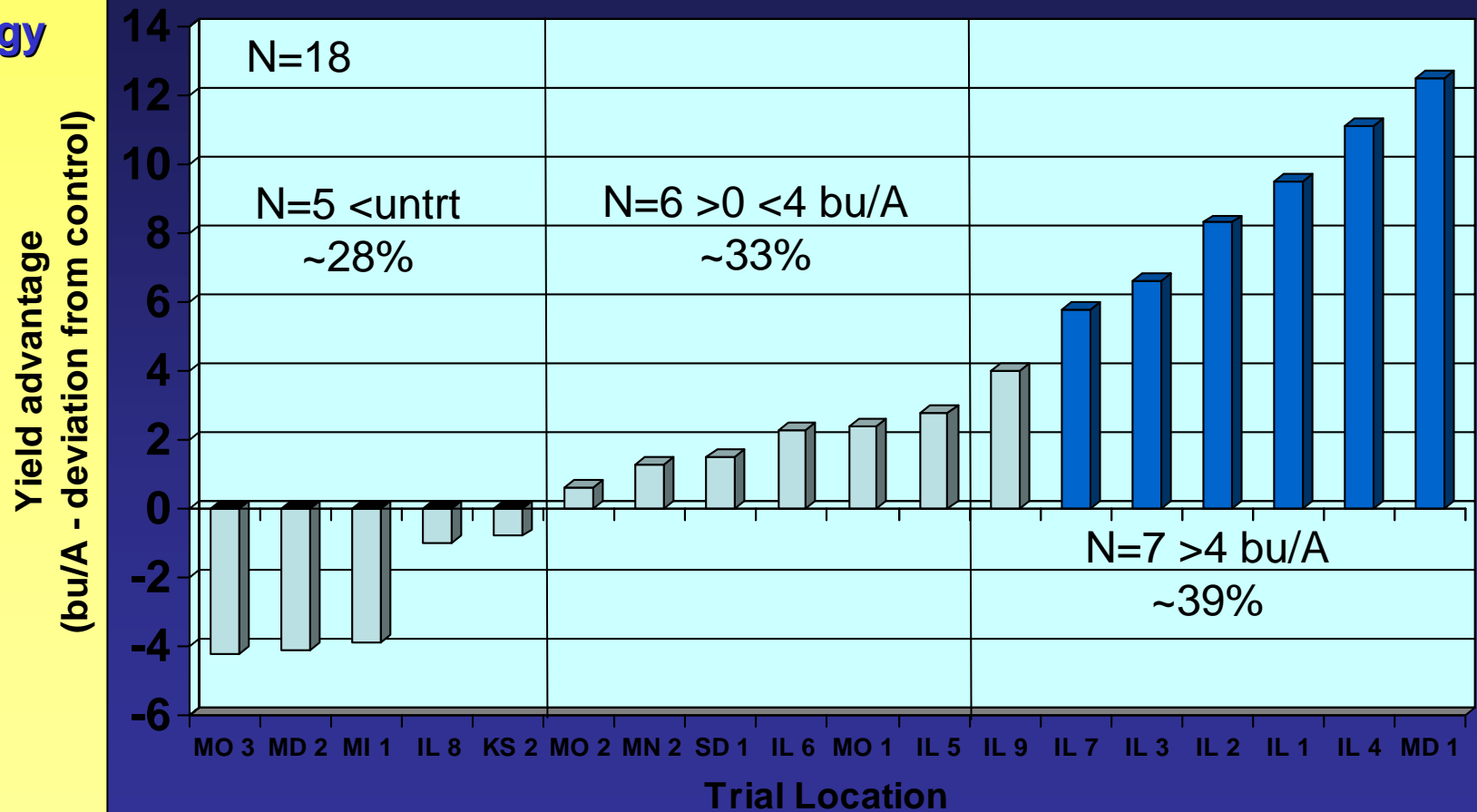
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Strobilurin/Triazole - Quilt



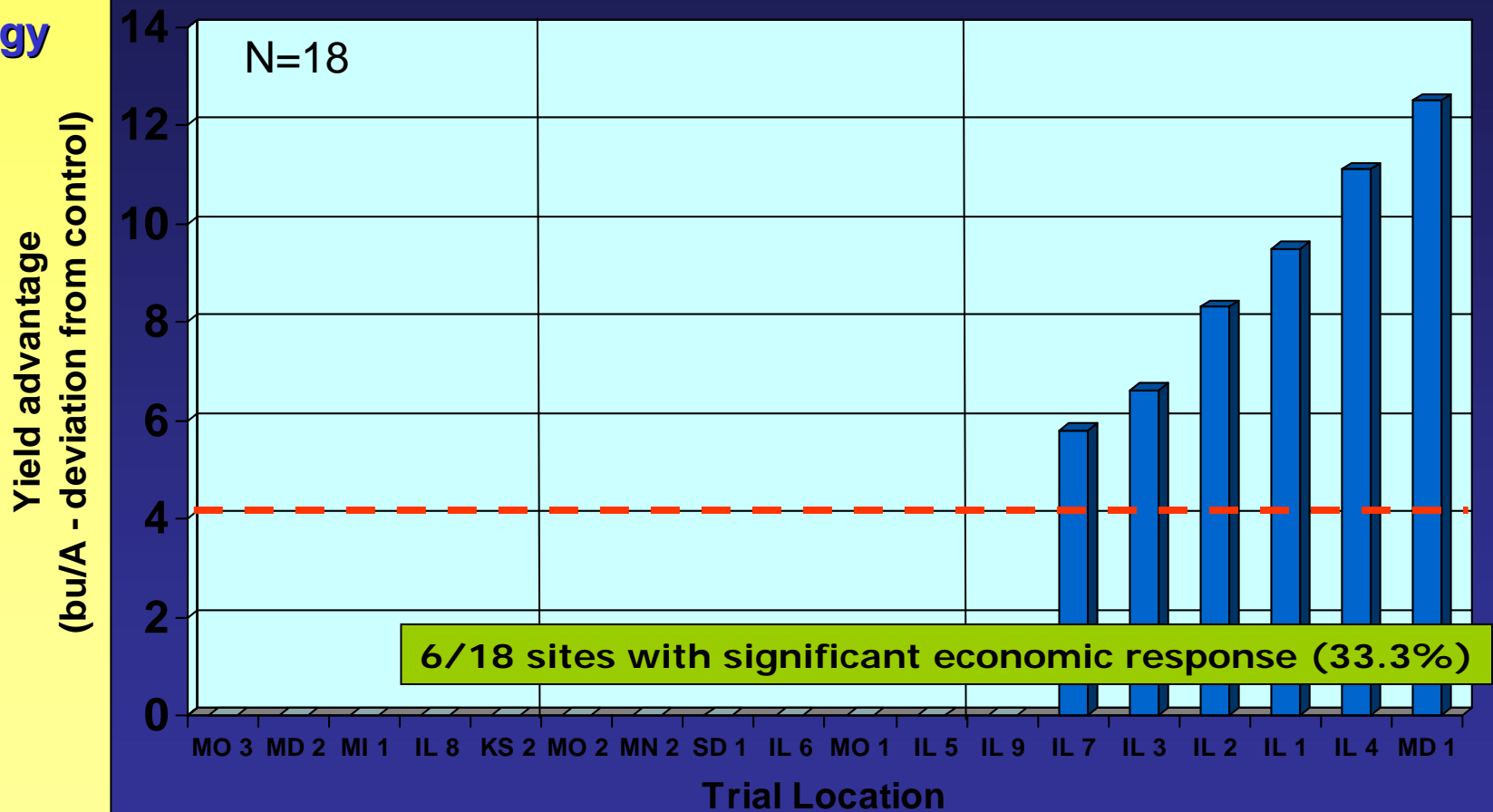
Yield Response by Location

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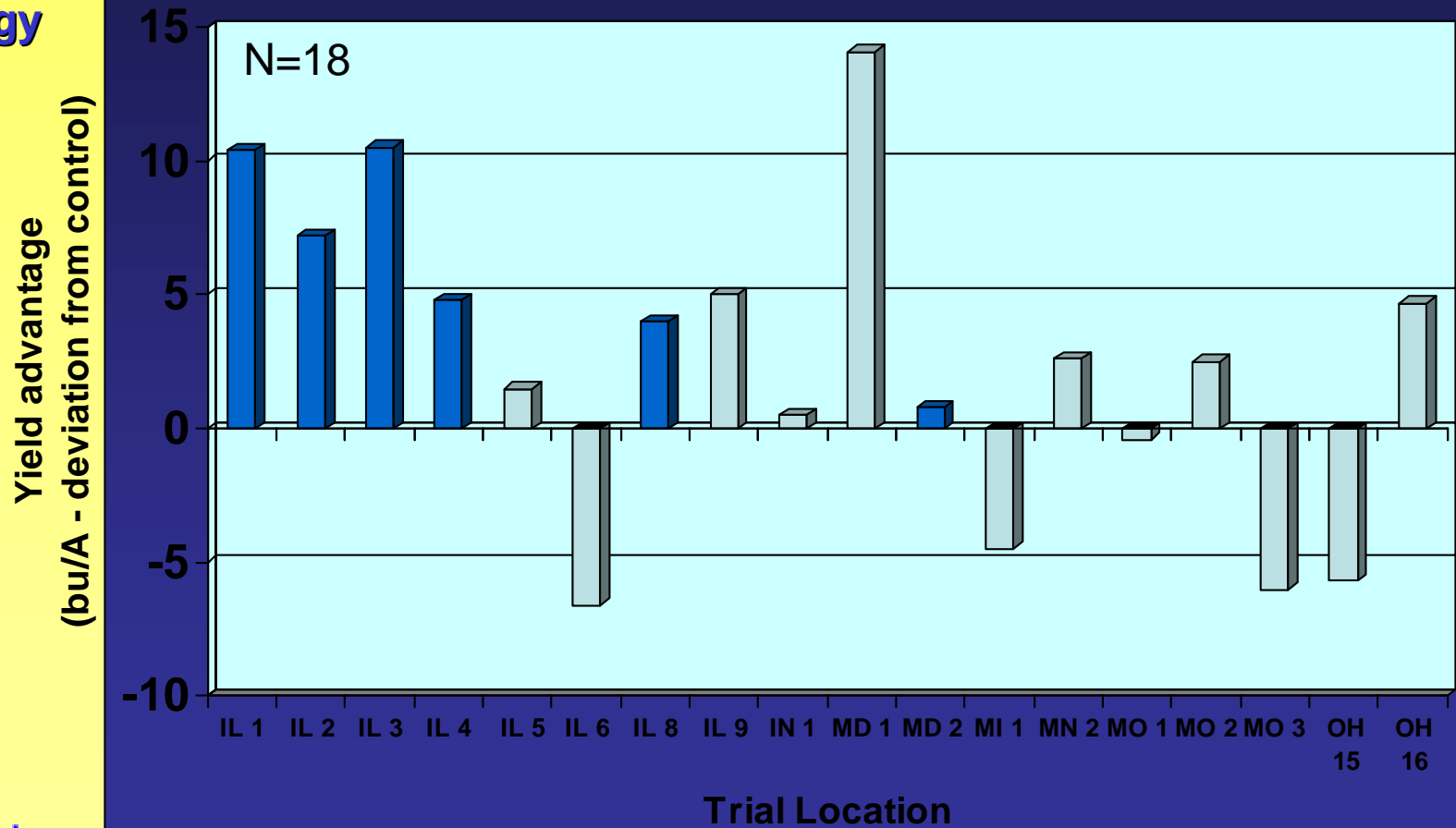
Yield Response by Location

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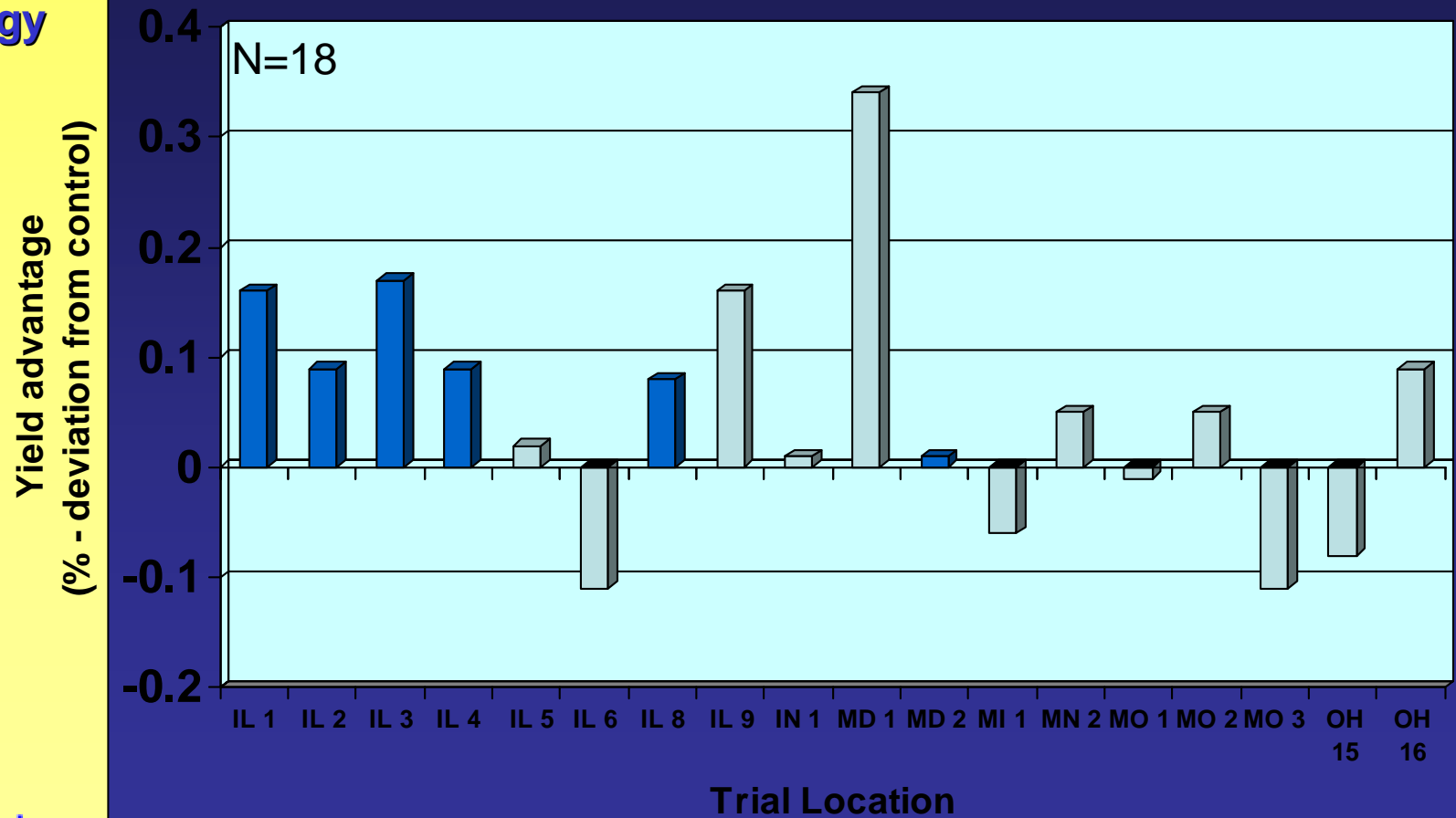
Yield Response by Location

Strobilurin/Triazole - Stratego



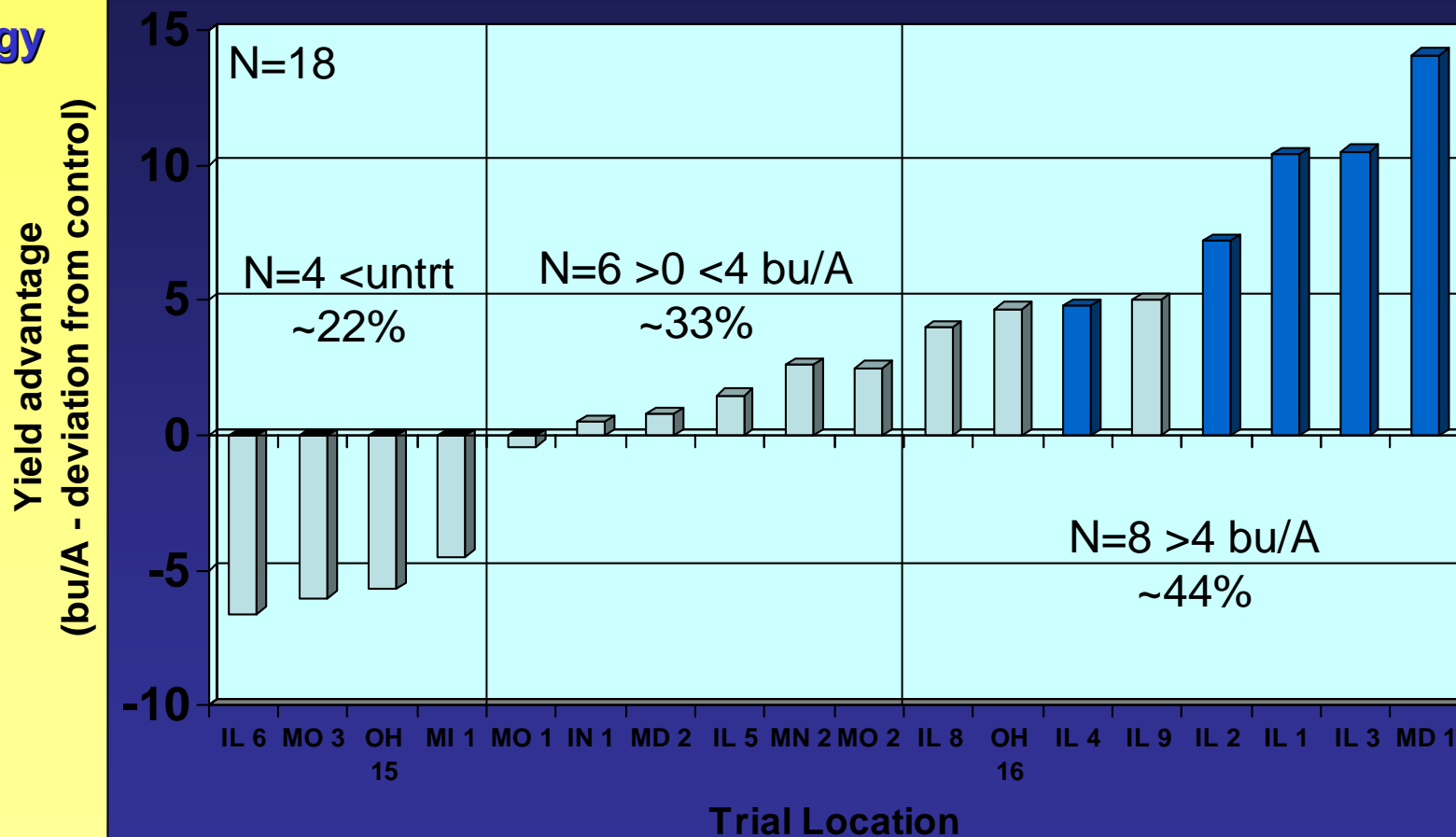
Yield Response by Location

Strobilurin/Triazole - Stratego



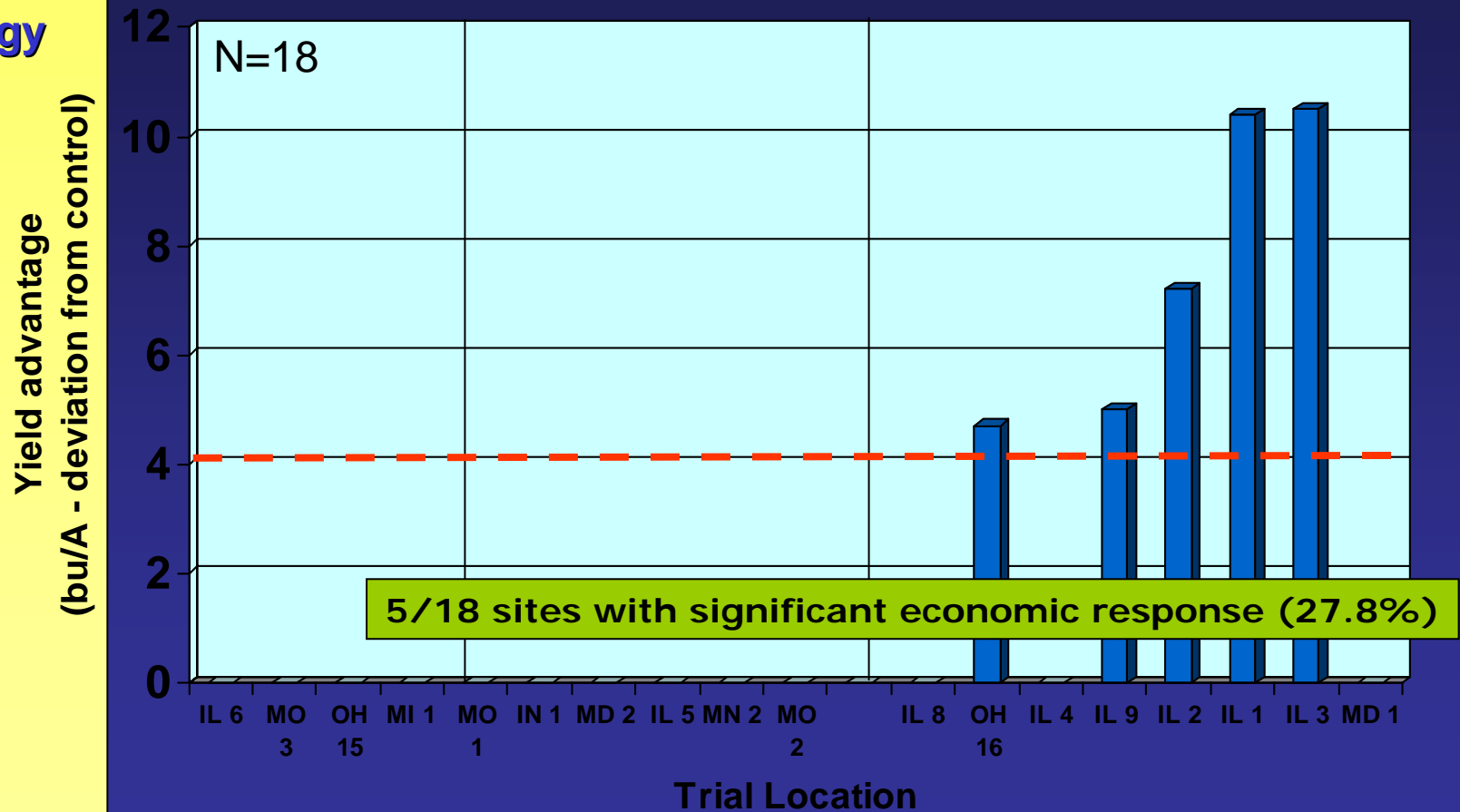
Yield Response by Location

Strobilurin/Triazole - Stratego



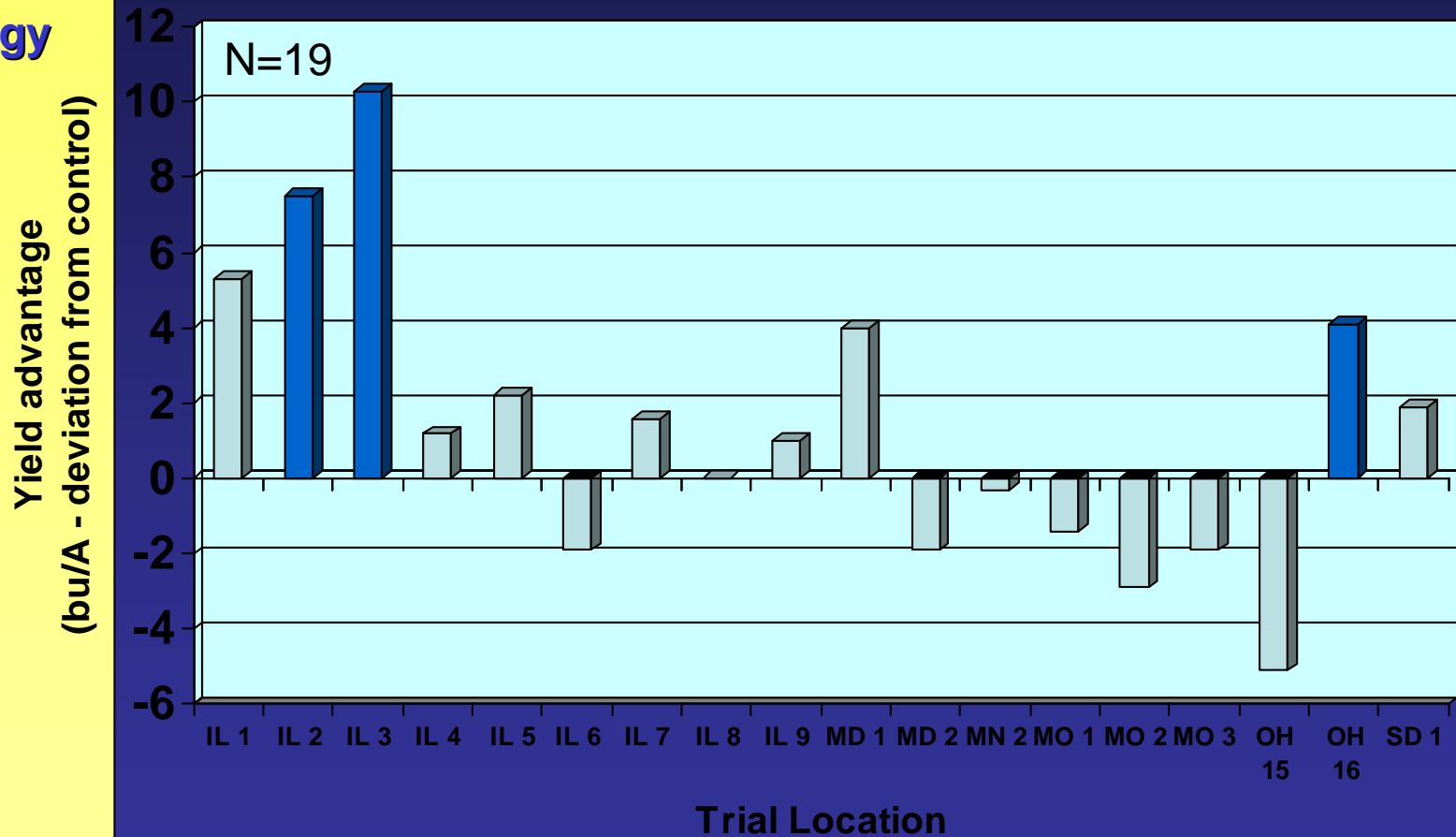
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Strobilurin/Triazole - Stratego



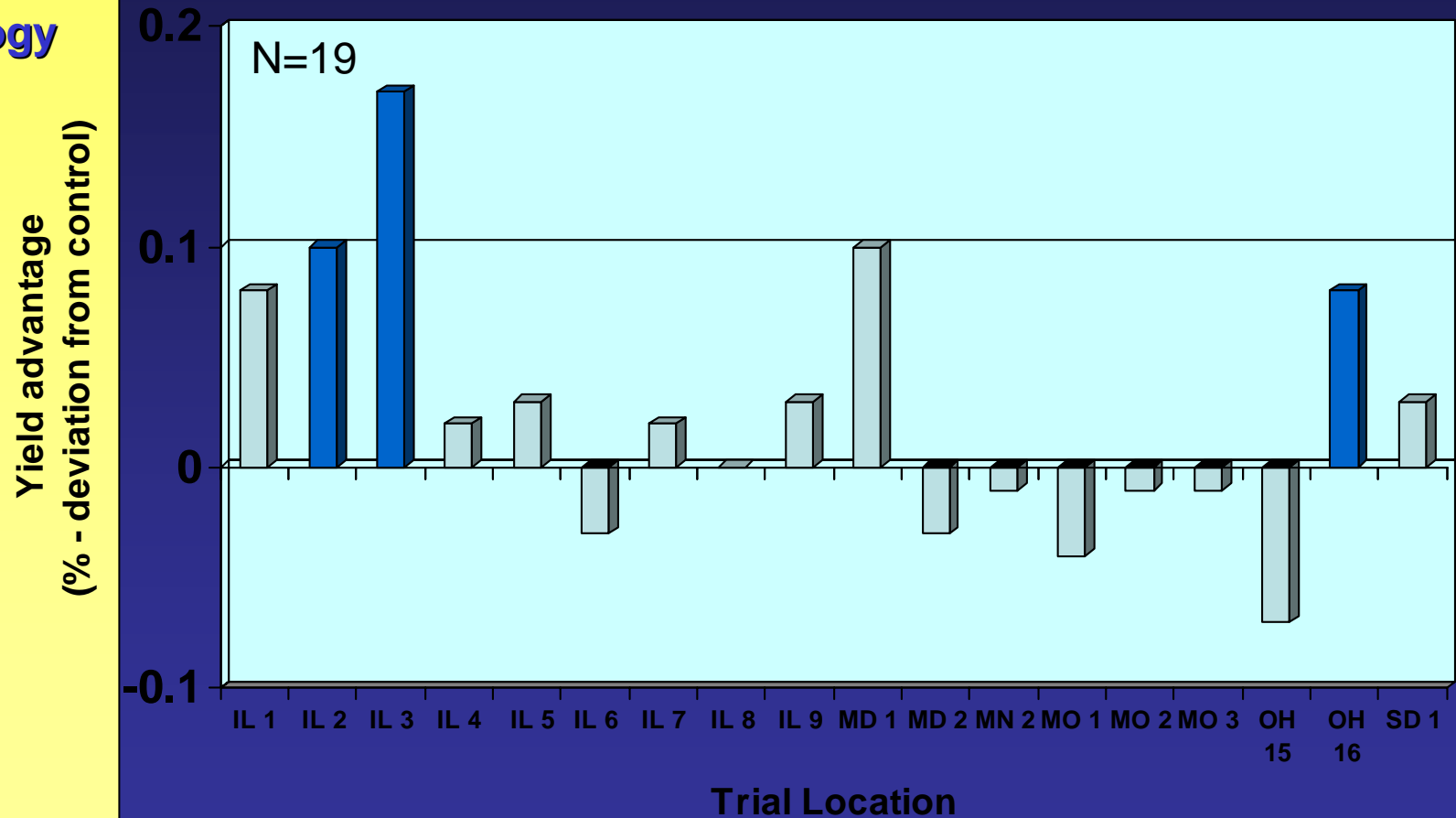
Yield Response by Location

Triazole - Folicur



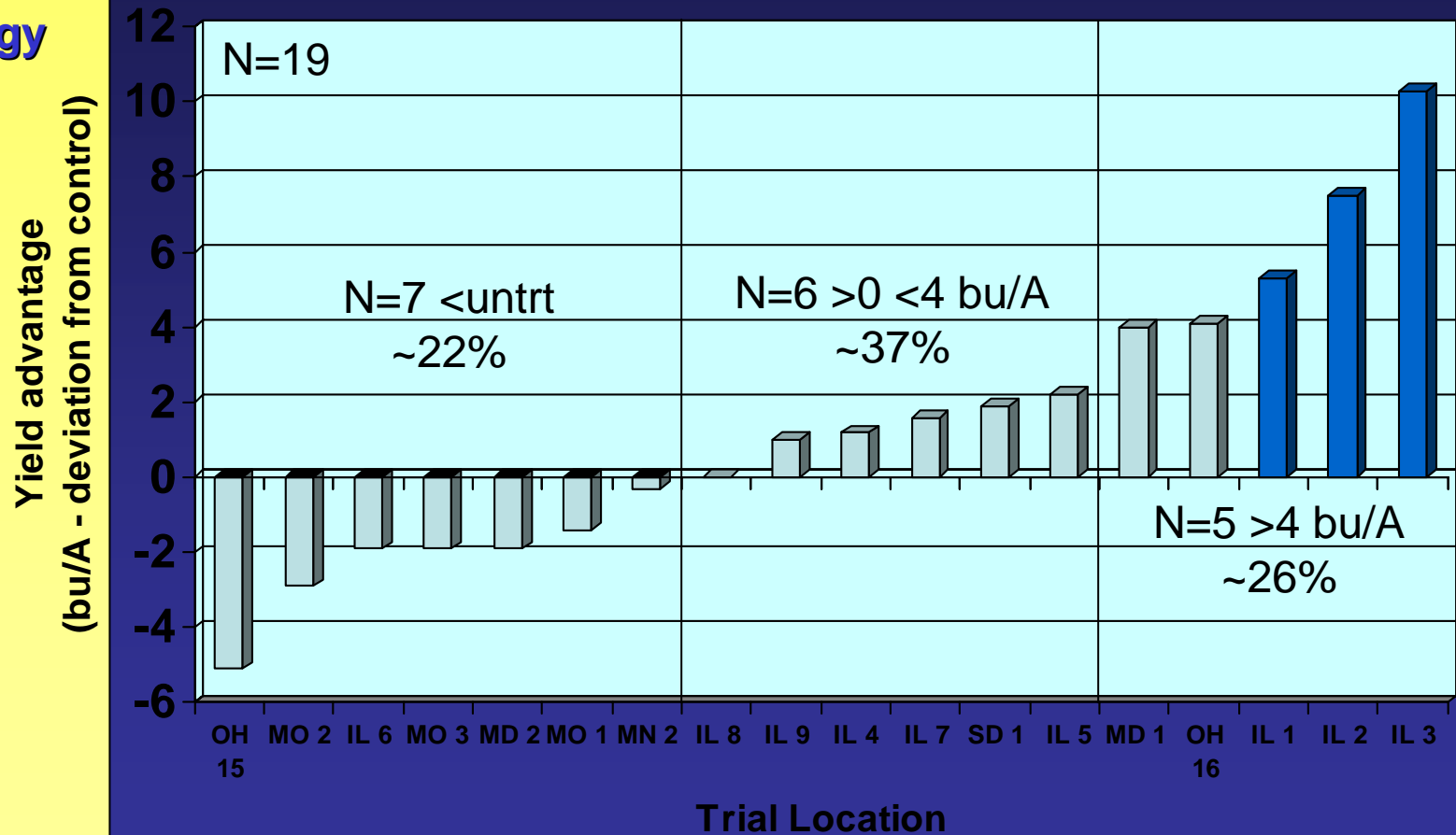
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Triazole - Folicur



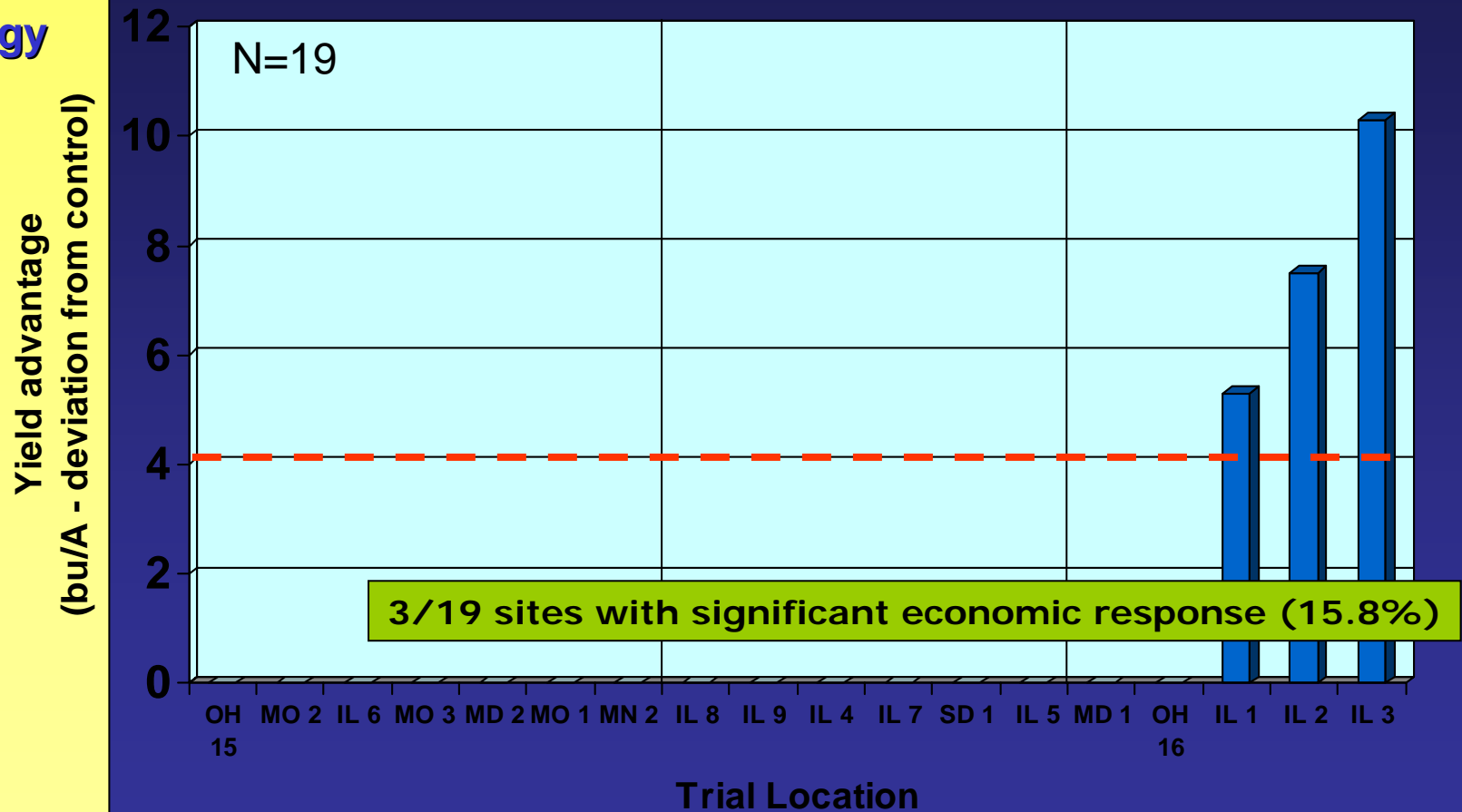
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Triazole - Folicur



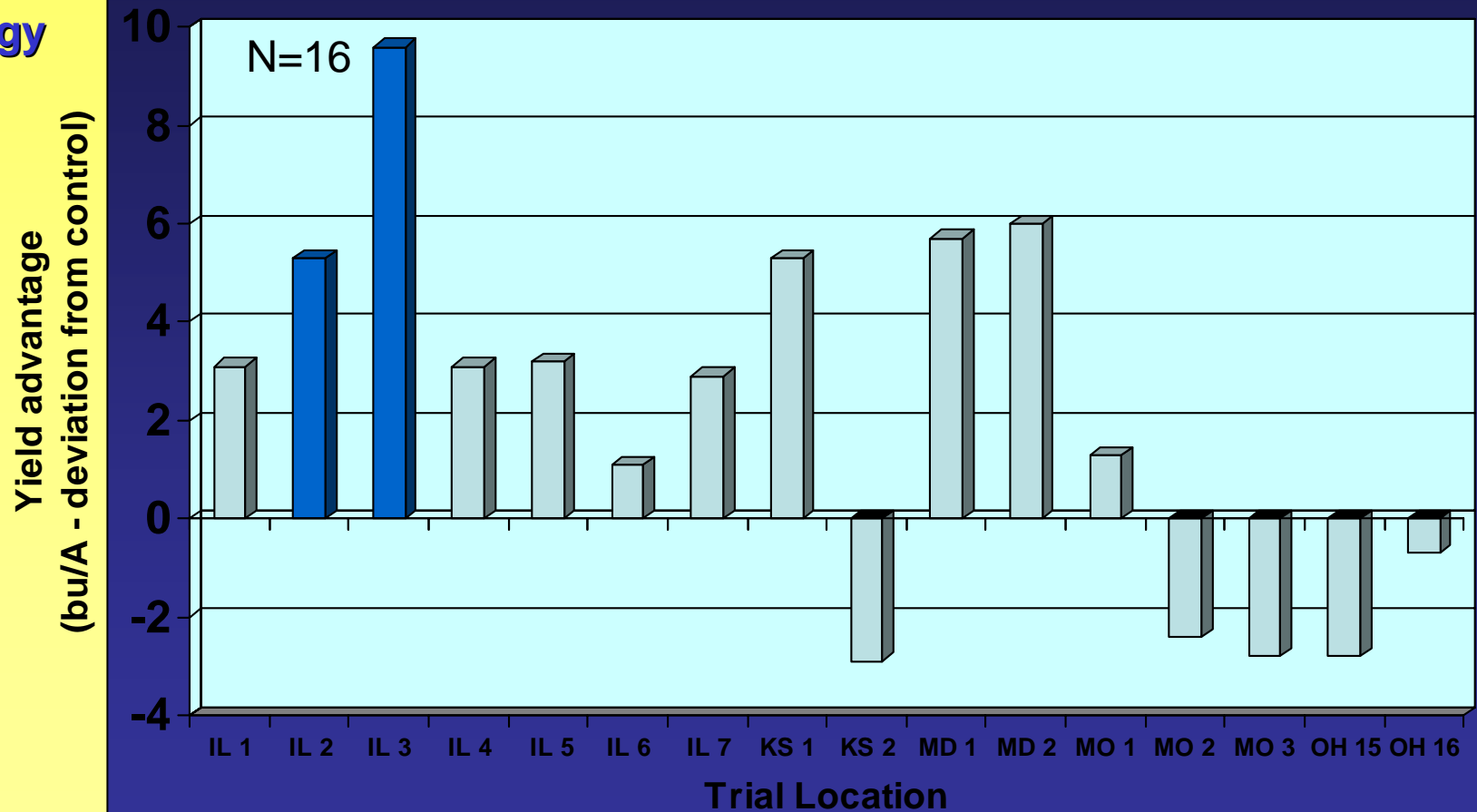
Yield Response by Location

Triazole - Folicur



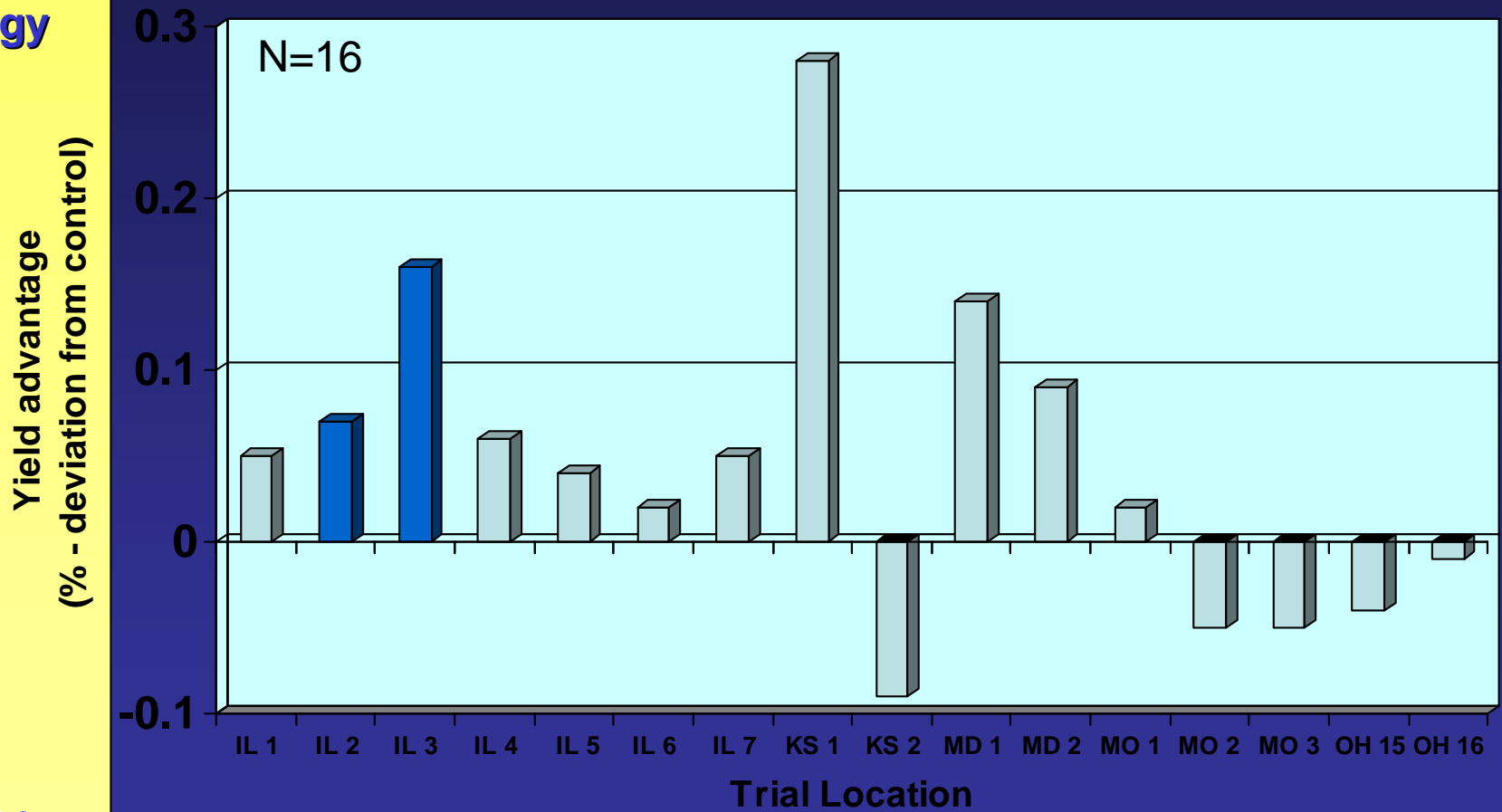
Yield Response by Location

Triazole - Laredo



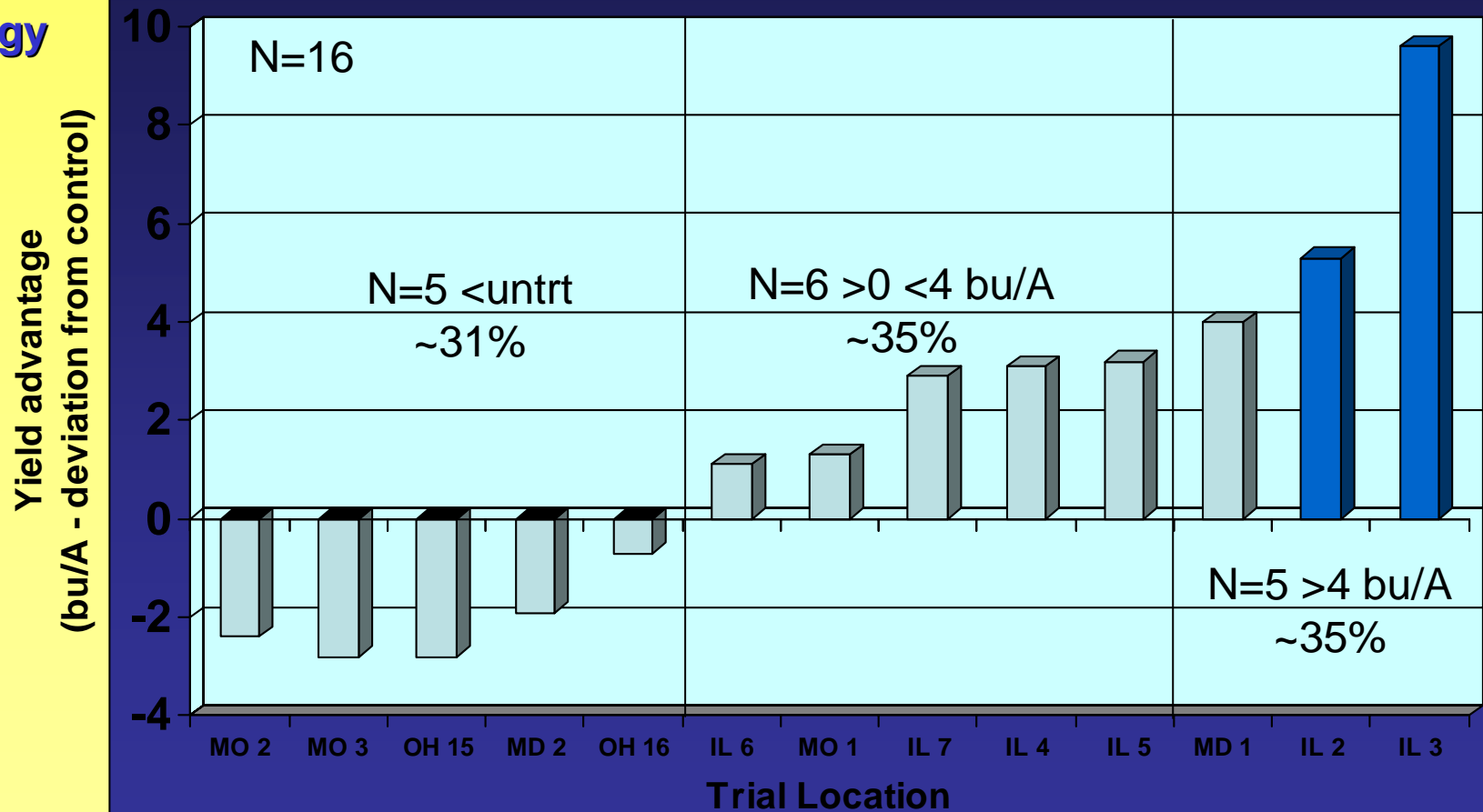
Yield Response by Location

Triazole - Laredo



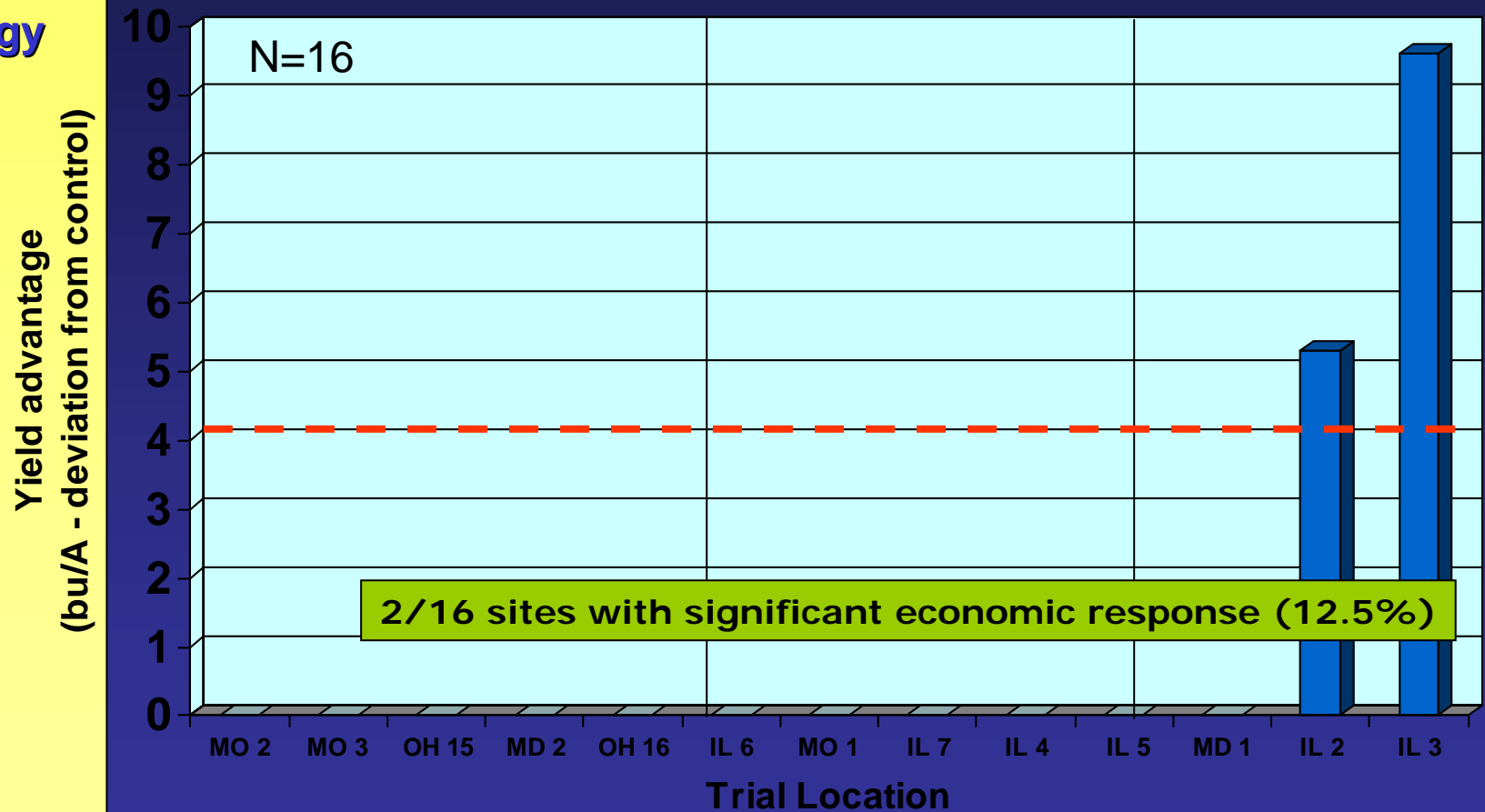
Yield Response by Location

Triazole - Laredo



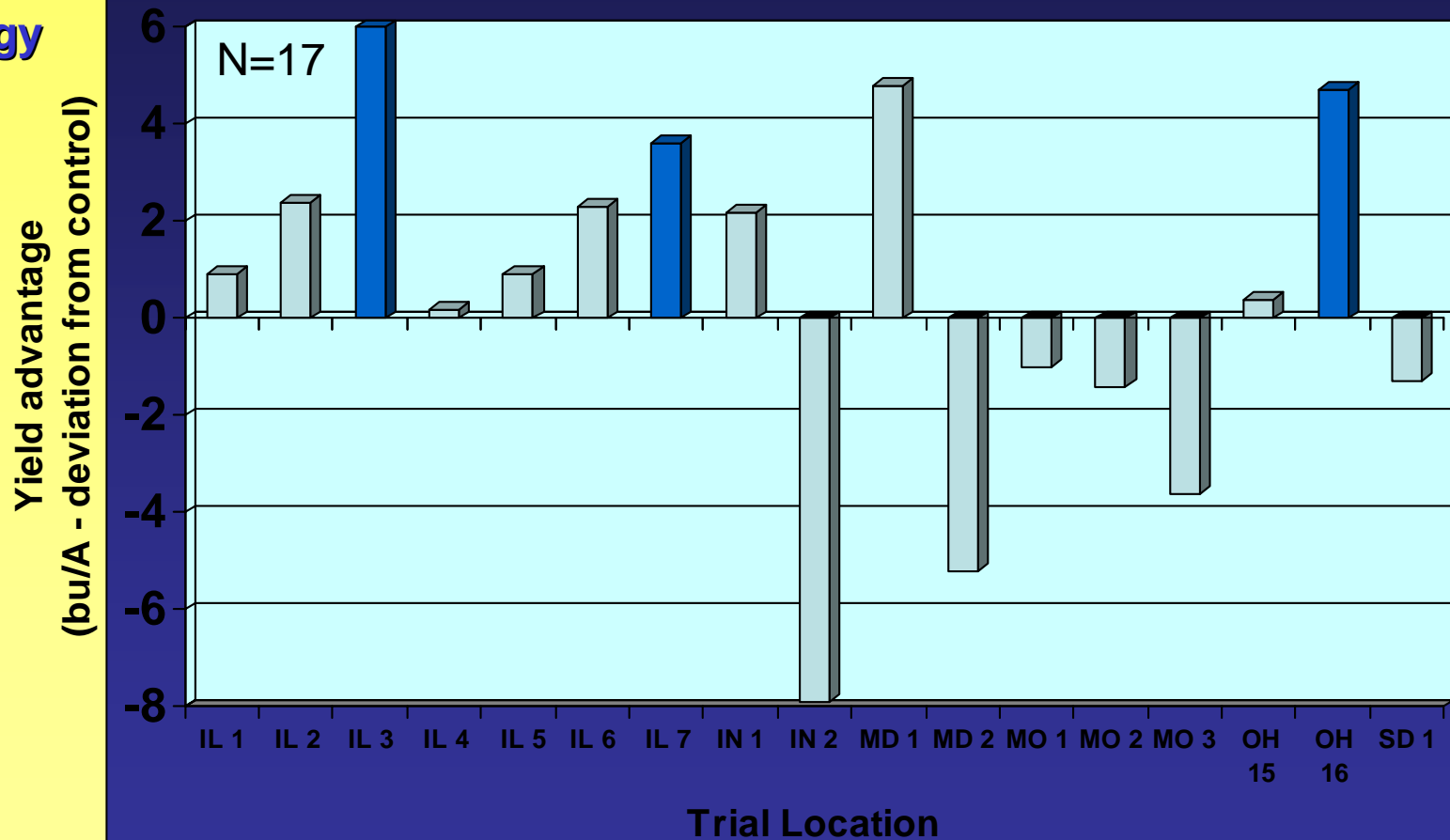
Yield Response by Location

Triazole - Laredo



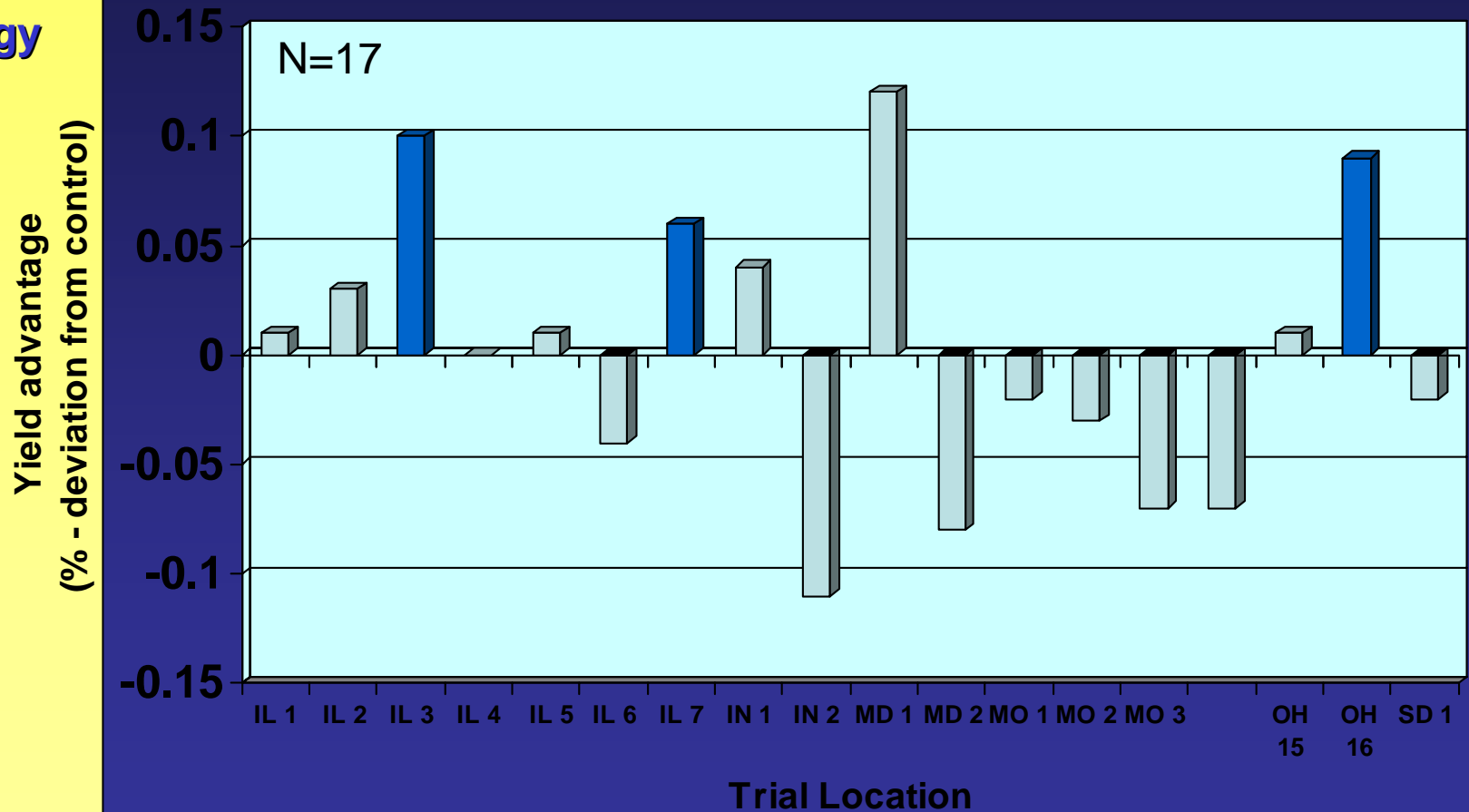
Yield Response by Location

Triazole - Domark



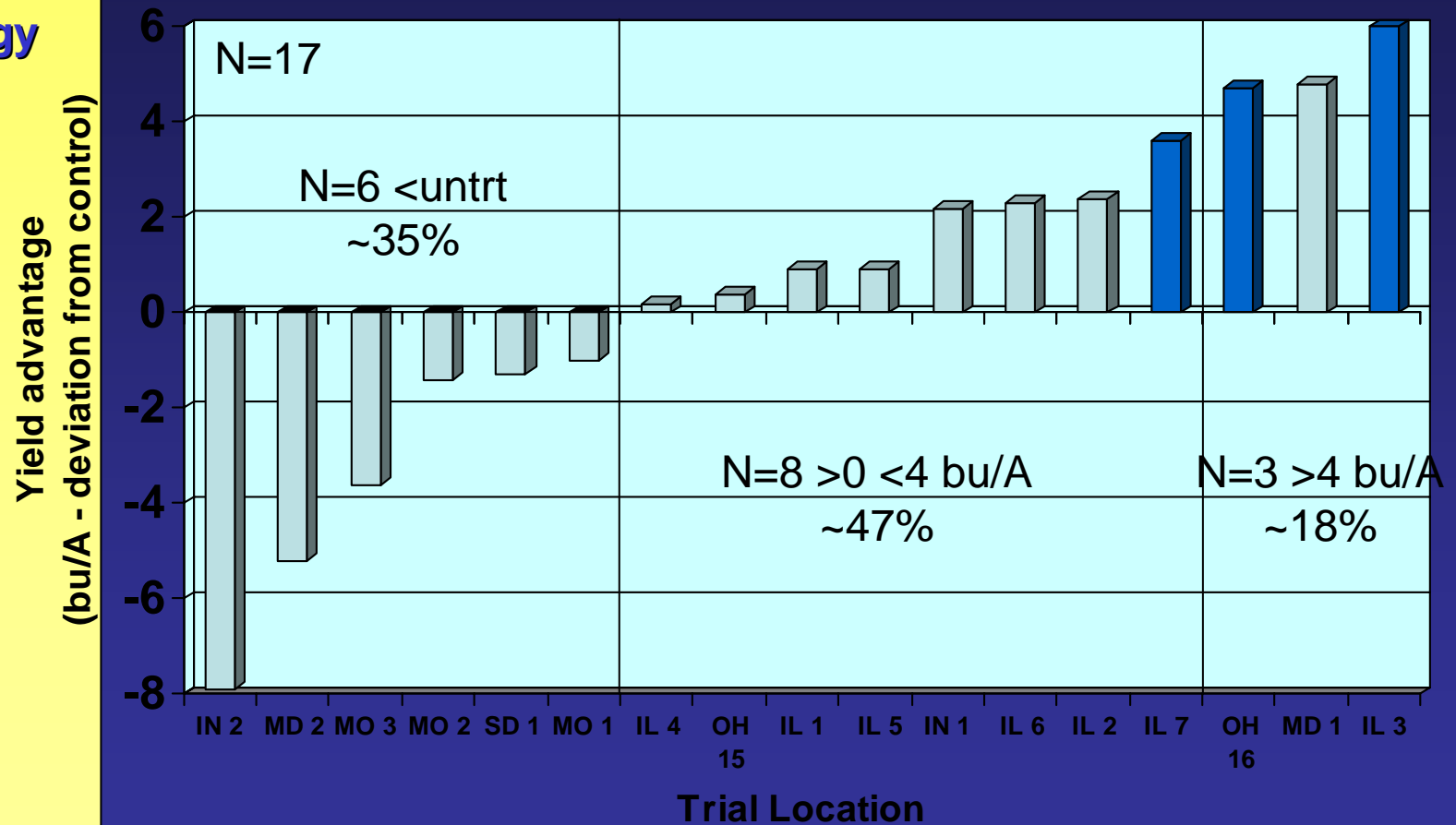
Yield Response by Location

Triazole - Domark



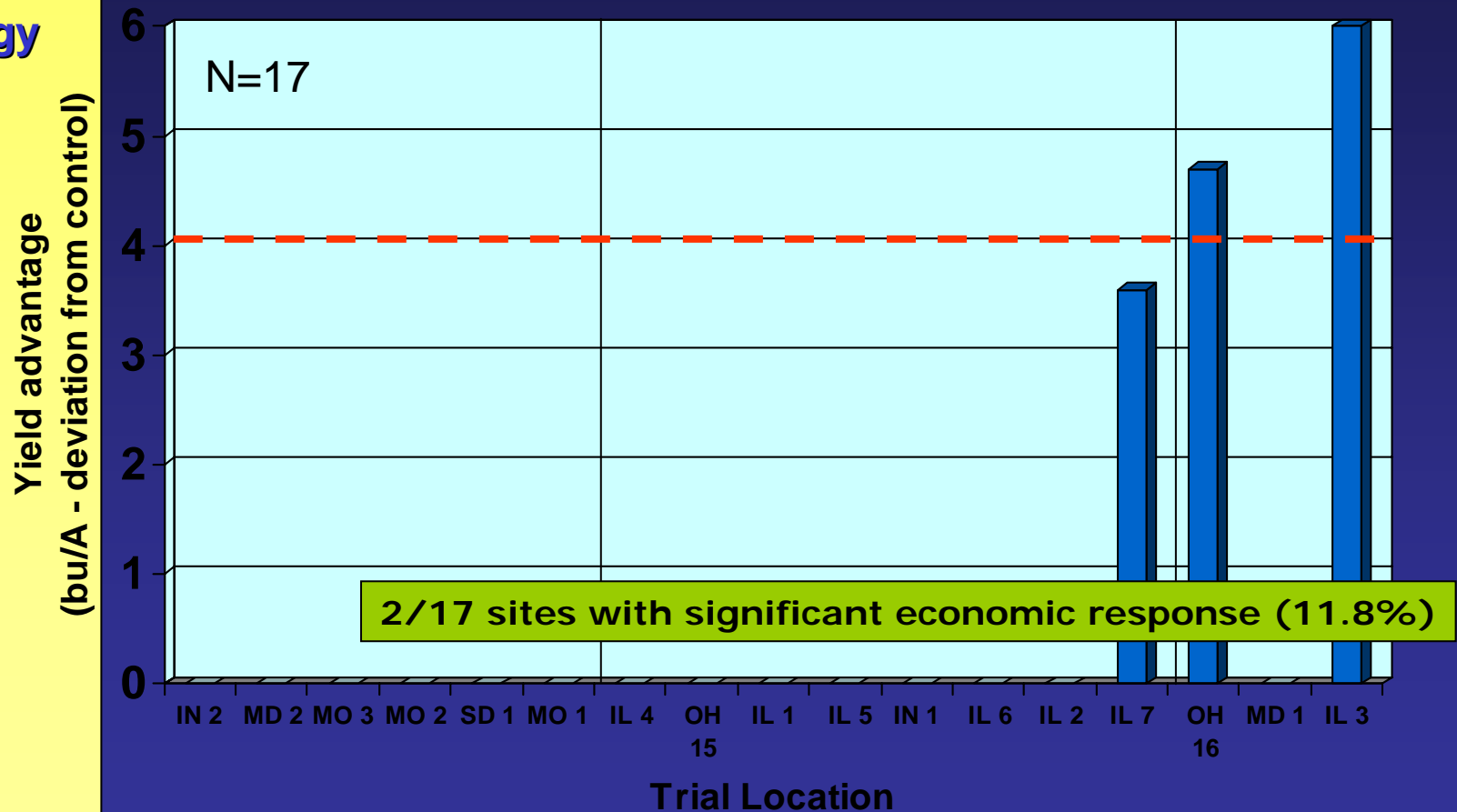
Yield Response by Location

Triazole - Domark



Yield Response by Location

Triazole - Domark



Frequency of observed significant economic yield increase in Midwest Trials, 2005

Fungicide	N	%*
Headline	35	28.6
Quadris	28	28.6
Quilt	18	33.3
Stratego	18	27.8
Folicur	19	15.8
Laredo	16	12.5
Domark	17	11.8

Economic advantage associated with applying any fungicide is far from a sure thing.

* Frequency of sites with economically significant yield advantage

On-farm strip trials across the U.S. in 2004 and 2005

Region	Response to Headline*	
	2004	2005
North	+3.9 bu	+2.1 bu
Midwest	+3.9	+3.0
Northeast	+1.2	+4.8
South	+8.0	+6.2
N=	208	1388

*Source BASF (compiled by Hershman, UK)

Observations

- Assurance of fungicide performance is best when treating a disease
- All products work best with a preventative use strategy
- Absence of Disease or Stress?
- Challenging to minimize lost residual

Conclusions & Concerns

- Strobilurin components generally provide a slightly better chance of response in the absence of disease.
- Combination products and solo strobilurins appear to offer chance of response.
- Still inconsistent.
- Rare triazole response sites were a unexpected but may correlate to random chance.



Collaborators and Contributors

- **Delaware** - Robert Mulrooney, University of Delaware
- **Illinois** - Wayne Pederson, Univ. of Illinois & Jason Bond, So. Illinois Univ.
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- **Ohio** - Anne Dorrance and Dennis Mills, Ohio State University
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