

*Nitrogen & fungicide  
mangement for barley*

GL Hop and Barley Conference  
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## Potential for significant barley production in MI

- Plenty of room in the rotation for small cereal grains  
( perhaps 1 M acres of which winter wheat uses half)
- Yield can be very good (3 ton/ac = 100 bu wheat; 125 bu barley)
- Largest production concerns:
  - value of the grain
  - meeting quality standards
  - planting in timely fashion



# Growth stages and potential inputs

adapted from the University of Illinois

## heading & flowering

## boot

## tillering

## jointing

*N fertilization*

*early fungicide*

*herbicide*

*fungicide*

*Feekes growth stages*

4 5 6 7 8 9 10 10.1 10.5 11

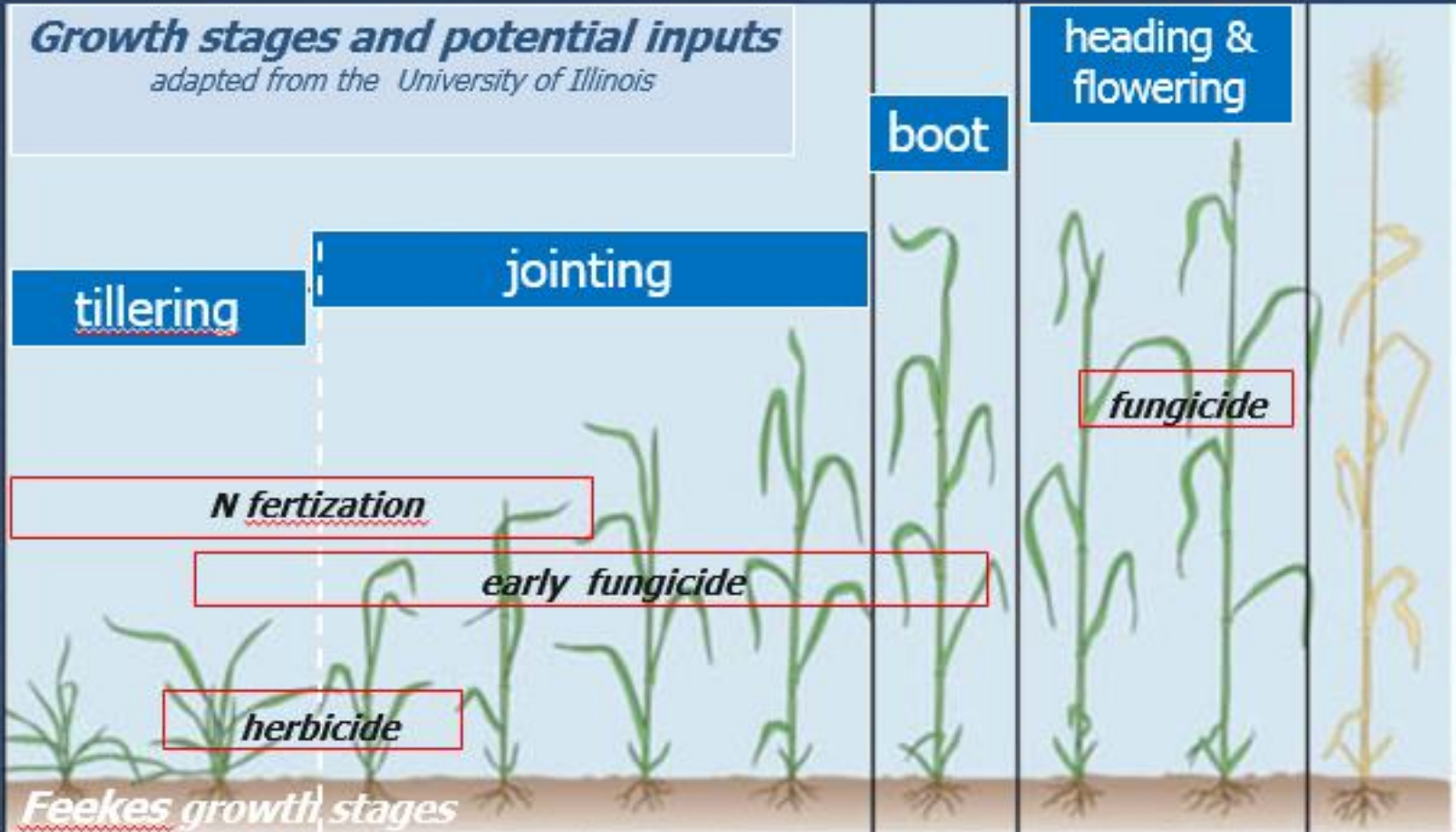
Full tiller

1<sup>st</sup> joint

2<sup>nd</sup> joint

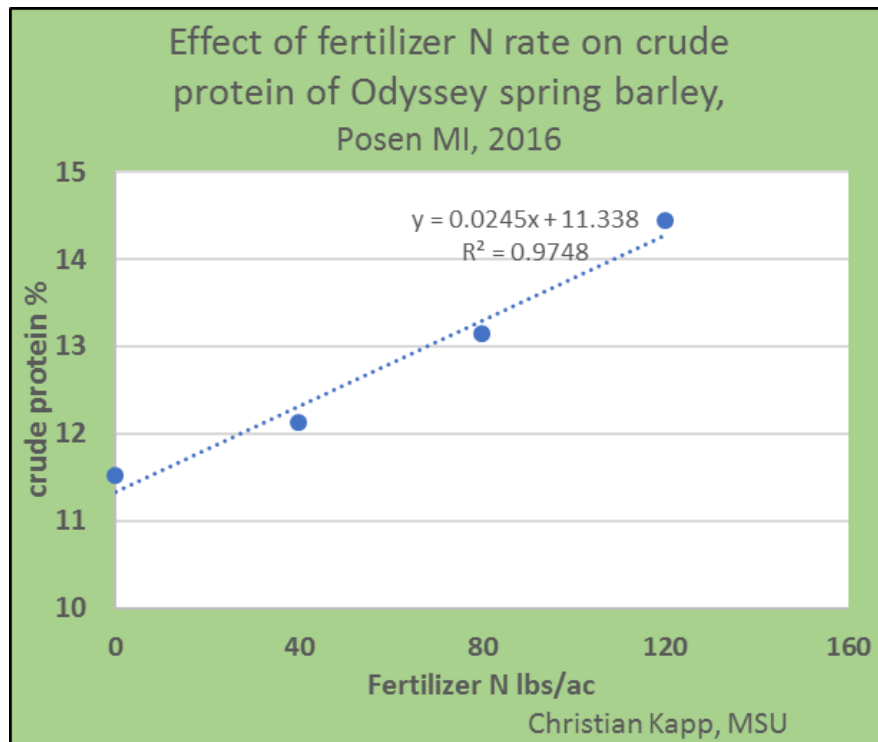
Flag tip

Full flag



# Spring barley

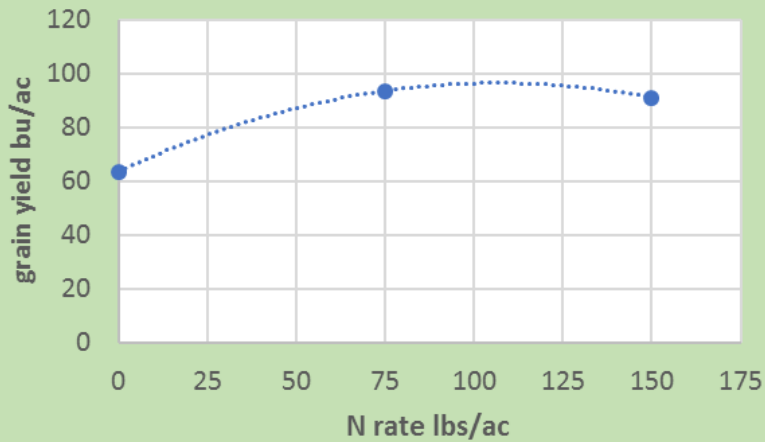
Excessive N risks elevating protein beyond acceptable limits



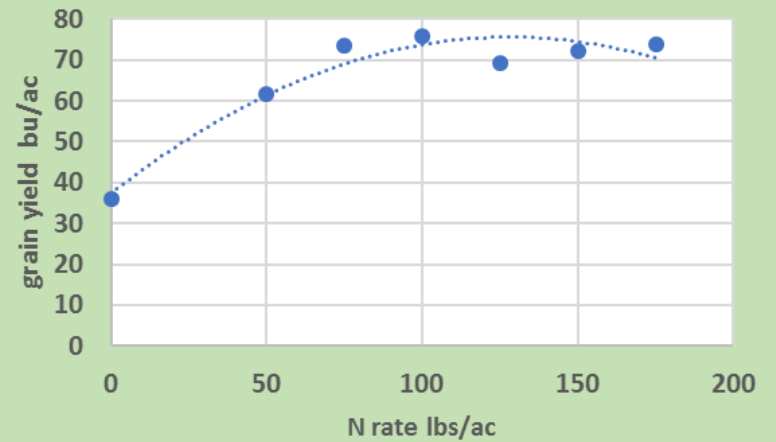
- In this data set from the U.P (Christian Kapp), grain yields failed to increase with increasing rates of N.
- Increasing N rates significantly increased protein levels..

# Winter barley

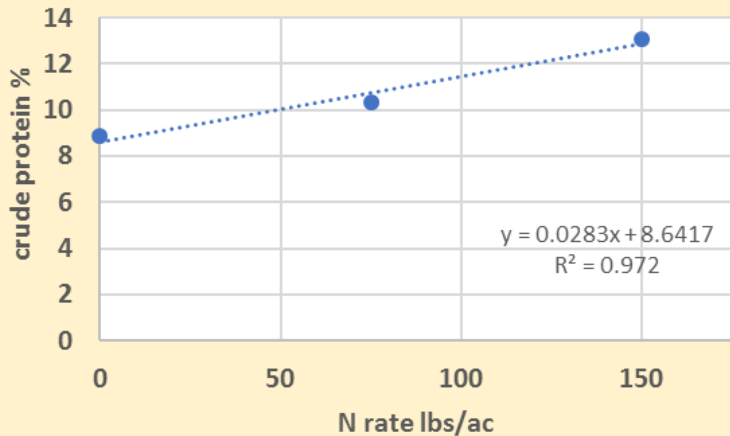
Response in grain yield to N rates  
B Wilkie, KBS, 2017



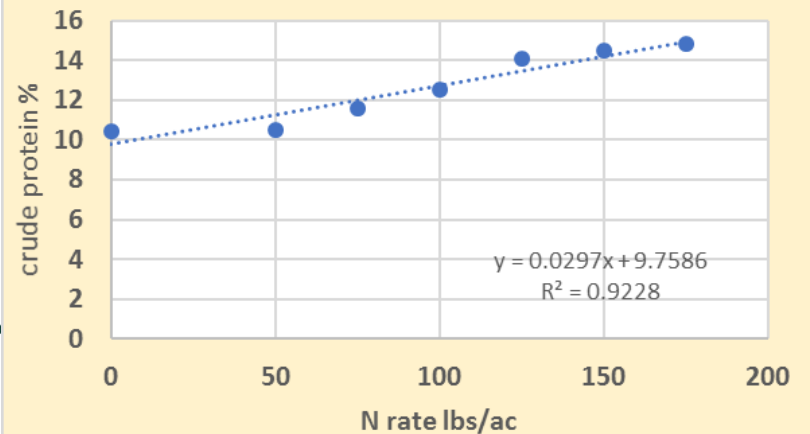
Response in grain yields to N rates  
B Wilkie, KBS, 2018



Response in crude protein to N rates  
B Wilkie, KBS, 2017



Response in crude protein to N rates  
B Wilkie, KBS 2018



## Effect of N on yield & protein 2016 - 2018

Effect of low and high N rates on the yield and protein of winter barley in Thumb						
fertilizer N level	2016		2017		2018	
	protein	yield	protein	yield	protein	yield
low N (75 to 85 lbs N/ac)	10	70	12.8	130	10.8	125
high N (135 lbs N /ac)	10.1	78	13.2	133	12.0	124

Perhaps 0.9 lbs of N for each bushel of anticipated yield may be reasonable (?)



# Spring barley

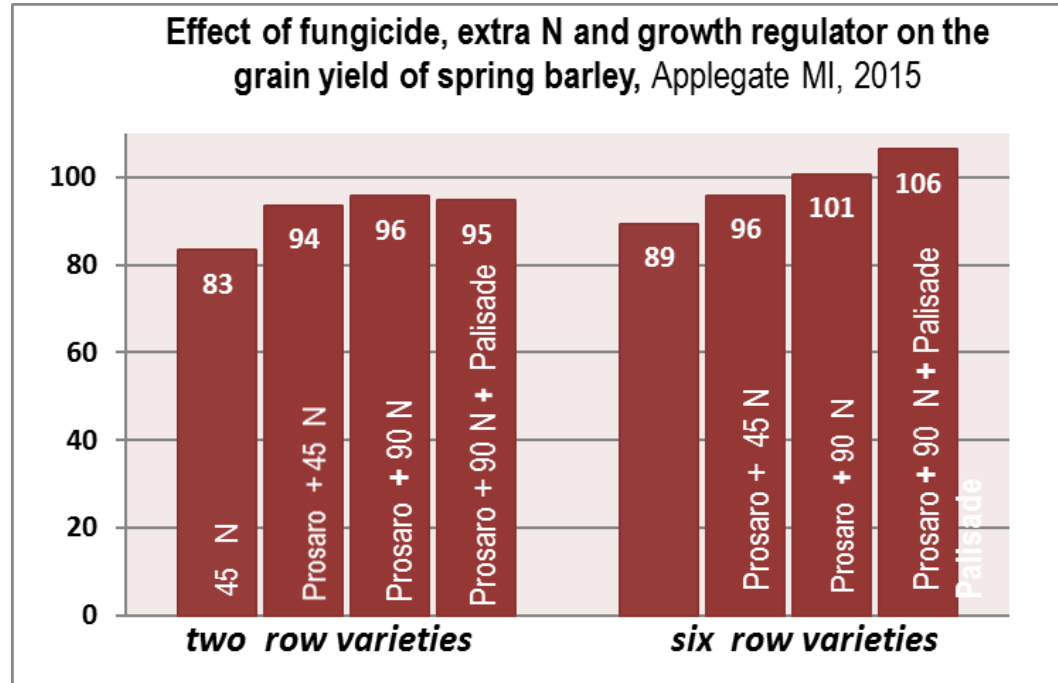
Performance of four spring barley varieties, Applegate MI 2015																			
Conlon (3 reps) <sup>1</sup>					Pinnacle (4 reps) <sup>1</sup>					Lacy (2 reps) <sup>1</sup>					Rasmusson (2 reps) <sup>1</sup>				
yld <sup>2</sup> bu/ac	tw lbs	hght in.	lodg %	lfspt <sup>3</sup> %	yld <sup>2</sup> bu/ac	tw lbs	hght in.	lodg %	lfspt <sup>3</sup> %	yld <sup>2</sup> bu/ac	tw lbs	hght in.	lodg %	lfspt <sup>3</sup> %	yld <sup>2</sup> bu/ac	tw lbs	hght in.	lodg %	lfspt <sup>3</sup> %
71	50	33	16	6	112	50	36	5	9	94	48	37	25	5	102	49	36	41	5

## Treatments

- 1) 45 N
- 2) 45 + Prosaro
- 3) 90 N + Prosaro
- 4) 90 N + Prosaro + Palisade



# Spring barley



Two row (Colon & Pinnacle) vs six row ( Lucy & Rasmussen):

- Prosaro added 11 bu to two rows and 7 bushels to six rows;
- Additional 45 lbs N added 4 and 5 bu yield;
- Palisade plant growth regulator may have added a few bu to six row



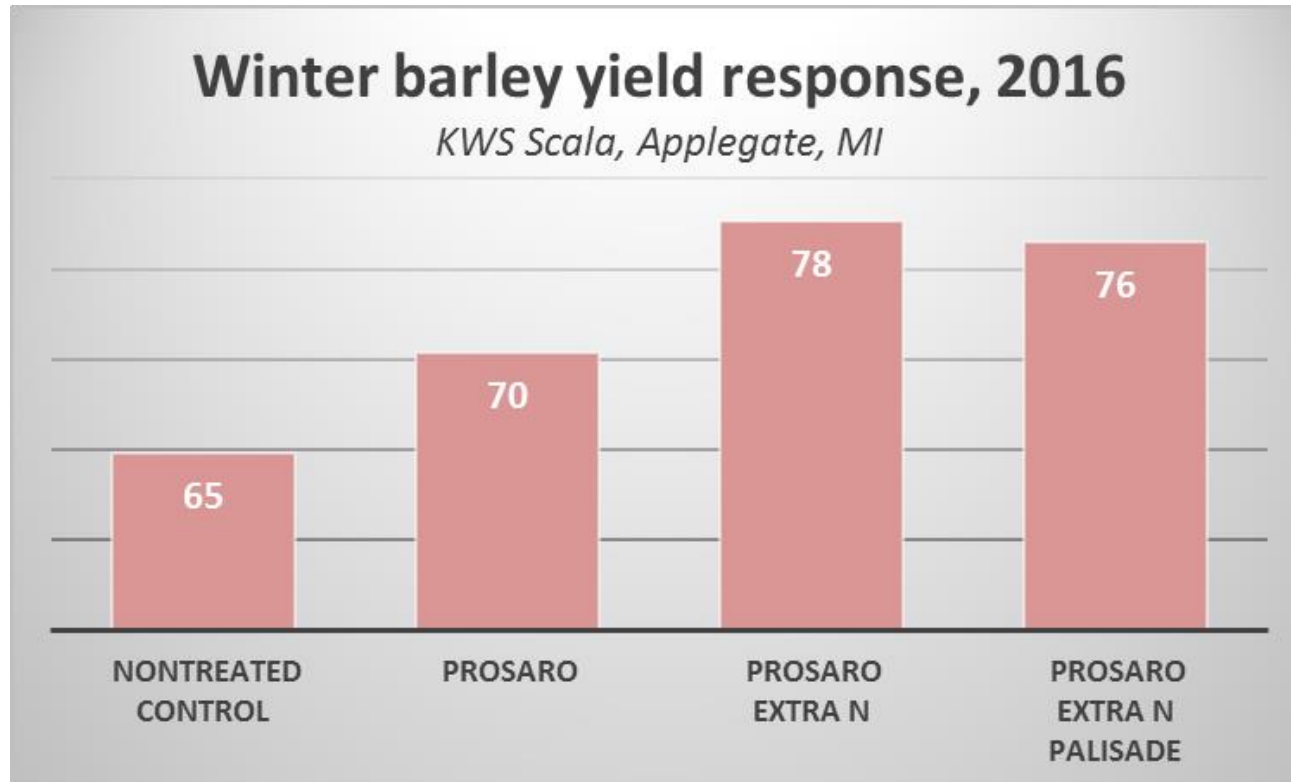


# Spring barley

Effect of various inputs on the performance of Pinnacle spring barley, 2015						
treatment	yield <sup>2</sup> 12%M bu/ac	test weight lbs	harv. moist. %	plant height in.	plant lodging %	leaf <sup>3</sup> spot %
<b>45#N (control)</b>	<b>103</b>	<b>49.9</b>	<b>11.4</b>	<b>36.3</b>	<b>5</b>	<b>16</b>
<b>45# N + Prosaro</b>	<b>116</b>	<b>49.6</b>	<b>12.6</b>	<b>36.8</b>	<b>6</b>	<b>6</b>
<b>90# N + Prosaro</b>	<b>115</b>	<b>49.7</b>	<b>12.2</b>	<b>36.8</b>	<b>7</b>	<b>7</b>
<b>90# N + Prosaro+ Palisade</b>	<b>116</b>	<b>49.6</b>	<b>12.7</b>	<b>34.5</b>	<b>2</b>	<b>8</b>
CV (%)	8.3	0.5	6.1	3.5		
LSD 0.05	12.1	0.3	1.0	1.6	NS	NS



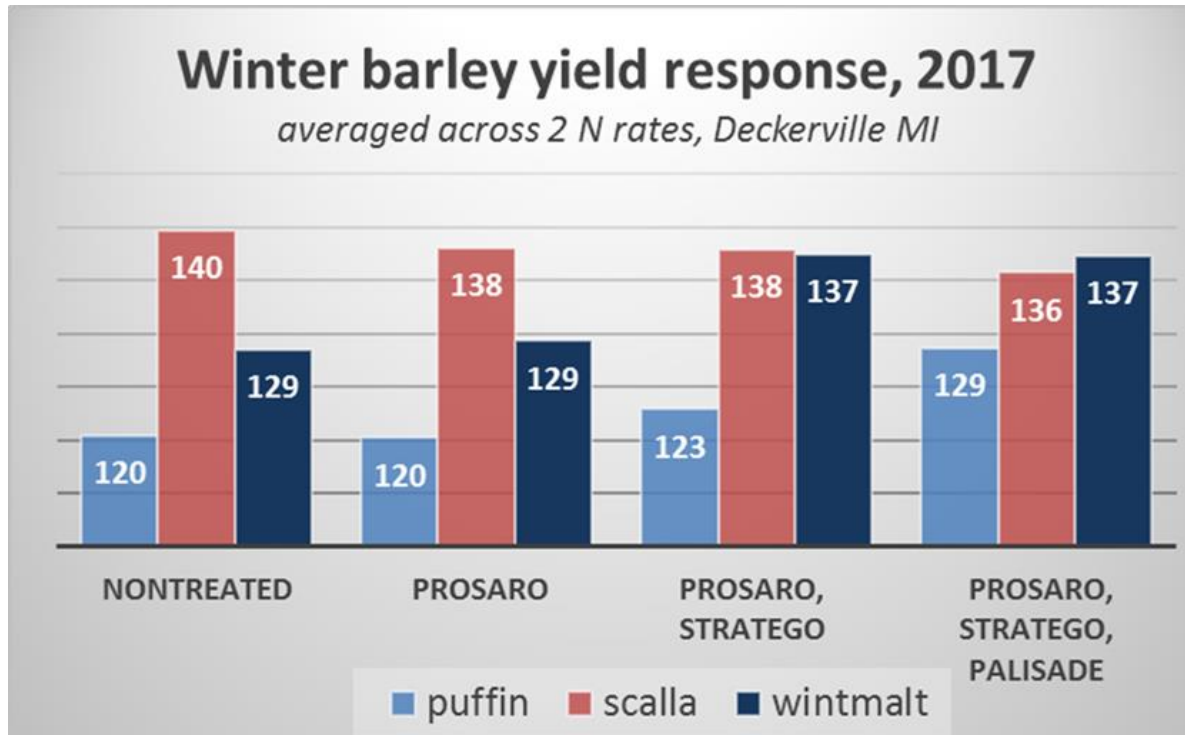
## Winter barley



2016: Prosaro plus additional N resulted in a significant yield improvement



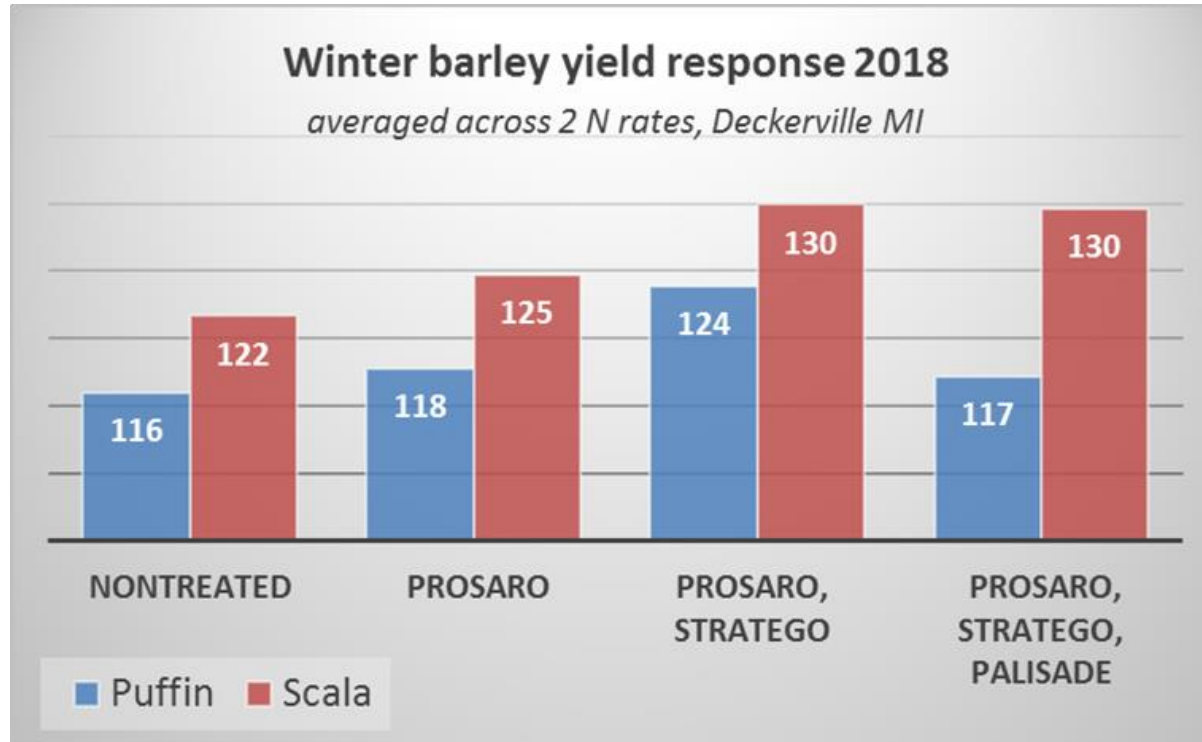
# Winter barley



2017: Inconclusive results. Near ideal weather resulted in high yields of high quality barley



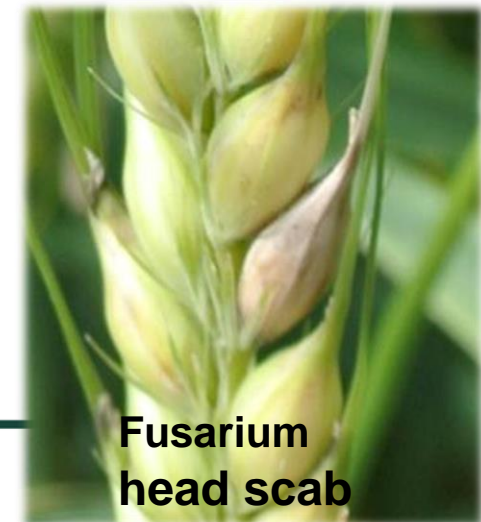
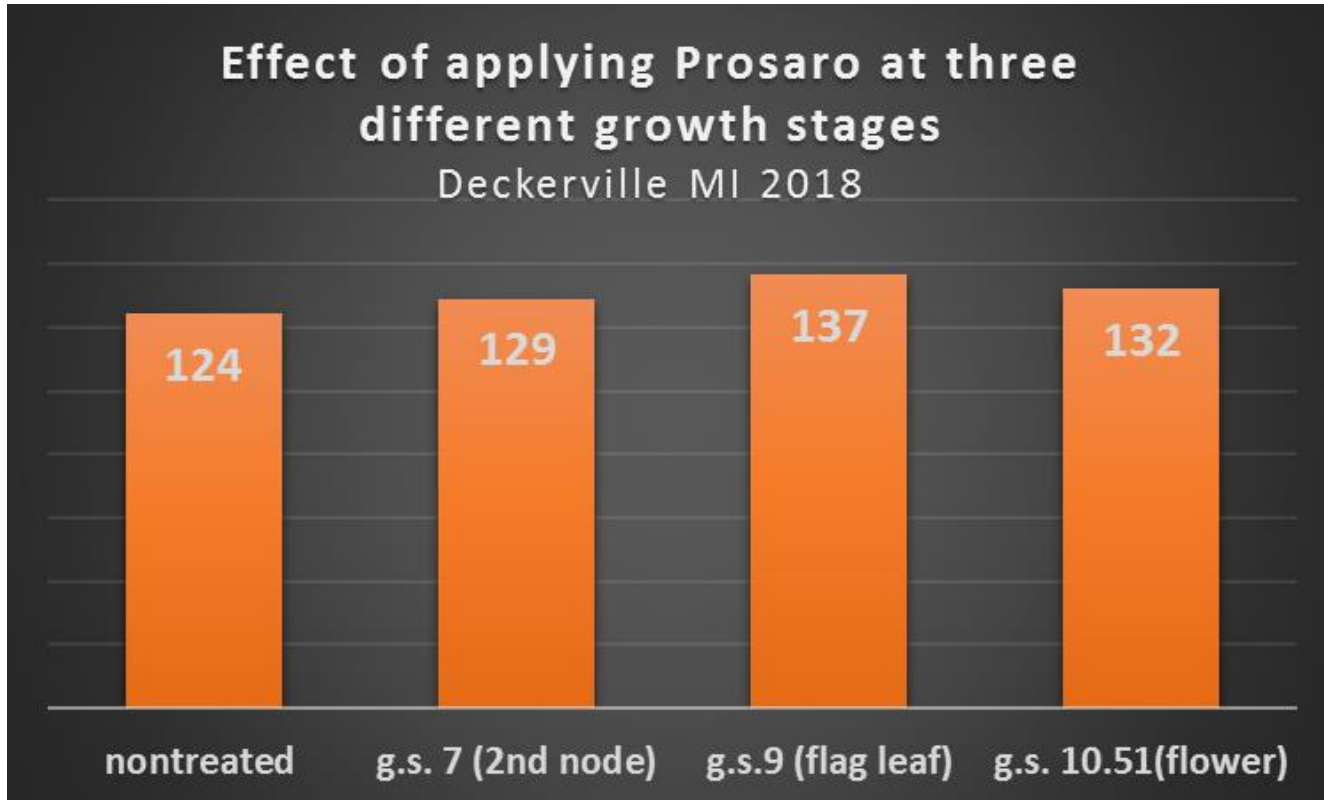
# Winter barley



2018: fungicides were helpful, particularly an early application against foliar disease; Palisade was not cost effective.



# Winter barley



# Winter barley

Apply fungicide a few days after fully headed



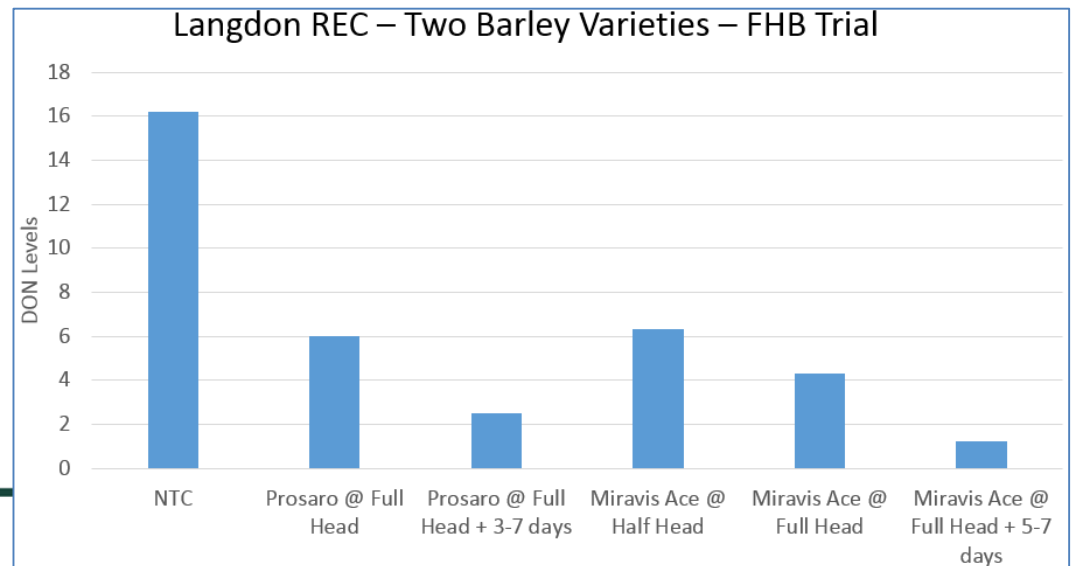
# Fungicides for head scab & leaf diseases

Products reduce DON levels by half & protect from leaf diseases through grain-fill.

Prosaro (Bayer)

Caramba (BASF)

Miravis Ace (Syngenta)



# Plant growth regulators

Reduce plant height and stiffen straw

Inconsistent results

Some risk of over-regulation

Palisade (Trinexapac-ethyl)

Adjust (chloraquat chloride)





*Thanks*



