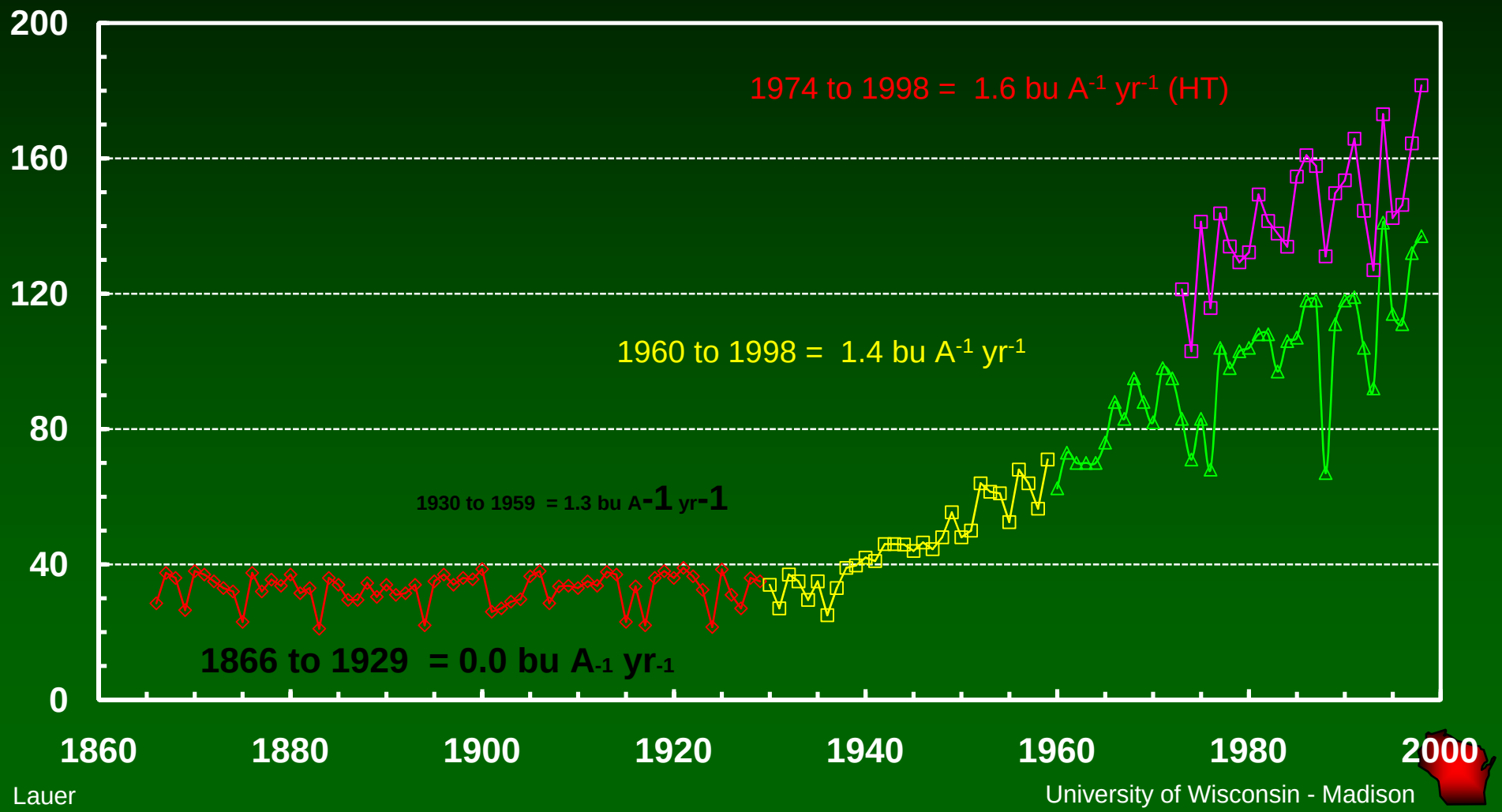
2000 Seed Dealer Update Meetings

Joe Lauer

University of Wisconsin

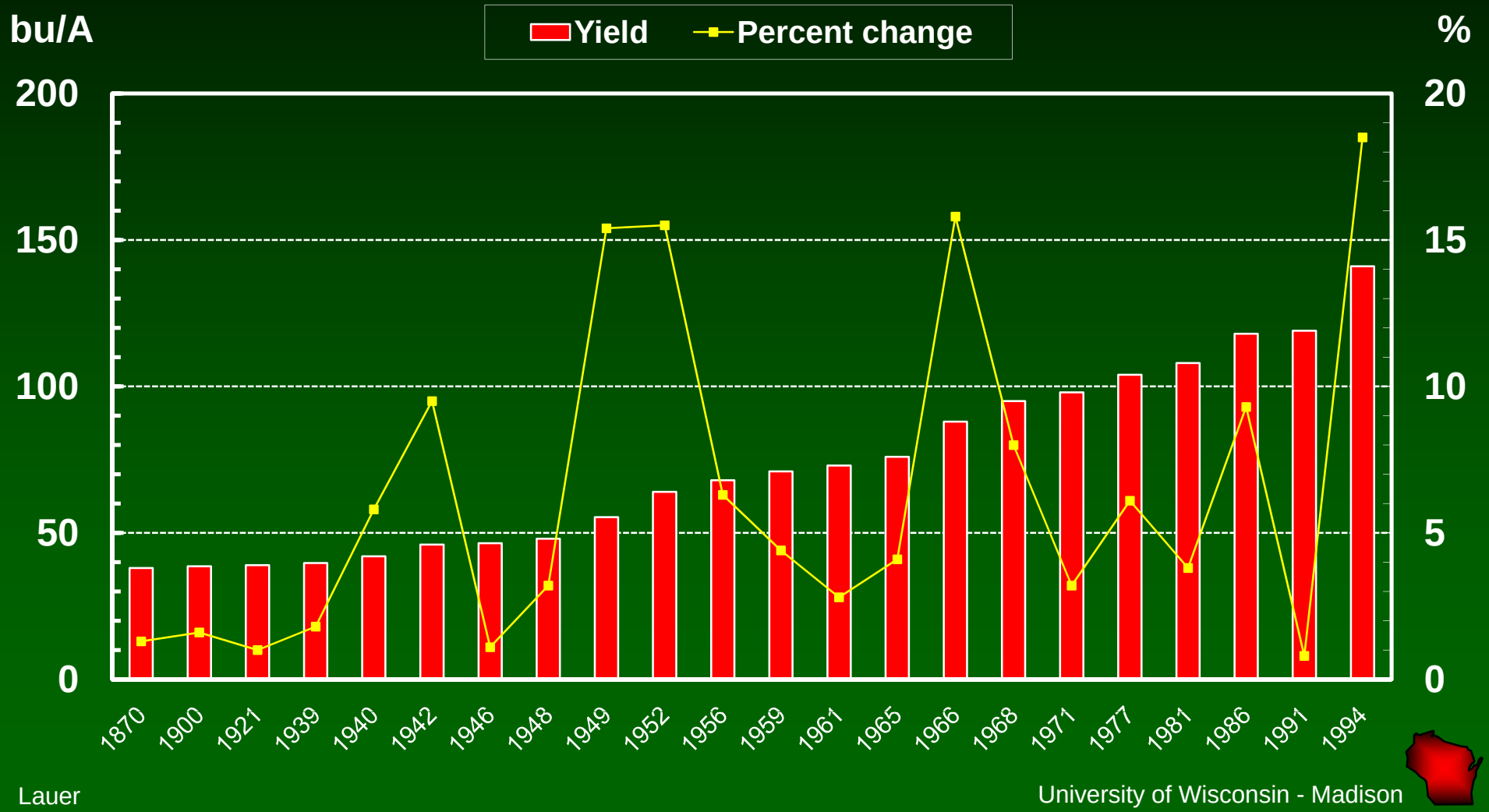
Corn Yield (bu/A) in Wisconsin Since 1866



Lauer

University of Wisconsin - Madison

Years of Record Corn Yield and the Percent Increase Over the Previous Record Year



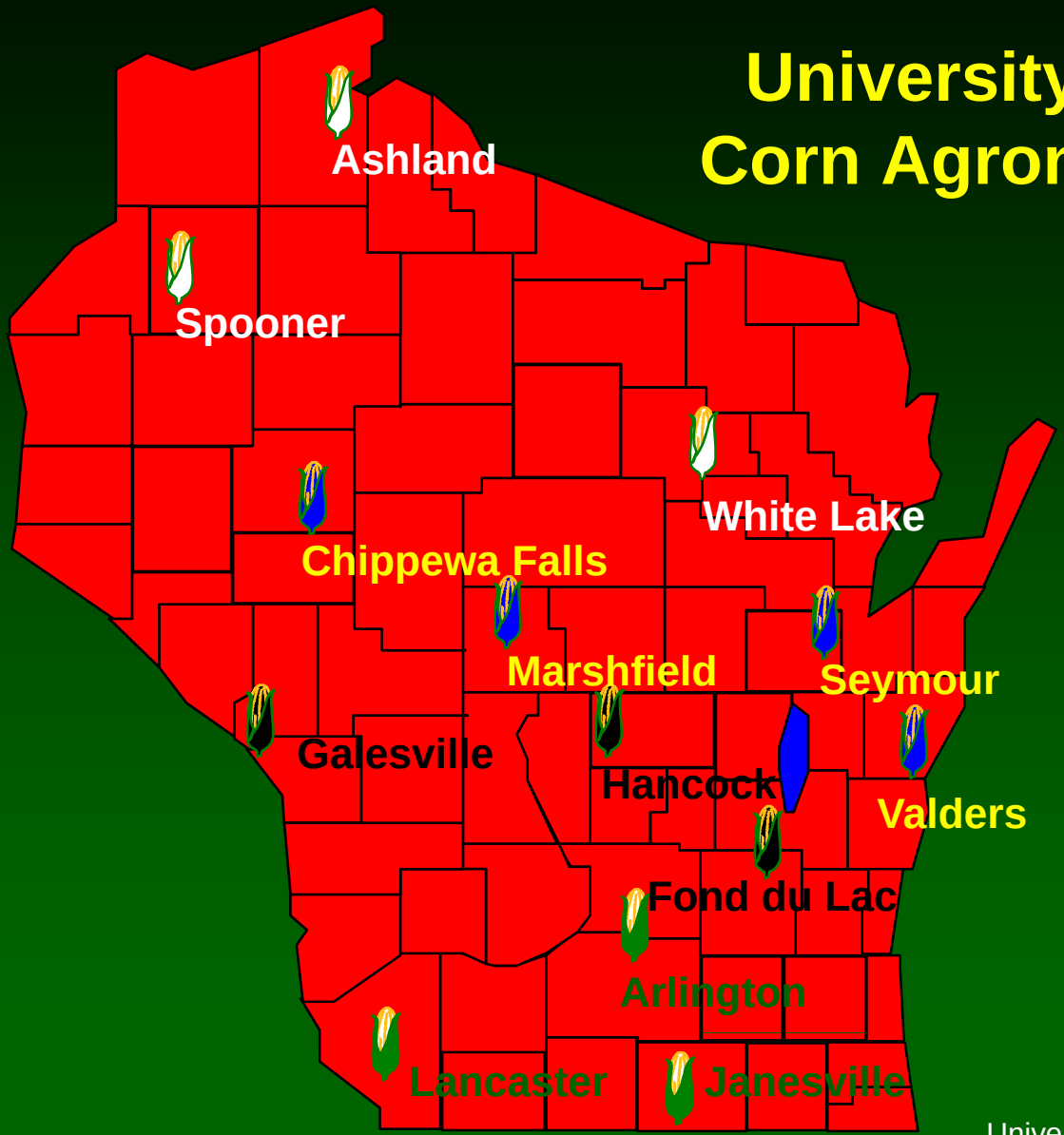
Lauer

University of Wisconsin - Madison

Factors Contributing to Continued Yield Gain

- Resistance to root and stalk lodging
  - *Necessary for machine harvesting at higher plant densities*
- Resistance to diseases - little data to support
- Resistance to insects
- Improvement of stay-green
  - *Continuous improvement of 2nd ECB resistance (Duvick 1984)*
- Use of single-cross hybrids
- Resistance to barrenness
- Better pollen production
- Production under higher population
- Earlier planting date
  - *Better seed quality*
  - *Improved cold tolerance, better germination and emergence*
- Use of commercial fertilizers
- Pest control techniques

University of Wisconsin Corn Agronomy Program



1999 Environment Characteristics for Corn Production in Wisconsin

- **Weather**
  - ***Temperature*: Faster GDU accumulation than normal over entire growing season.**
  - ***Precipitation*: Adequate and timely rains through pollination. Little precipitation during grain-filling.**
  - ***Events*: Scattered hail**
- **Planting progress was faster than normal**
- **Pollination began earlier than normal**
- **Silage harvest began earlier than normal. Grain dry-down was faster than normal.**
- **Pests**
  - ***Weeds*: No major problems.**
  - ***Diseases*: Eyespot, Anthracnose and Gray Leaf Spot were observed often and early. Mycotoxin development in corn silage in eastern WI.**
  - ***Insects*: Low European corn borer pressure. High Corn rootworm pressure in scattered areas.**

1999 Wisconsin Corn Performance Trials
Grain Summary

	1989-1998		1999		Percent
Location	*N*	Yield	*N*	Yield	Change
Arlington	1727	185	198	222	+ 20
Janesville	1727	177	198	222	+ 25
Lancaster	1727	170	198	192	+ 13
Fond du Lac	1525	159	159	207	+ 30
Galesville	1525	157	159	202	+ 29
Hancock	1524	178	159	202	+ 13
Chippewa Falls	1276	147	168	169	+ 15
Marshfield	990	137	168	179	+ 31
Seymour	922	144	69	171	+ 19
Valders	1400	145	168	199	+ 37
Ashland	129	129	16	157	+ 22
Spooner	1901	123	189	168	+ 37
White Lake	582	85	63	147	+ 73

Note: Seymour average includes New London 1989-1992.

Using Wisconsin Corn Hybrid Performance Trial Results

- **Use multi-environment average data**
  - *Begin with trials in zone(s) nearest you*
  - *Compare hybrids with similar maturities*
  - *Use many years and locations*
- **Evaluate consistency of performance**
  - *Check performance in other zones and locations*
  - *Check other reliable unbiased trials*
  - *Be wary of inconsistent performance.*

You are taking a tremendous gamble if basing your hybrid selection decisions on 1 or 2 local test plots

Multi- versus Single-Environment Trials

Use <u>Multi-Environment</u> information to evaluate:

- Grain yield
- Moisture and maturity
- Standability

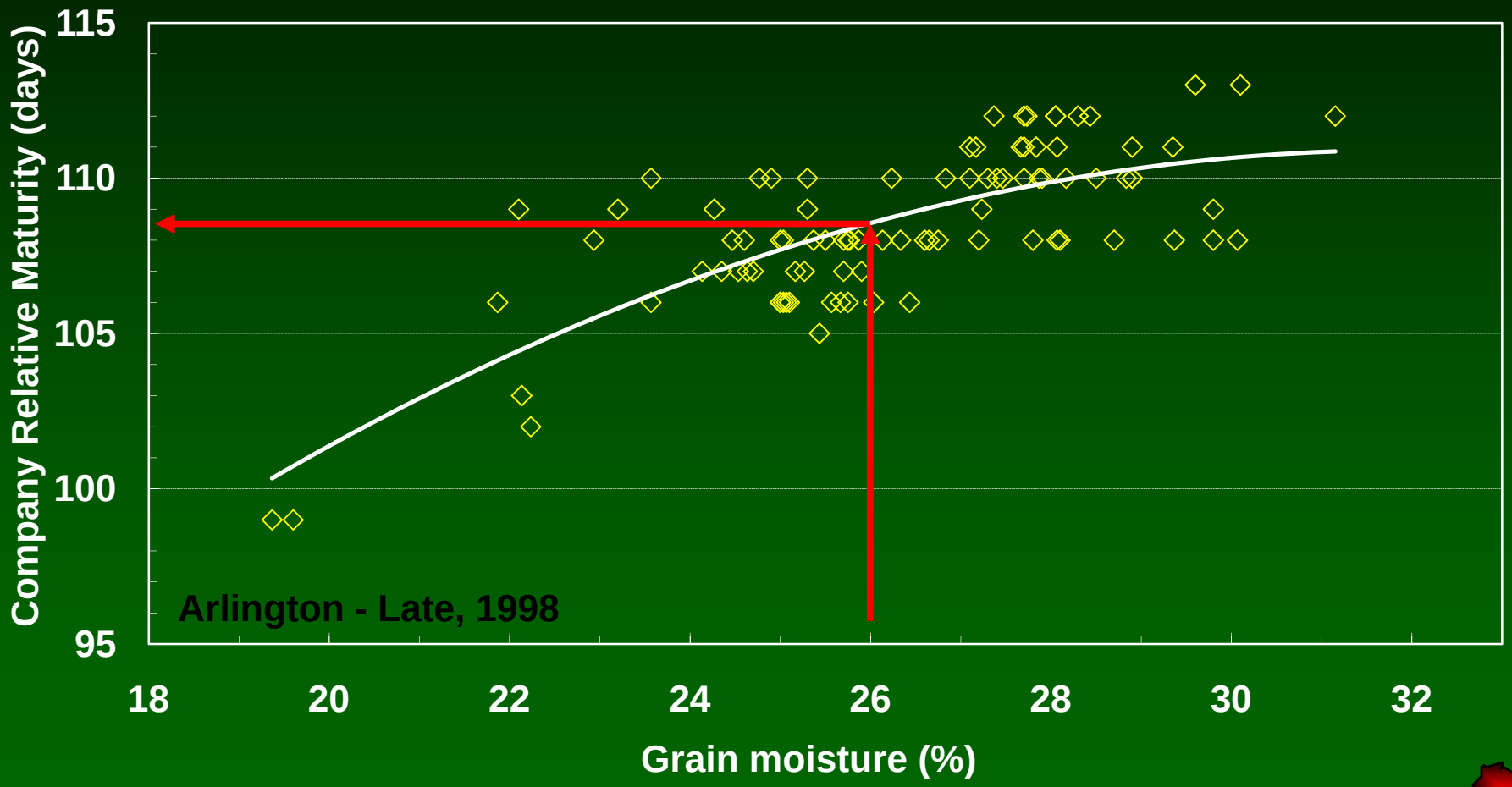
Use <u>Single-Environment</u> information to evaluate:

- Consistency of performance
- Test weight
- Dry-down rate
- Grain quality
- Ease of combine-shelling or picking

Methods for Determining Corn Hybrid Maturity

- Minnesota Relative Maturity System (1929)
- Growing Degree Days (1970)
- Company ratings
- Wisconsin Comparative Relative Maturity rating

Method for determining Wisconsin comparative relative maturity - WI CRM (n=92)



Examples of hybrid CRM ratings (based on MN RM) using WI Corn Hybrid Performance Trial data

Year	Pioneer 3751	Nk Brand N4242	Jung 2496	Golden Harvest H2441	Dekalb DK493
1989	97		98		
1990	97		101		
1991	99	99	100		
1992	100	101	101	104	
1993	99	99	100	105	99
1994		99	99	105	99
1995		101	100	107	100
1996		99		105	101
1997		99		105	101
1998	97				98

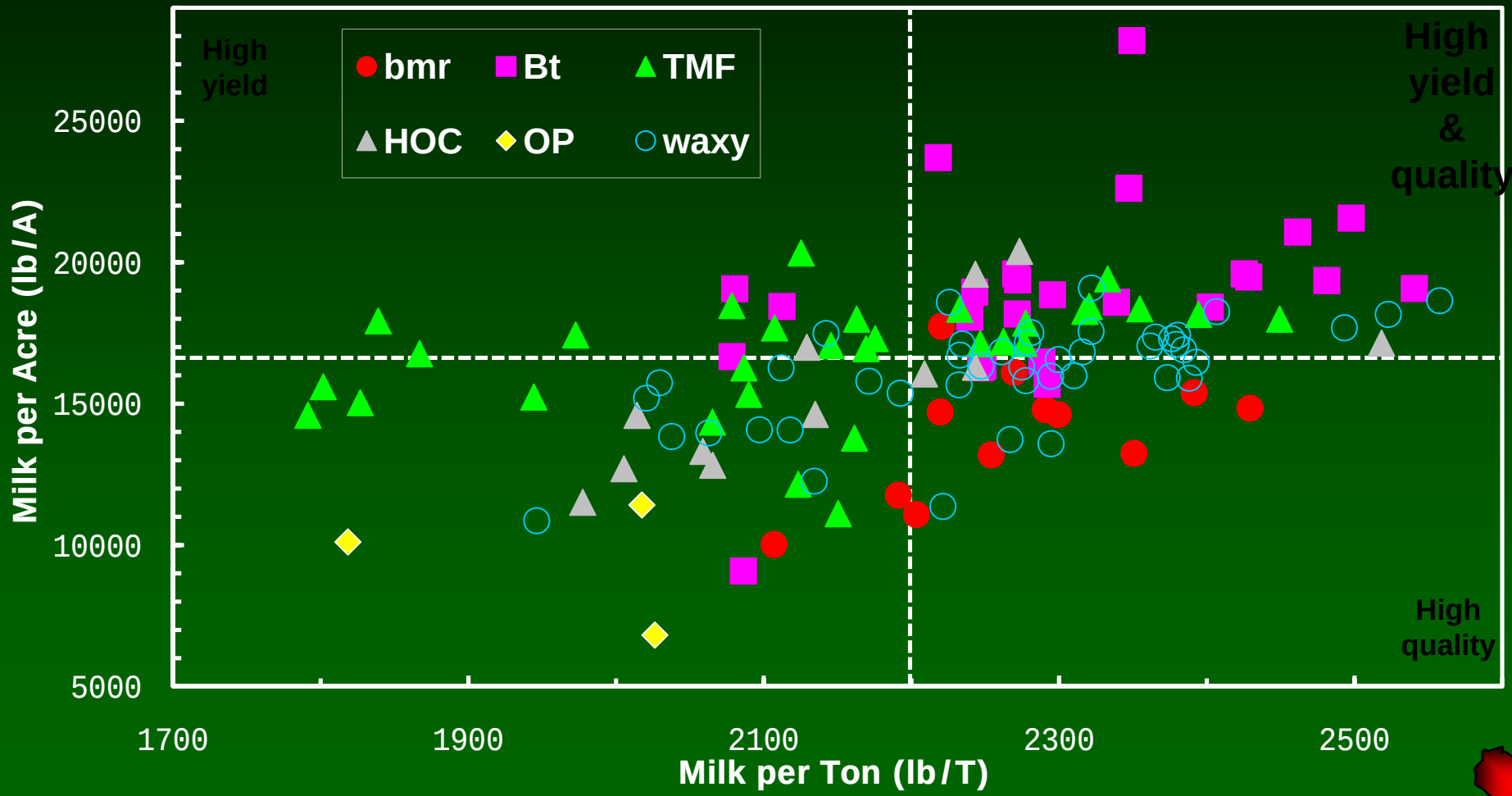
Wisconsin Corn Hybrid Silage Performance Trials

- Each hybrid is tested at 2 locations in a production zone
- Seed companies are encouraged to enter silage hybrids in at least one grain trial

1999 Wisconsin Corn Performance Trials
Silage Summary

	1989-1998		1999		Percent
Location	*N*	Yield	*N*	Yield	change
Arlington	322	9.3	66	10.1	+ 9
Lancaster	245	7.7	66	8.9	+ 16
Fond du Lac	207	8.7	67	9.8	+ 13
Galesville	207	8.0	67	8.1	+ 1
Marshfield	346	6.6	60	7.5	+ 14
Valders	273	7.0	60	8.0	+ 14
Ashland	93	7.0	16	8.0	+ 14

Corn Specialty Hybrid Silage Yield and Quality During 1990-1998 in Wisconsin



Lauer

University of Wisconsin - Madison

Criteria for Selecting Silage Hybrids

- **Grain yield: allows flexibility (dual purpose)**
- **Whole plant silage yield**
- **Relative maturity: 5-10 days later than grain hybrids**
- **Standability: allows flexibility**
- **Pest resistance**
- **Silage quality**

"Variation for silage yield and quality exists among commercial hybrids in Wisconsin."

GMO Issues

- **Successes**
- **Agronomic Performance**
  - ***Yield lag and drag***
  - ***Pollen drift***
- **Marketing**
  - ***Premiums***
  - ***Emotional***
- **Pest Resistance Management**
- **Crop Rotation**

Specialty Corns

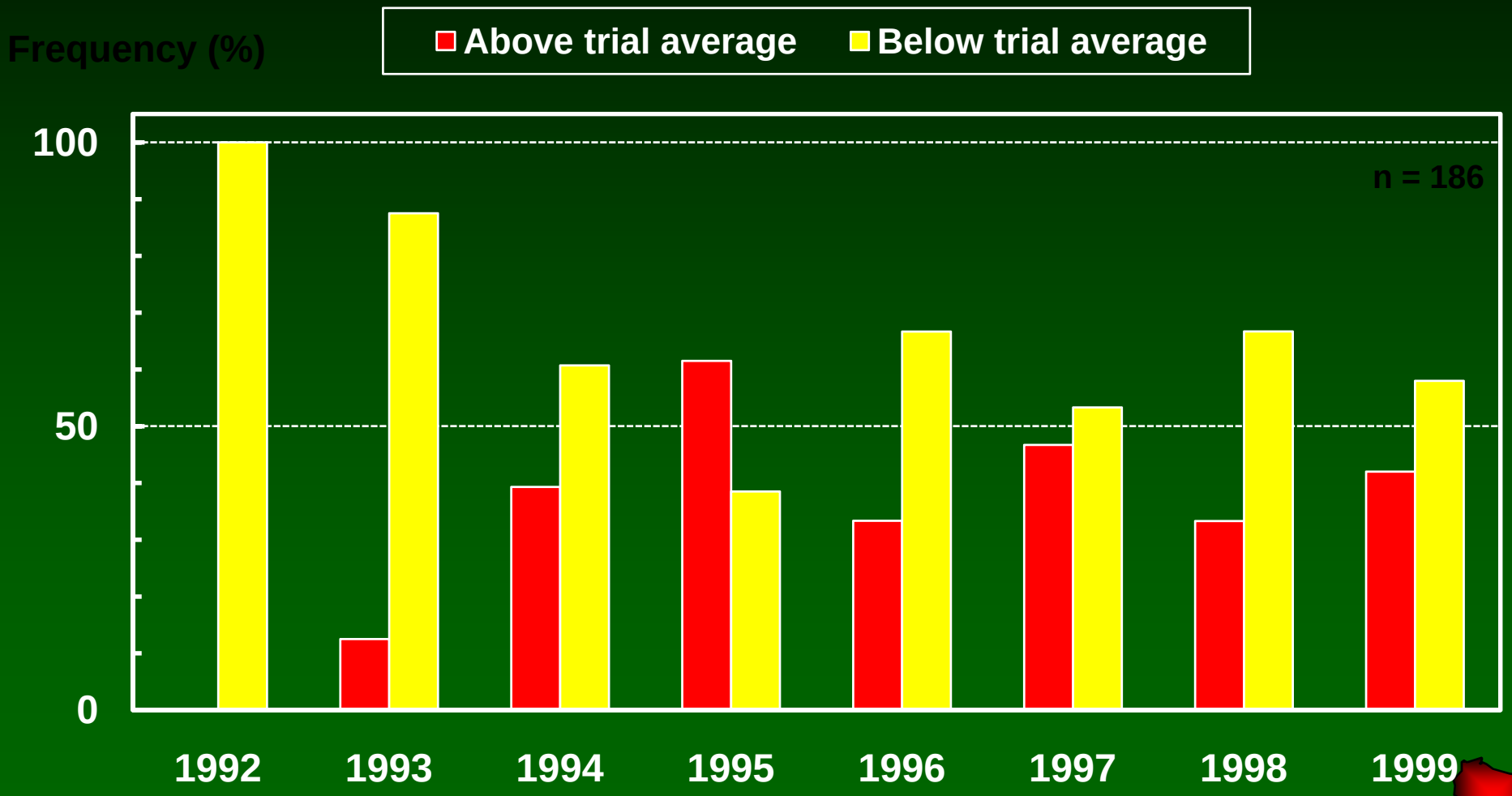
Specialty Marketing Corns

- Amylomaize (high amylose)
- Waxy corn
- High-protein (lysine) corn
- High-oil corn
- White & Yellow Food corn
- HAP corn (high available P)
- Silage corn
- Sweet corn and Popcorn

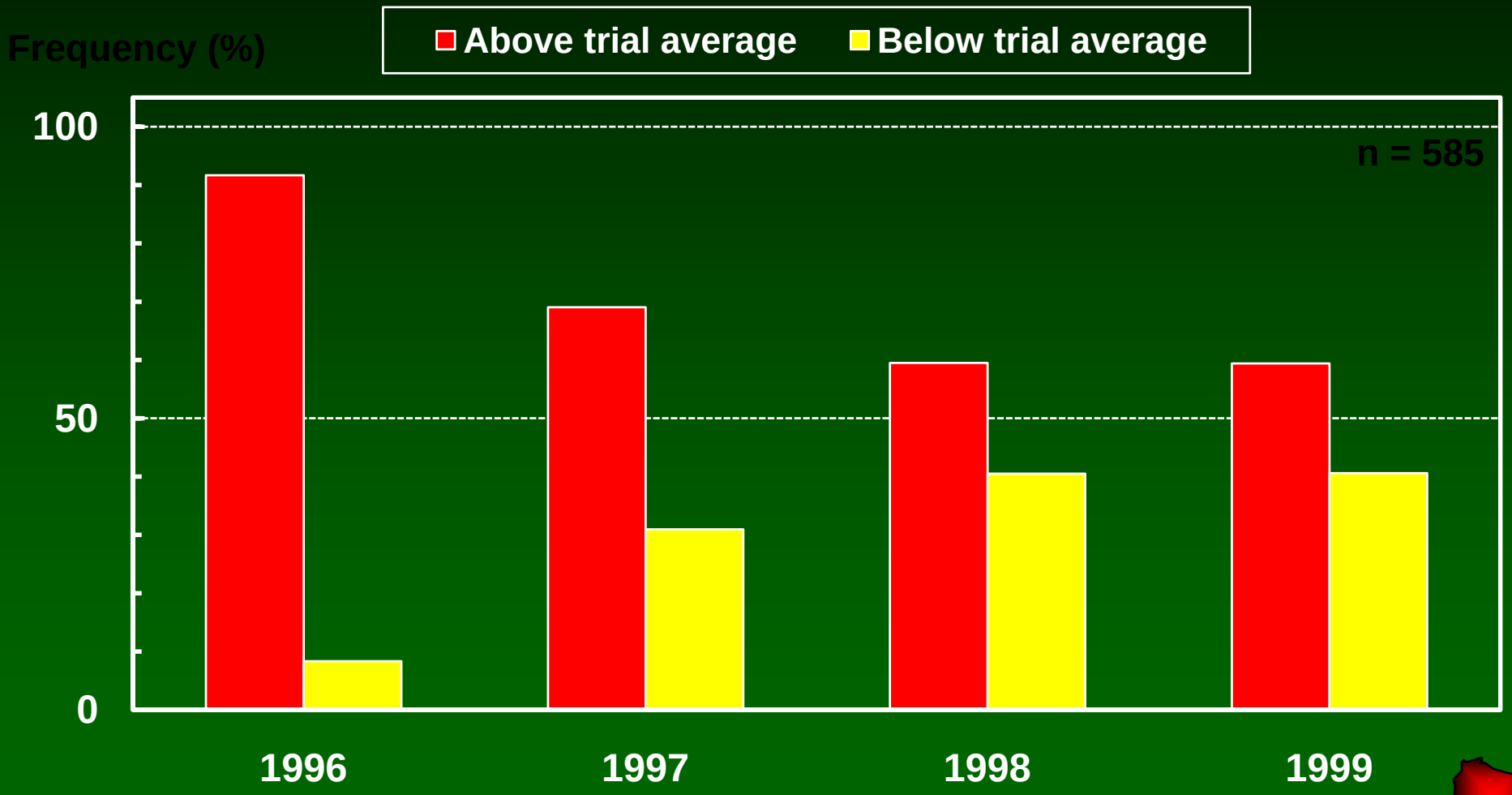
Specialty Management Corns

- "IMI" - Imidazolinone resistant or tolerant
- "SR" - Sethoxydim resistant
- "Liberty Link" - Glufosinate resistant
- "Bt"
- "Round-up Ready" - Glyphosate resistant
- "Gene stacking"
  - *Bt,LL; Bt,IMI*

Yield of "IMI" Hybrids in Relation to the Average of All Hybrids in a Wisconsin Trial



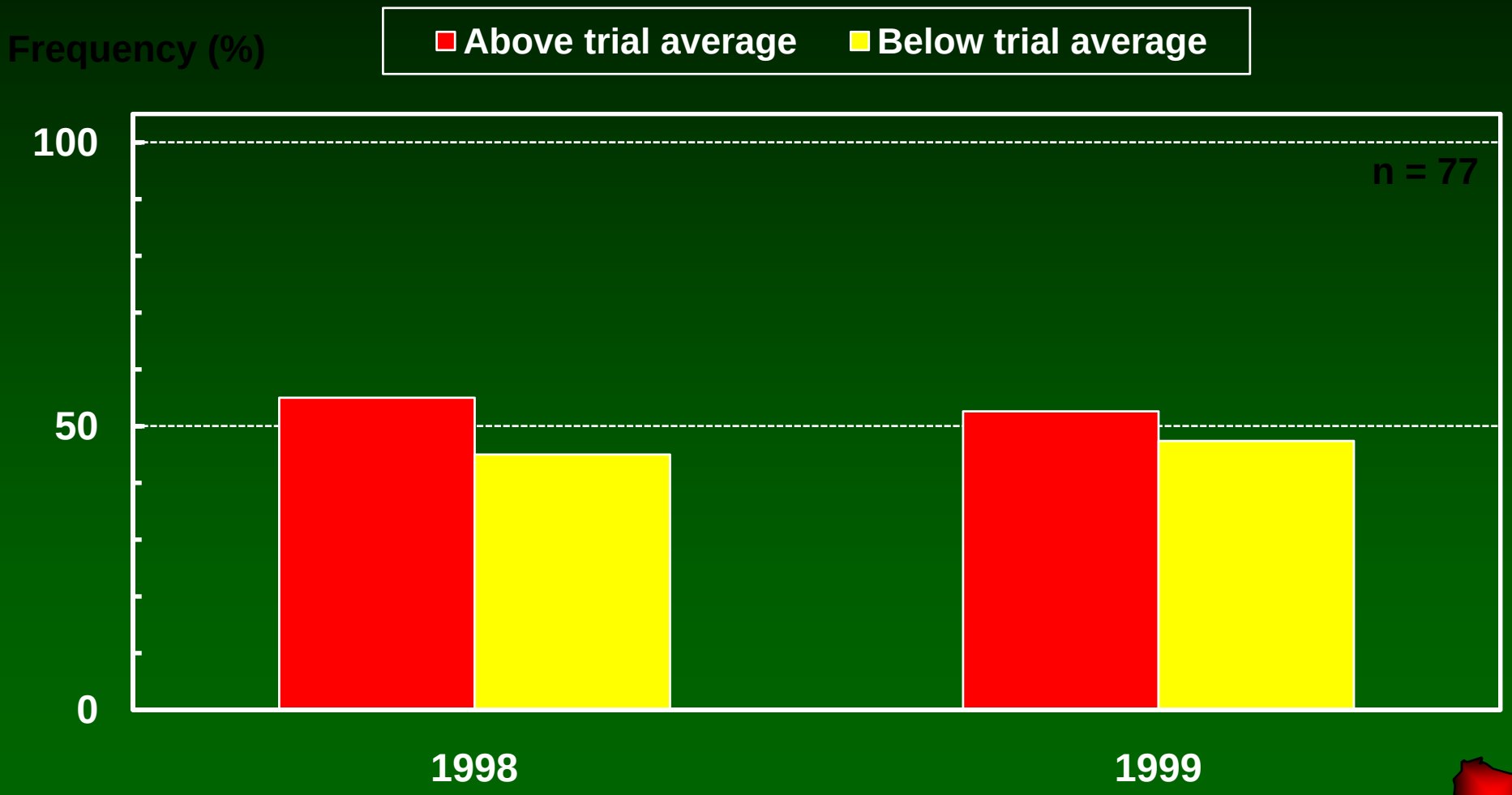
Yield of “BT” Hybrids in Relation to the Average of All Hybrids in a Wisconsin Trial



Lauer

University of Wisconsin - Madison

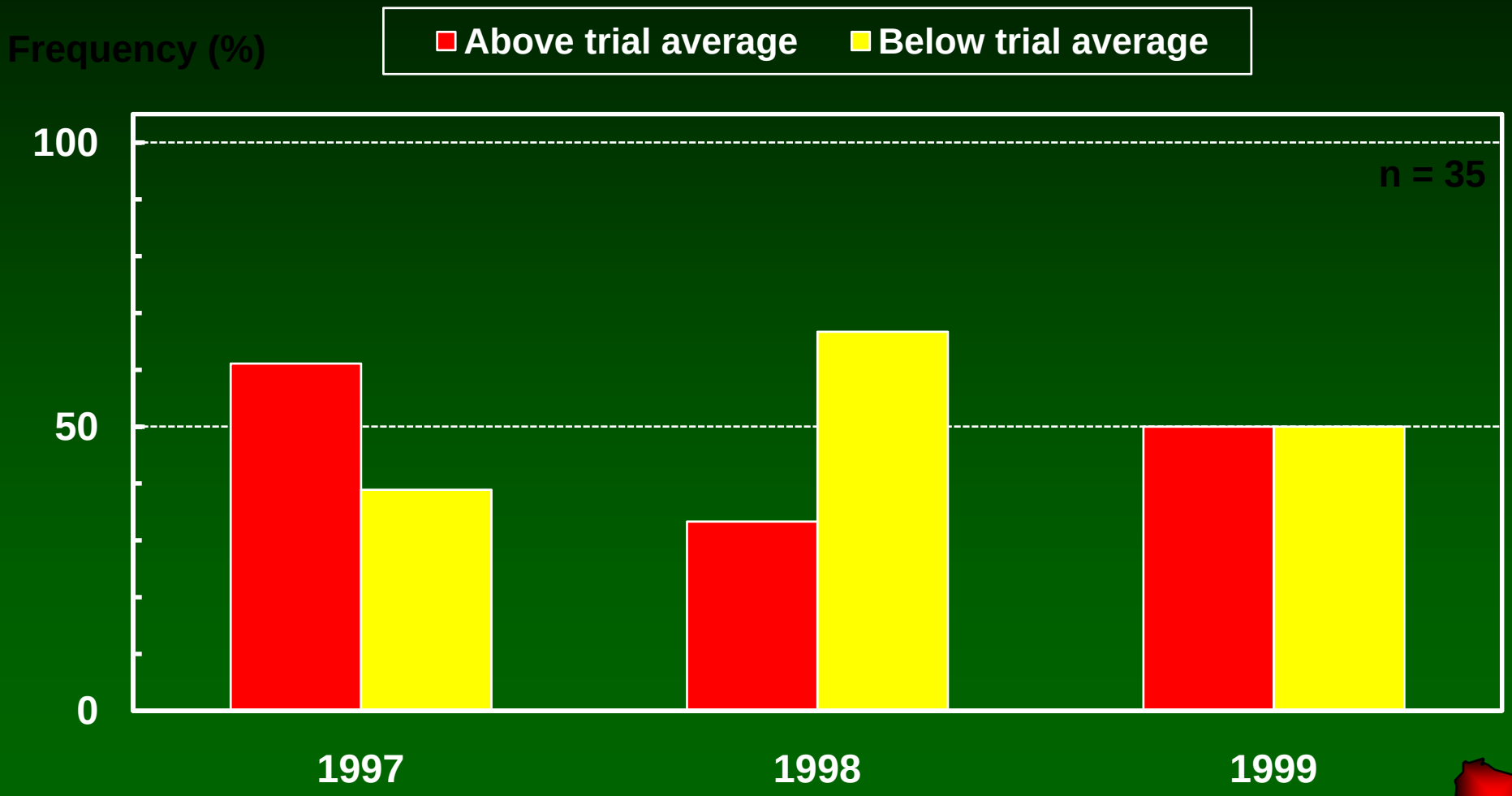
Yield of “Round-up Ready” Hybrids in Relation to the Average of All Hybrids in a Wisconsin Trial



Lauer

University of Wisconsin - Madison

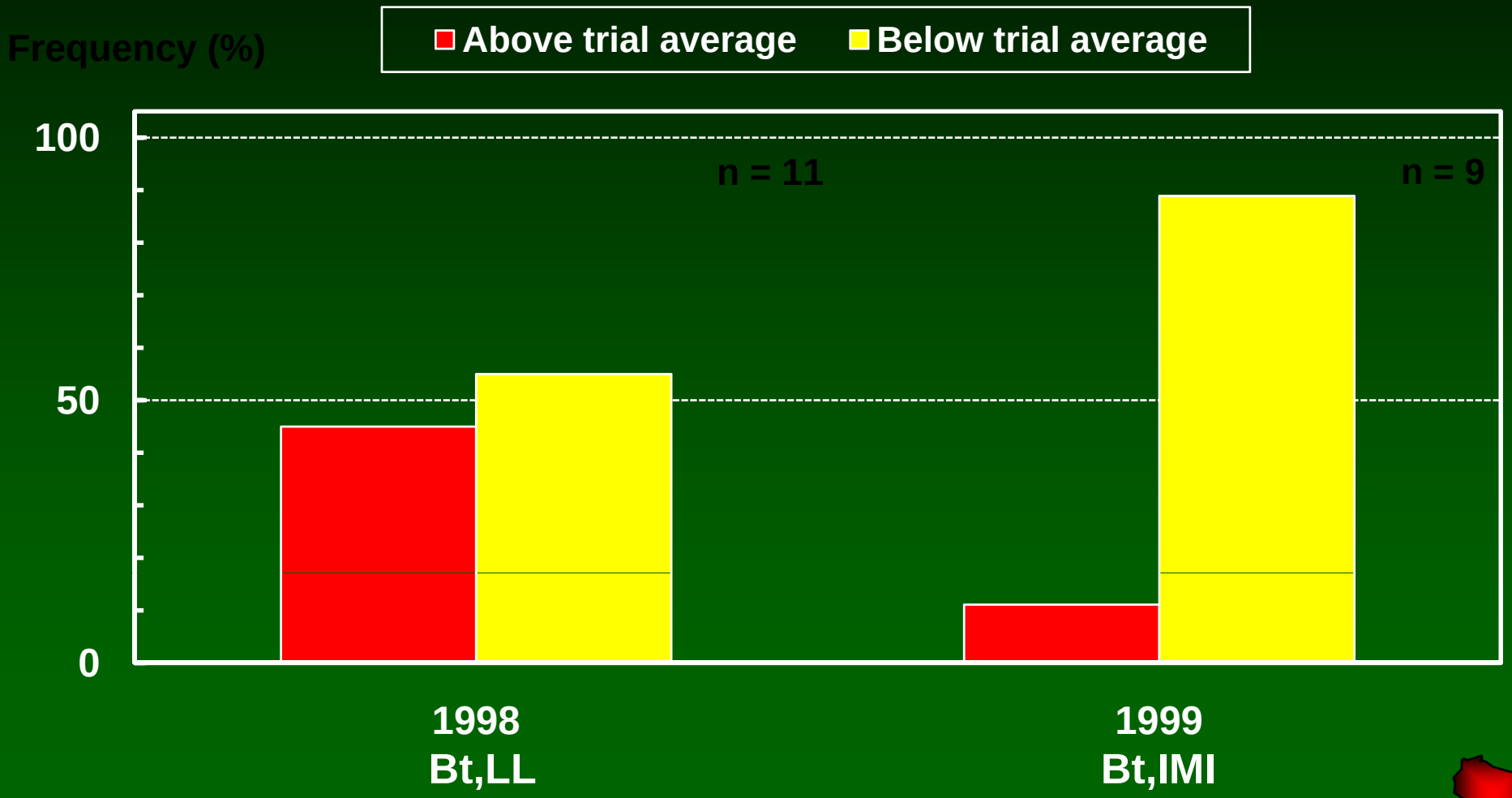
Yield of “Liberty Link” Hybrids in Relation to the Average of All Hybrids in a Wisconsin Trial



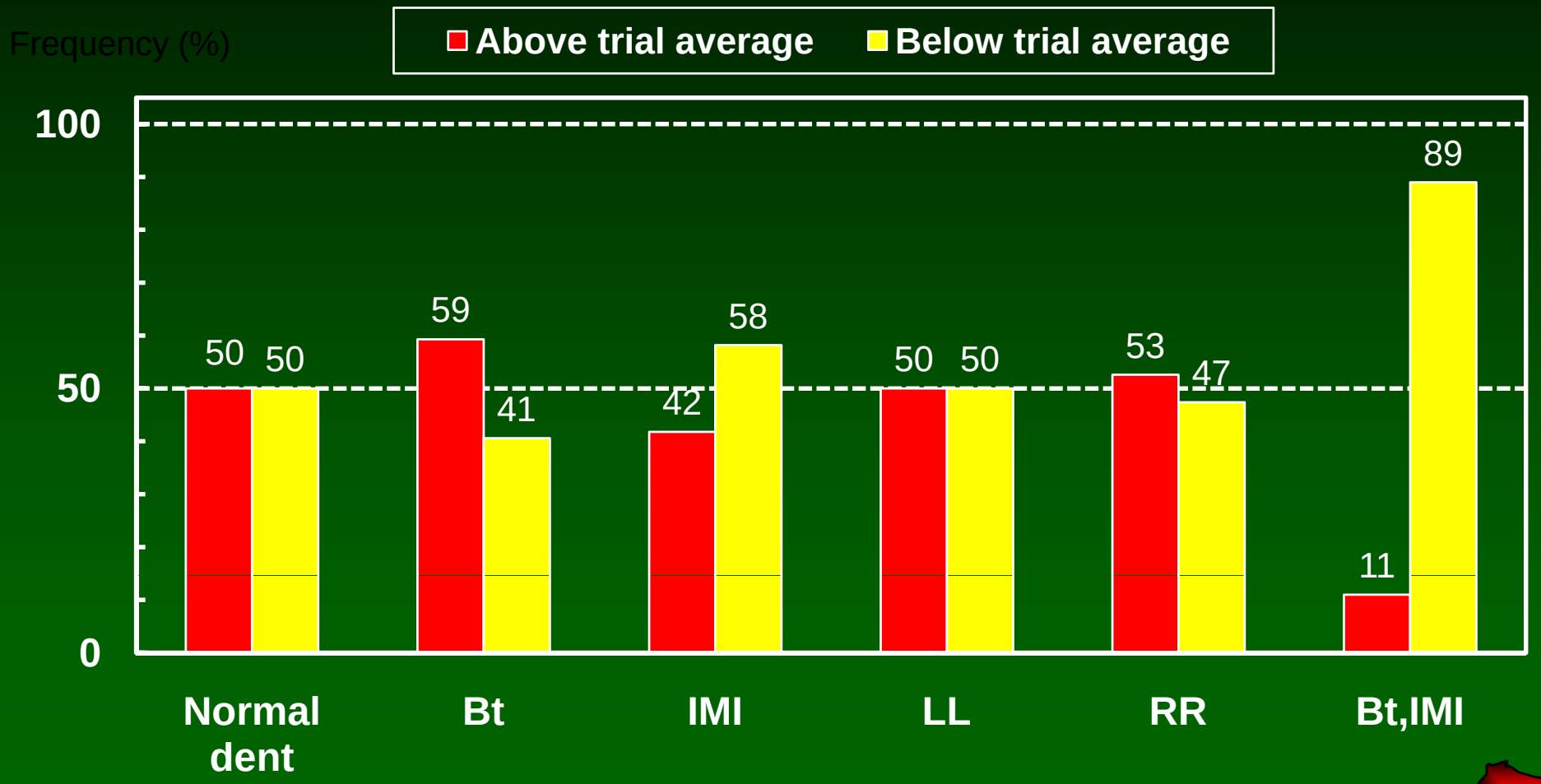
Lauer

University of Wisconsin - Madison

Yield of "Gene Stacked" Hybrids in Relation to the Average of All Hybrids in a Wisconsin Trial



Yield of Specialty Hybrids in Relation to the Average of All Hybrids in the 1999 Wisconsin Hybrid Trials

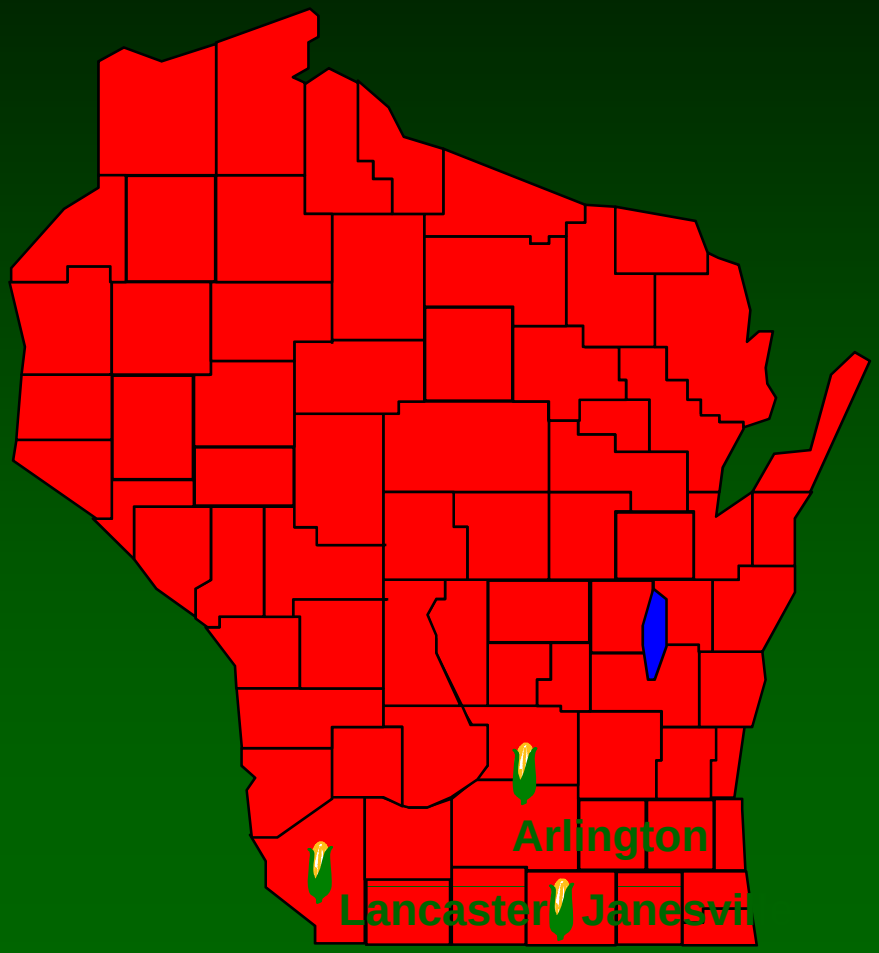


Lauer

University of Wisconsin - Madison

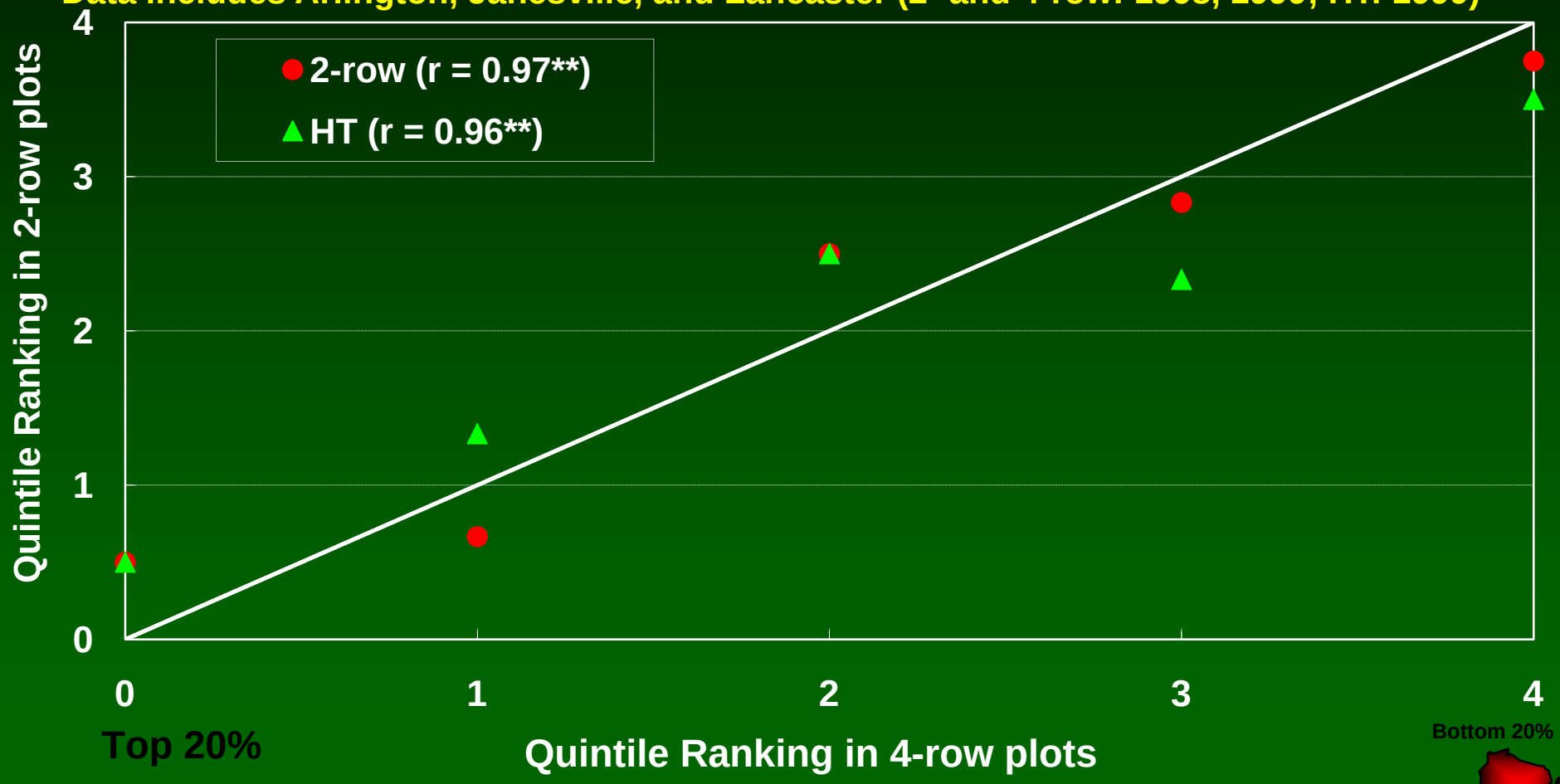
Comparison of 2-row and 4-row Plots
Materials and Methods

- RCB in split-plot arrangement
- Main: Plot size
  - *2-row (5’ x 25’)*
  - *4-row (10’ x 25’)*
- Split: Randomly selected hybrids
  - *1998: Maturity*
  - *1999: Height*
- In 1999, chose same hybrids as in HT
  - *Planted adjacent to HT*



Correlation Between 2-row and 4-row Plots

Data includes Arlington, Janesville, and Lancaster (2- and 4-row: 1998, 1999; HT: 1999)



Hybrid Challenge I
Materials and Methods

- Farmers feel that results from small plots do not relate to field scale production.
- Paul Carter challenged Farmer
  - *Hybrid selected using UW results*
  - *Hybrid selected by seed company, consultant, or farmer*
- Random odds = ~50%
- Trials replicated and randomized (1991: n = 60)
- Large plots: 0.1 to 0.5 A
- Farm-scale machinery used to plant, manage and harvest plots

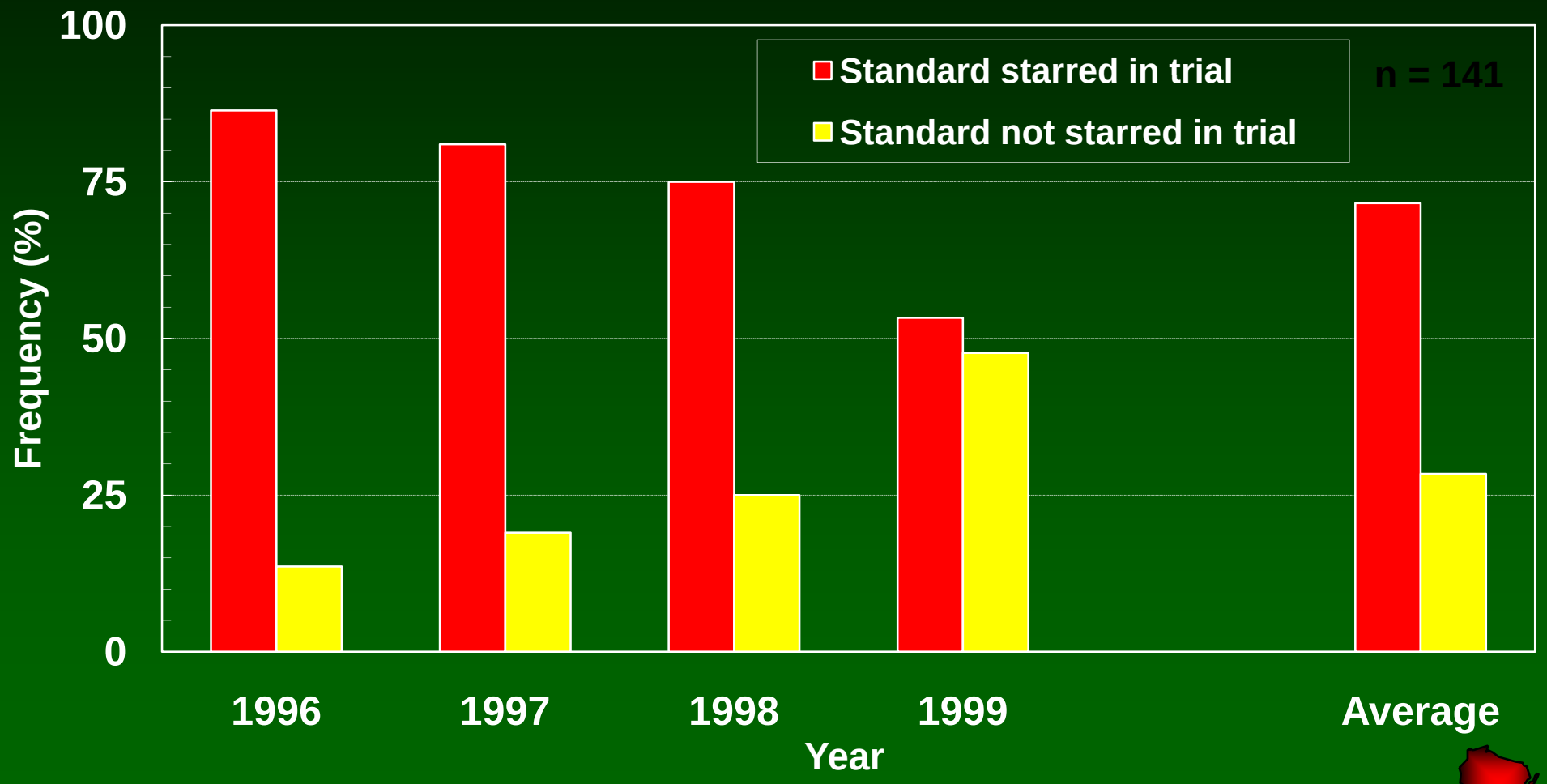
Conclusions

- UW hybrids were starred (beat or tied farmer hybrid) in 47 of 60 trials or 78% of time
- UW Trial results were a useful predictor of future hybrid performance

Hybrid Challenge II
Materials and Methods

- Data set = WAPAC Hybrid Performance Trials
  - *2 "standard" hybrids: Selected using UW trial results.Used to "set the bar"*
  - *6 to 10 other hybrids. "Best of the best" Selected by seed companies, consultants, and farmers*
- Random odds = ~25%
- Trials replicated and randomized
- Multi-environments: same set of hybrids grown at numerous locations
- Large plots: 0.1 to 0.5 A
- Farm-scale machinery used to plant, manage and harvest plots

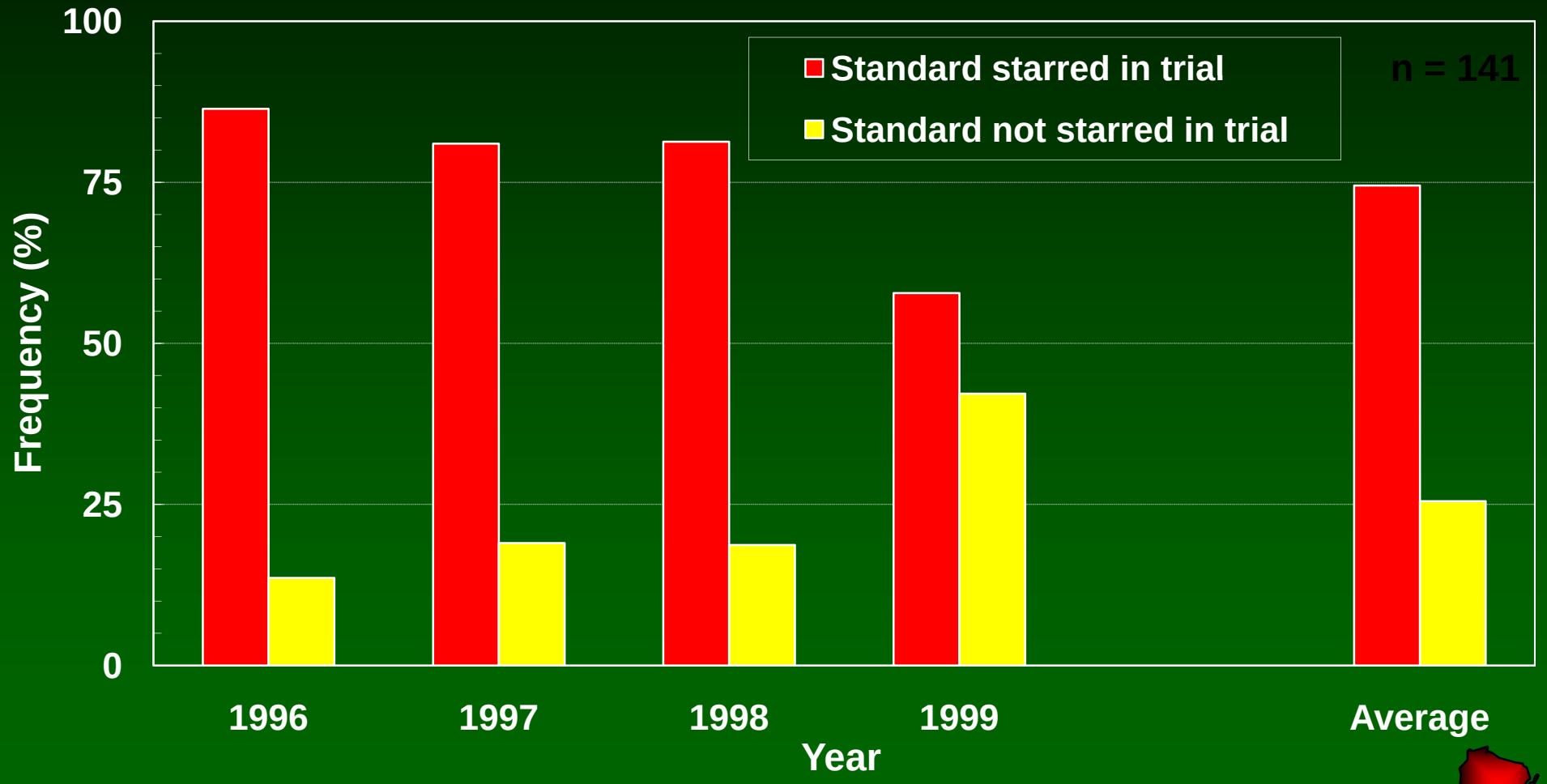
Hybrid Challenge II - Grain yield
Frequency of trials with starred standard hybrids.



Lauer

University of Wisconsin - Madison

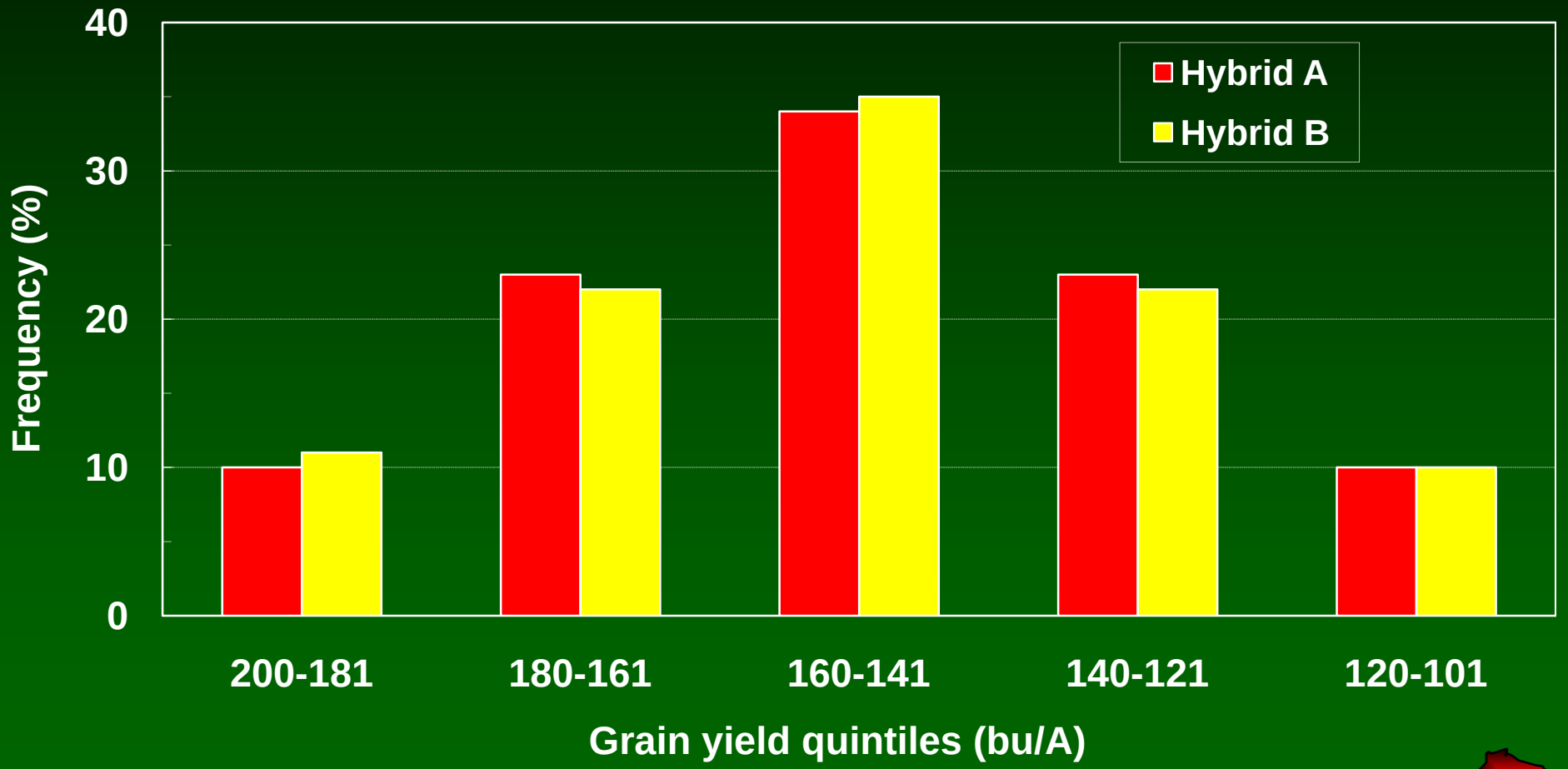
Hybrid Challenge II - Grower return
Frequency of trials with starred standard hybrids.



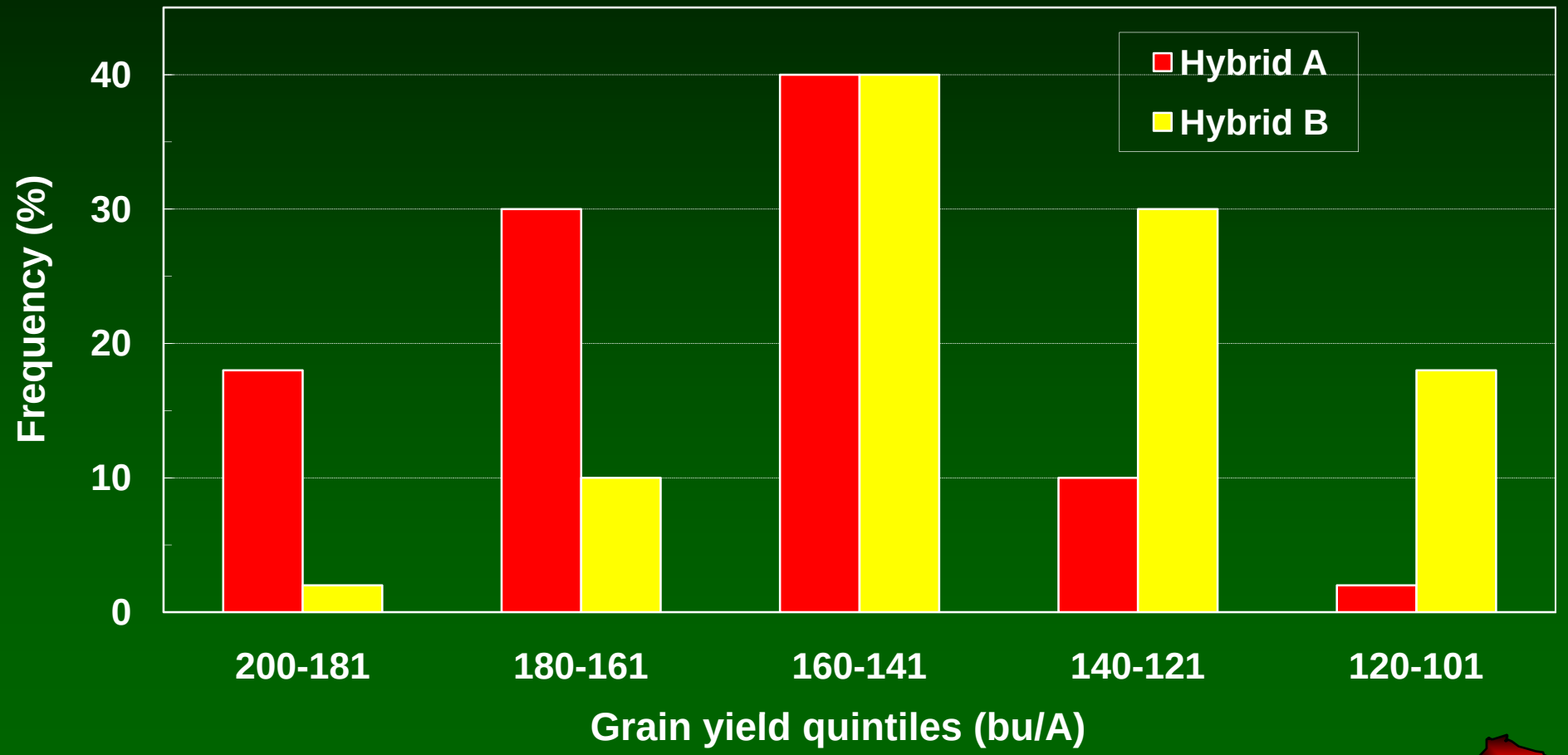
Lauer

University of Wisconsin - Madison

Quintile frequency of two hybrids in a trial where there is no significant difference

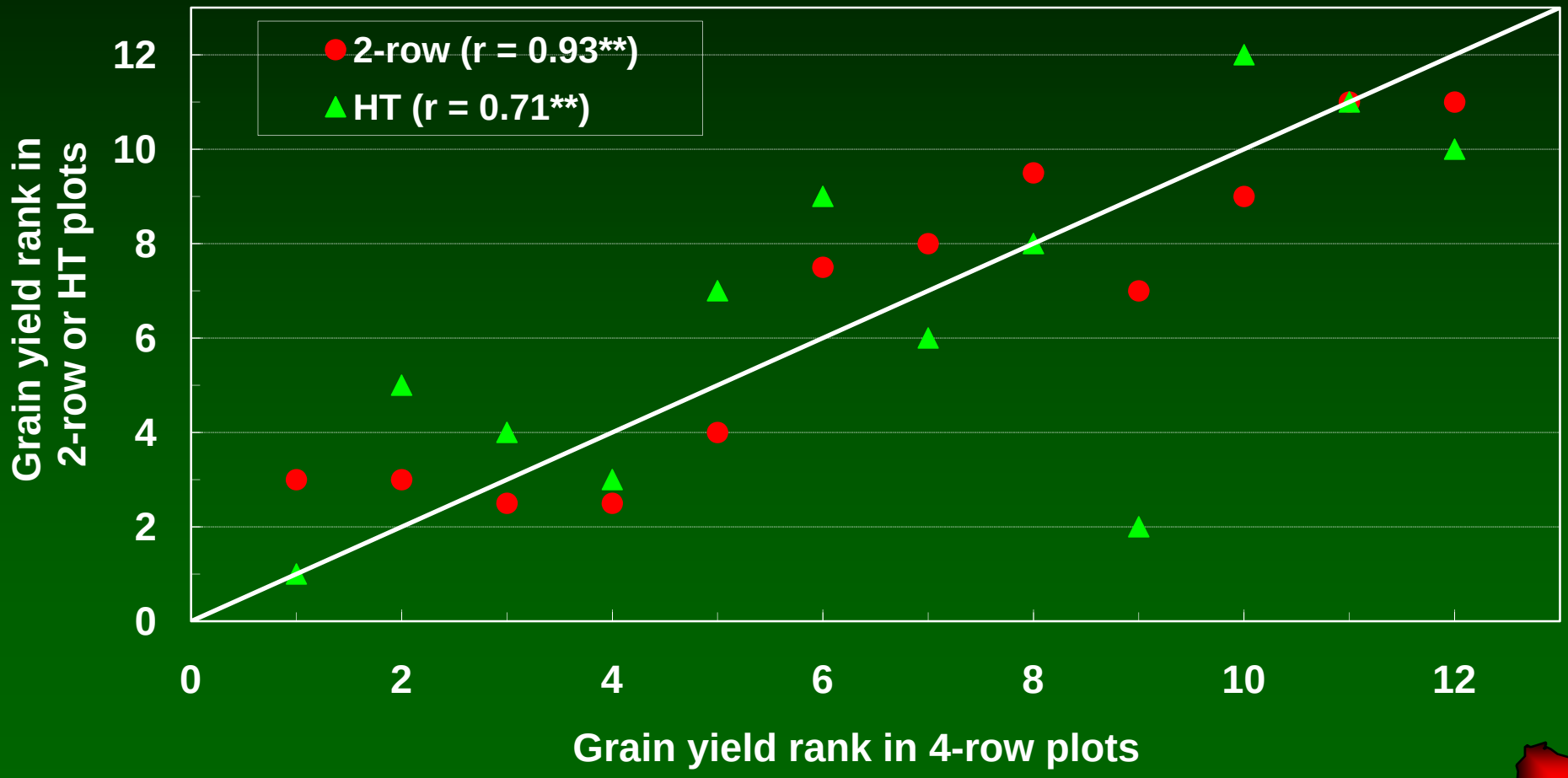


Quintile frequency of two hybrids in a trial where there is a significant difference



Correlation Between 2-row and 4-row Plots

Data includes Arlington, Janesville, and Lancaster (2- and 4-row: 1998, 1999; HT: 1999)

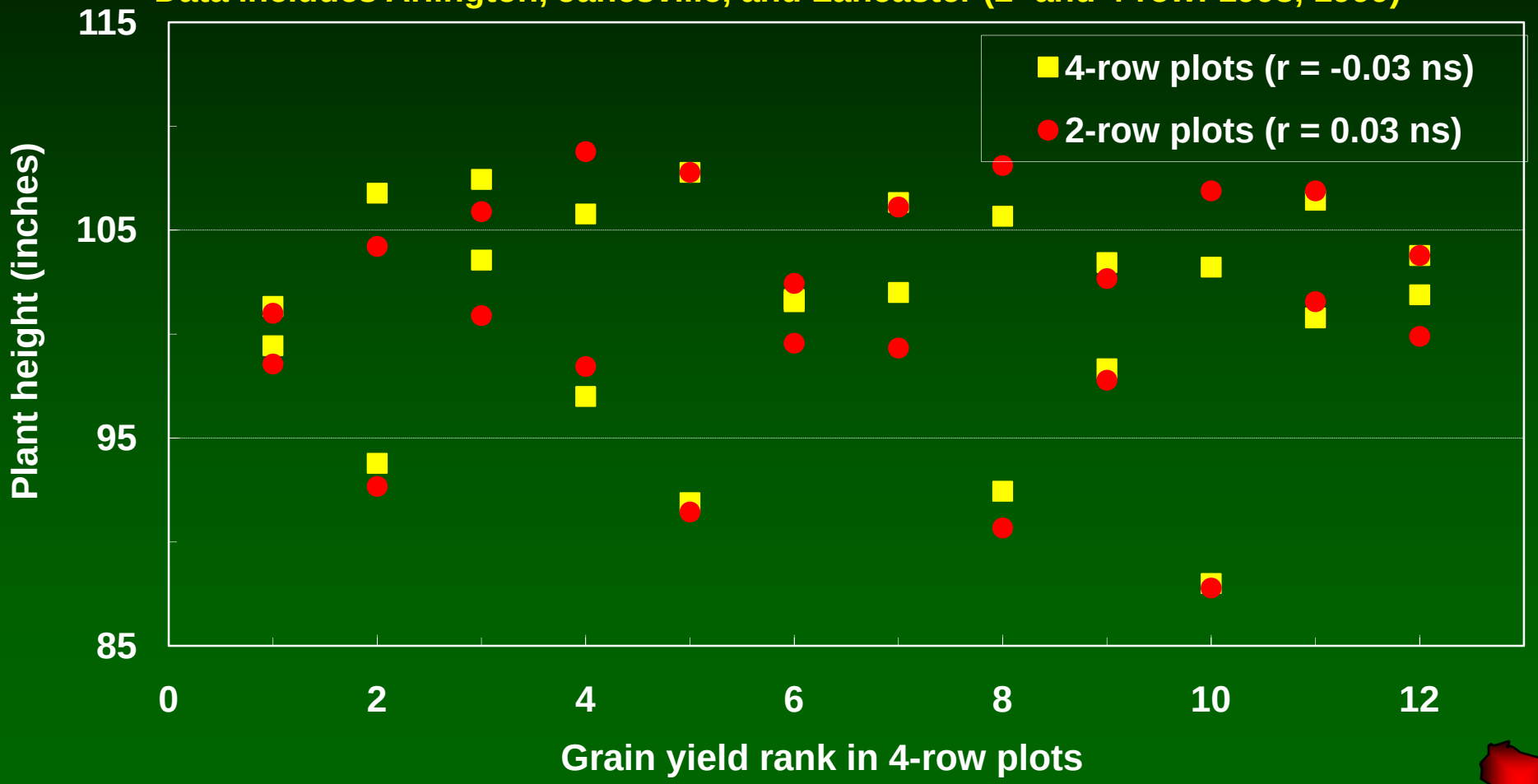


Lauer

University of Wisconsin - Madison

Correlation Between 2-row and 4-row Plots

Data includes Arlington, Janesville, and Lancaster (2- and 4-row: 1998, 1999)



Correlation Between 2-row and 4-row Plots

Data includes Arlington, Janesville, and Lancaster (2- and 4-row: 1998, 1999)