

Agronomic Practices for Optimizing Corn Silage Production in Southeast Minnesota

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UNIVERSITY OF MINNESOTA
Driven to DiscoverSM

Selecting Corn Hybrids for Silage

- Growing conditions can vary greatly from year to year
- Look for hybrids that are consistently top performers in your region
 - Over multiple locations
 - Over multiple years (if data available)
- Also look at data from neighboring regions
- Use any trustworthy data





The Minnesota Hybrid Corn Silage Evaluation Program evaluates the silage potential of corn hybrids in Minnesota. The goal of the program is to provide unbiased forage yield and quality information for educational and marketing programs.

The program is financed in part by entry fees from private seed companies that chose to enter hybrids for testing. These companies are listed in this publication. Results presented are from corn silage performance trials in regions of extensive corn silage use: southeastern, central and west-central Minnesota. The locations are in important dairy regions of Minnesota.

Test Sites

Silage hybrids entered in the southeast or central region trials were tested at two sites within each region. Hybrids entered in the west-central region were tested at one site. Sites within regions were as follows:

Southeast Dairy Region:
LaCrescent (Houston County)
Rochester (Olmsted County)

Central Dairy Region:
Paynesville (Stearns County)
Melrose (Stearns County)

West-Central Dairy Region:
Ottertail (Otter Tail County)

Test Procedure

Southeast and Central
Design: Plots were established at LaCrescent, Rochester, Paynesville and Melrose in randomized complete block designs with four replications. Hybrids were planted at 33,000 seeds per acre with 30-inch row spacing on May 3 at the SE sites (LaCrescent and Rochester) and May 7 at the Central MN sites (Paynesville and Melrose). Plant nutrients as manure or inorganic fertilizer were applied according to University of Minnesota recommendation. Cultivation and herbicides applied by University of Minnesota recommendation were used to control weeds.

Harvesting: Plots were harvested and whole-plant herbage sampled for dry matter and forage quality analysis at each site. Each test site was harvested when the average whole-plant moisture across entries was estimated to be 65%. In 2008, harvest dates at LaCrescent, Rochester, Paynesville and Melrose were September 9, September 16, September 23 and September 26, respectively.

West-Central

Design: Plots near Ottertail were established May 8 under center-pivot irrigation in a randomized complete block design with three replications. Hybrids were planted at 35,700 seeds per acre with 30-inch row spacing. Fertilizer was fall-applied liquid manure at 8,000 gallons per acre plus 25 gallons per acre 28% in July. Pre-emergent herbicide was applied to control weeds.

Harvesting: Plots were harvested and whole-plant herbage sampled for yield and forage quality analysis on September 24.

Results Provided

Tables 1-5 summarize hybrid yield and forage quality results from LaCrescent, Rochester, Paynesville, Melrose and Ottertail, respectively.

Companies participating in 2008 hybrid corn silage performance trials.

Crop Production Services (VIGORO)	220 Bottmiller Dr, Wadena Industrial Park, Wadena, MN 56482	www.cropproductionservices.com
Dairyland Seed Co, Inc.	P O Box 958, West Bend, WI 53095	www.dairylandseed.com
Dekalb (Monsanto Co)	800 N Lindberg Blvd., St Louis, MO 63167	www.dekalb.com
Fielder's Choice Direct	306 North Main, P O Box 898, Monticello, IN 47960	www.fielderschoicedirect.com
Garst Seed Company	2369 330th St, Slater, IA 50244	www.garst.seed
Gold Country Seed Inc.	16506 Hwy 15 North, P O Box 604, Hutchinson, MN 55350	www.goldcountryseed.com
Golden Harvest Seeds, Inc.	100 JC Robinson Blvd, P O Box 307, Waterloo, NE 68069	www.goldenharvestseeds.com
Heartland Hybrids	850 1st St North, P O Box J, Dassel, MN 55325	www.heartlandhybrids.com
Hyland Seeds	2 Hyland Drive, Bienenheim, Ontario, Canada N0P 1A0	www.hylandseeds.com
La Coop Federee (ELITE)	9001 Blvd de l'Acadia, Bureau 200, Montreal, Quebec, Canada H4N 3H7	www.coopfed.qc.ca
Legacy Seeds, Inc.	210 Pine Street, Waupaca, WI 54981	www.legacyseeds.com
Mycogen Seeds	9330 Zionsville Rd, Indianapolis, IN 46268	www.mycogen.com
Nu Tech Seed Co.	307 3rd Street, Alice, ND 58031	www.yieldleader.com
Pioneer Hi-Bred, International	7000 NW 62nd Ave, Johnston, IA 50131	www.pioneer.com
Producers Hybrids	P.O. Box C, Battle Creek, NE 68715	www.producershybrids.com
Renk Seed Co.	6800 Wilburn Road, Sun Prairie, WI 53590	www.renkseed.com
Trelay Seeds	11623 State Road 80N, Livingston, WI 53554	www.trelay.com
Wensman Seed Co.	Box 190, Wadena, MN 56482	www.wensmanseed.com



<http://corn.agronomy.wisc.edu/HT/2008/2008HTSTBook.pdf>

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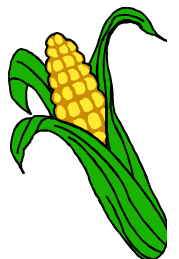
2008
Wisconsin Corn Hybrid
Performance Trial Results



Grain and Silage

Department of Agronomy
College of Agricultural and Life Sciences
University of Wisconsin
Wisconsin Crop Improvement Association

UW
Extension



Selecting Corn Hybrids for Silage

- 5 to 10 days later in maturity than for grain
 - Greater silage yield
 - With silage, less concern about reaching black layer before frost
- Plant a range in maturity
 - Reduces risk at pollination & widens harvest window
 - 50% of acres: full-season
 - 25% of acres: mid-season
 - 25% of acres: short-season



Selecting Corn Hybrids for Silage

- Select hybrids with high values for:
 - Milk/acre (indication of both silage yield & quality)
 - Silage dry matter yield x milk/ton
 - Milk/ton (overall indication of silage quality)
 - Calculated using many quality traits
- Fine-tune selection according to agronomic & quality traits



Agronomic Considerations for Silage Hybrids

- Standability:
 - Improves the option for harvesting as grain
- Stay-green:
 - Hybrids with strong stay-green can be too wet when harvested according to kernel stage
- Herbicide and insect resistance:
 - We need good hybrids first, and traits second



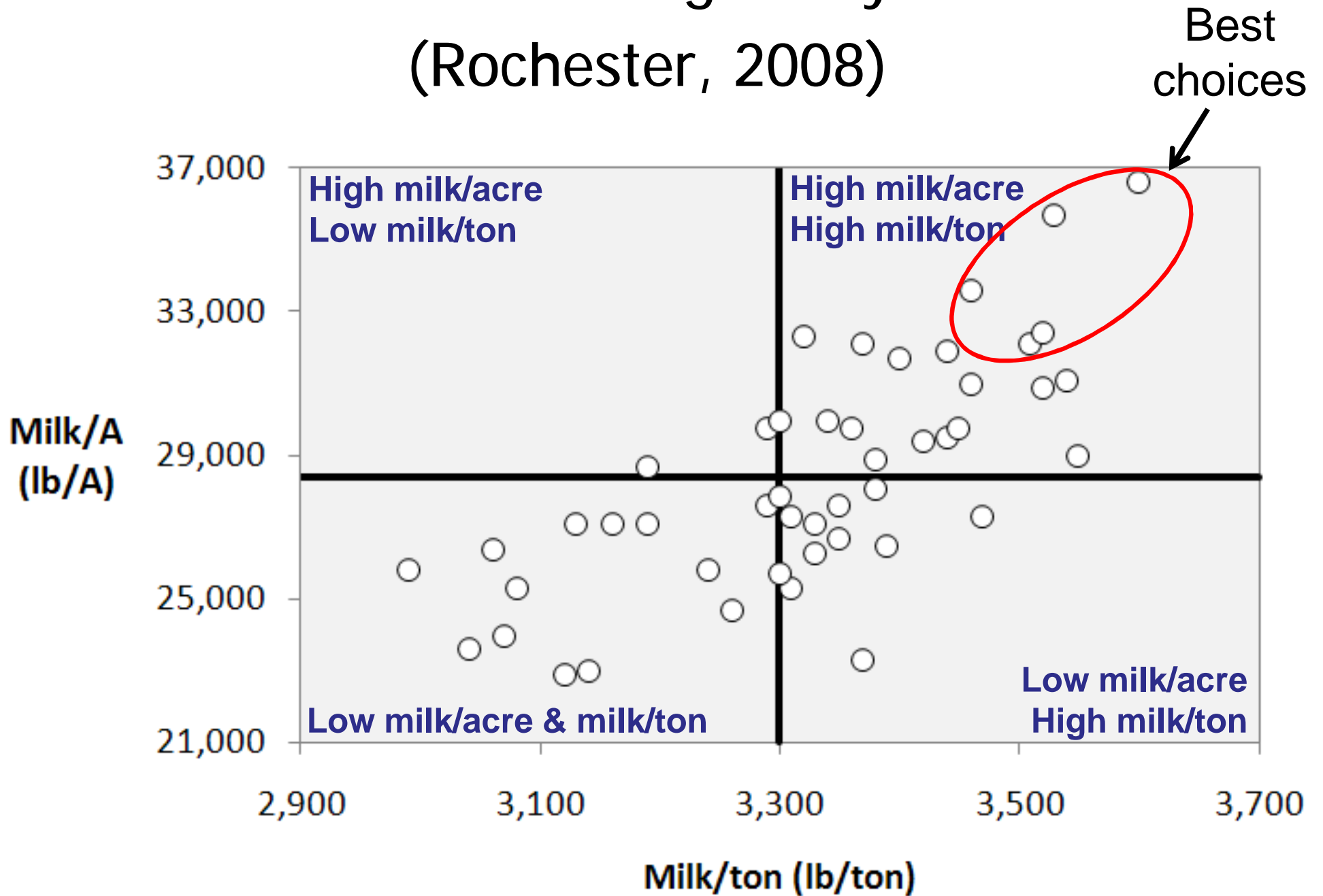
Variation Among 47 Hybrids

(Rochester, 2008)

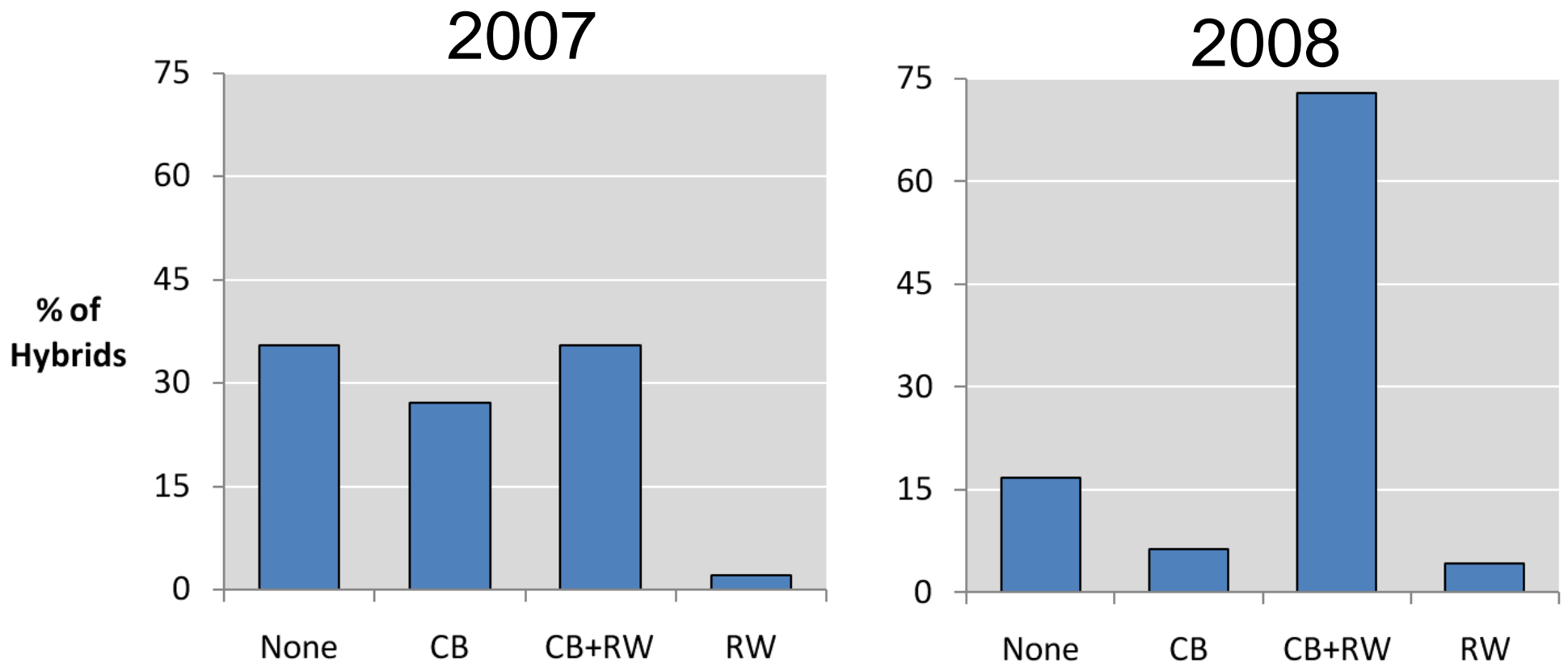
	Dry matter (tons/A)	Milk/ton (lb/ton)	Milk/A (lb/A)
Average	8.5	3,300	28,400
High	10.2	3,600	36,600
Low	6.9	2,990	22,900
Range	3.3	610	13,700



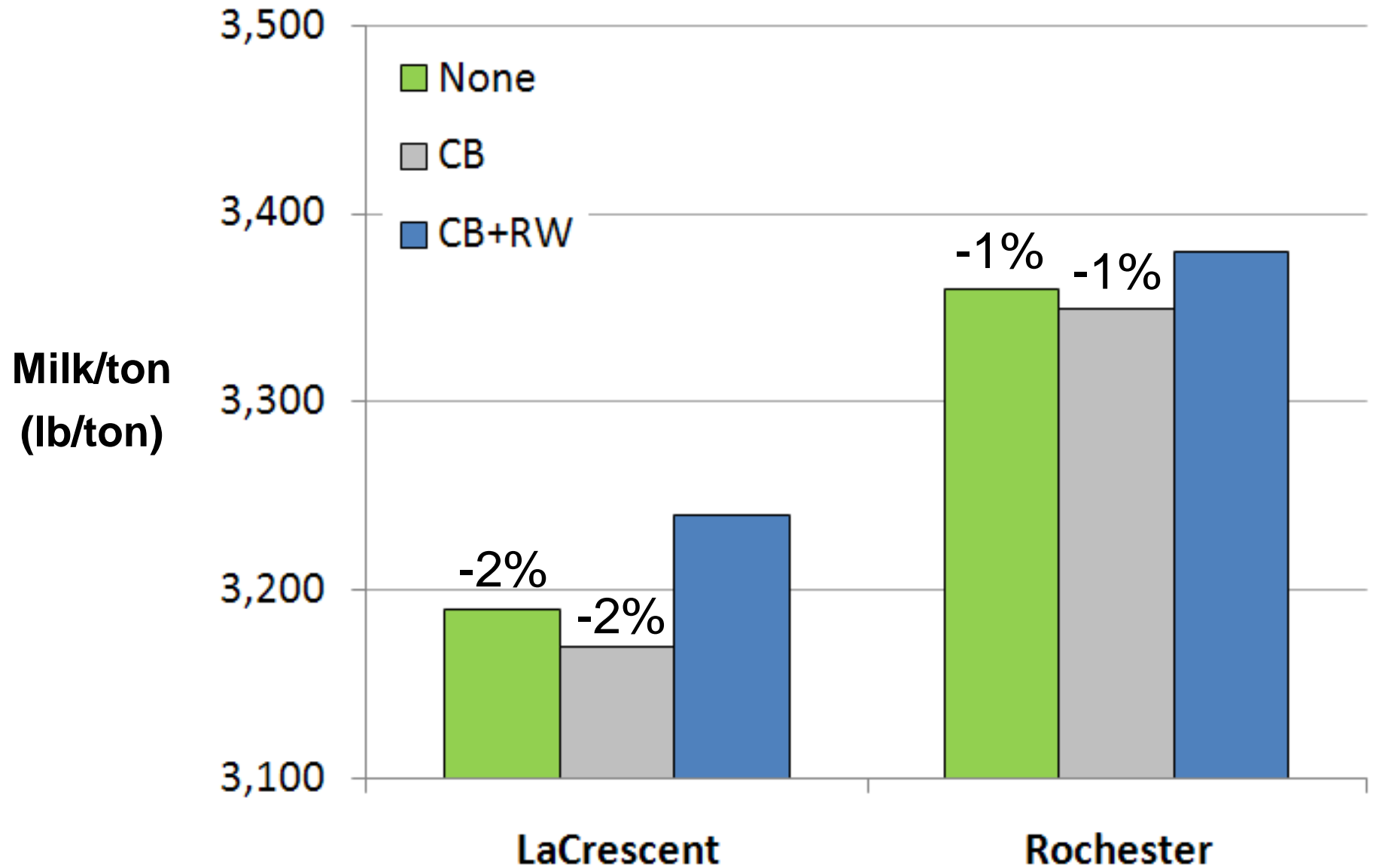
Variation Among 47 Hybrids (Rochester, 2008)



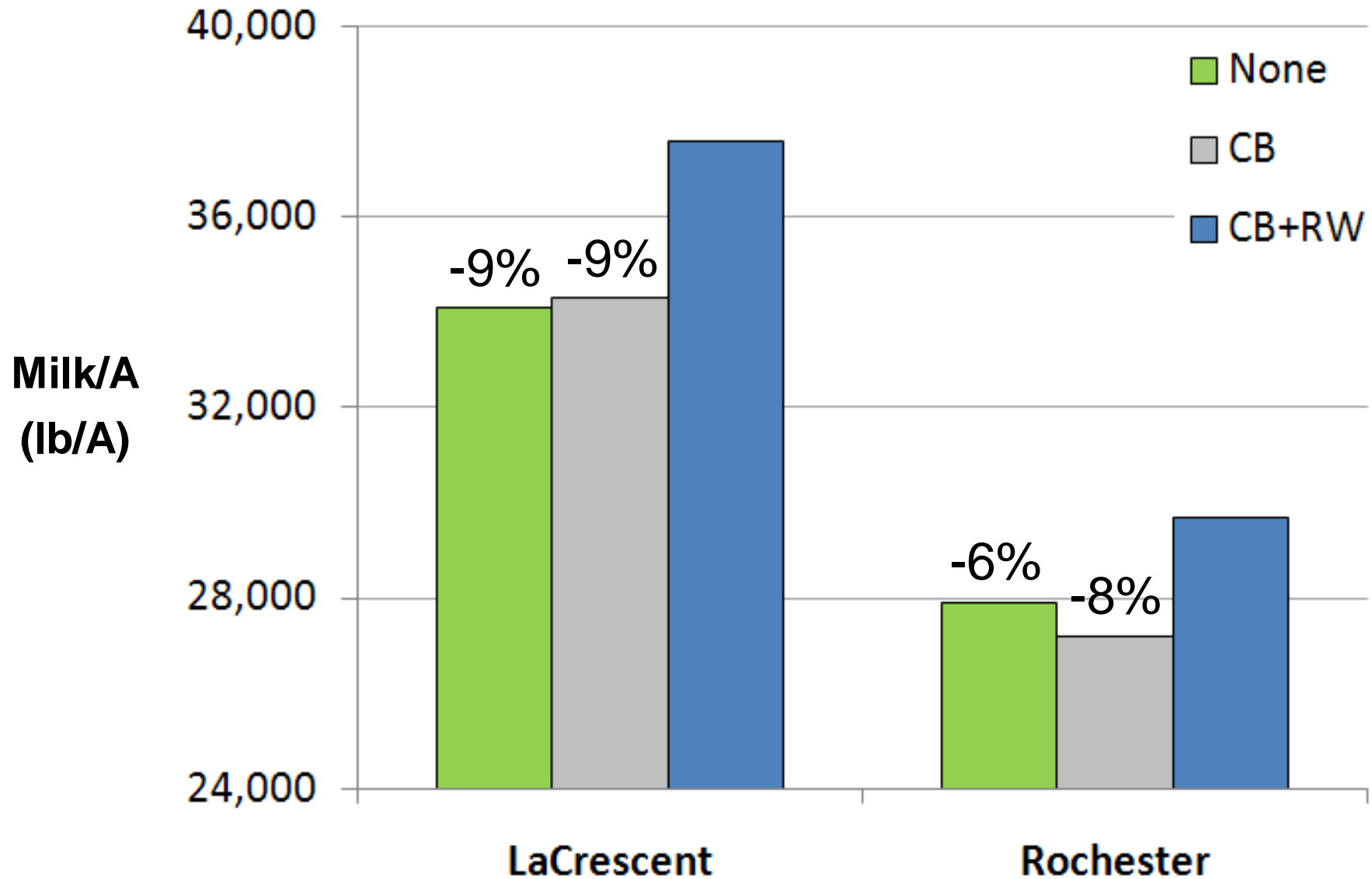
Insect Resistance of Hybrids Tested in Southeast MN Silage Trials



Milk per Ton of Hybrids Tested in 2007 Based on Insect Resistance

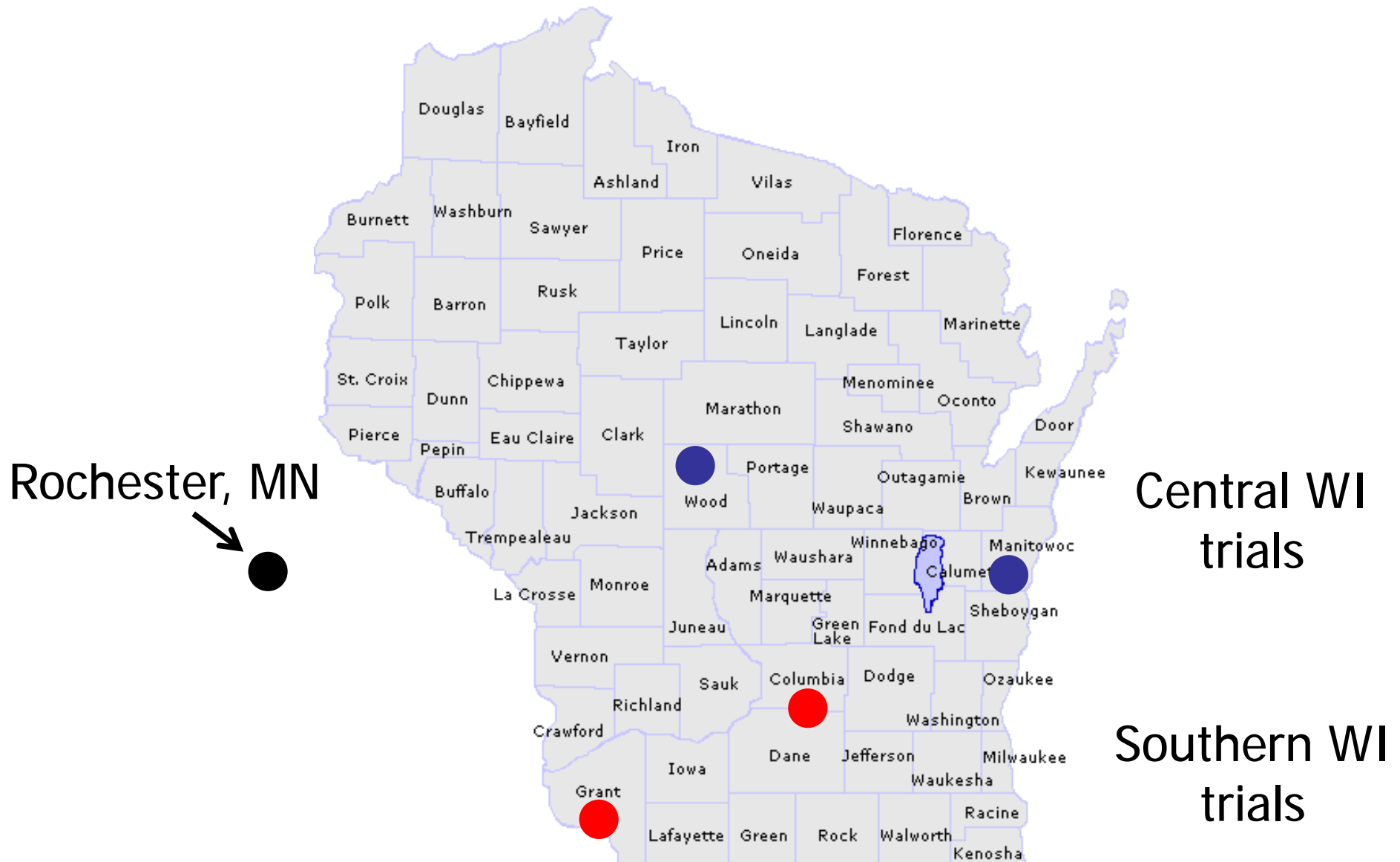


Milk per Acre of Hybrids Tested in 2007 Based on Insect Resistance

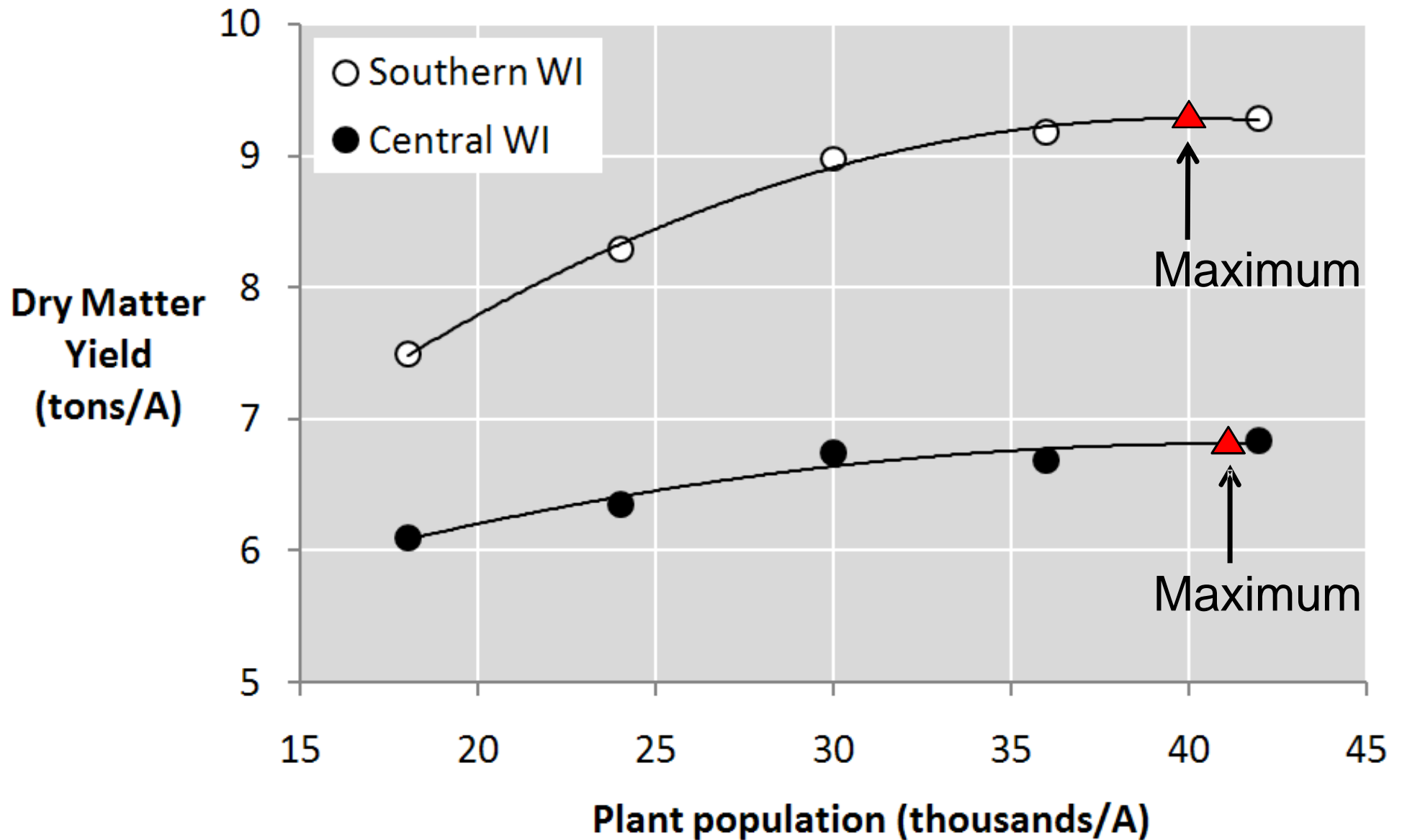


Corn Silage Plant Population Trials

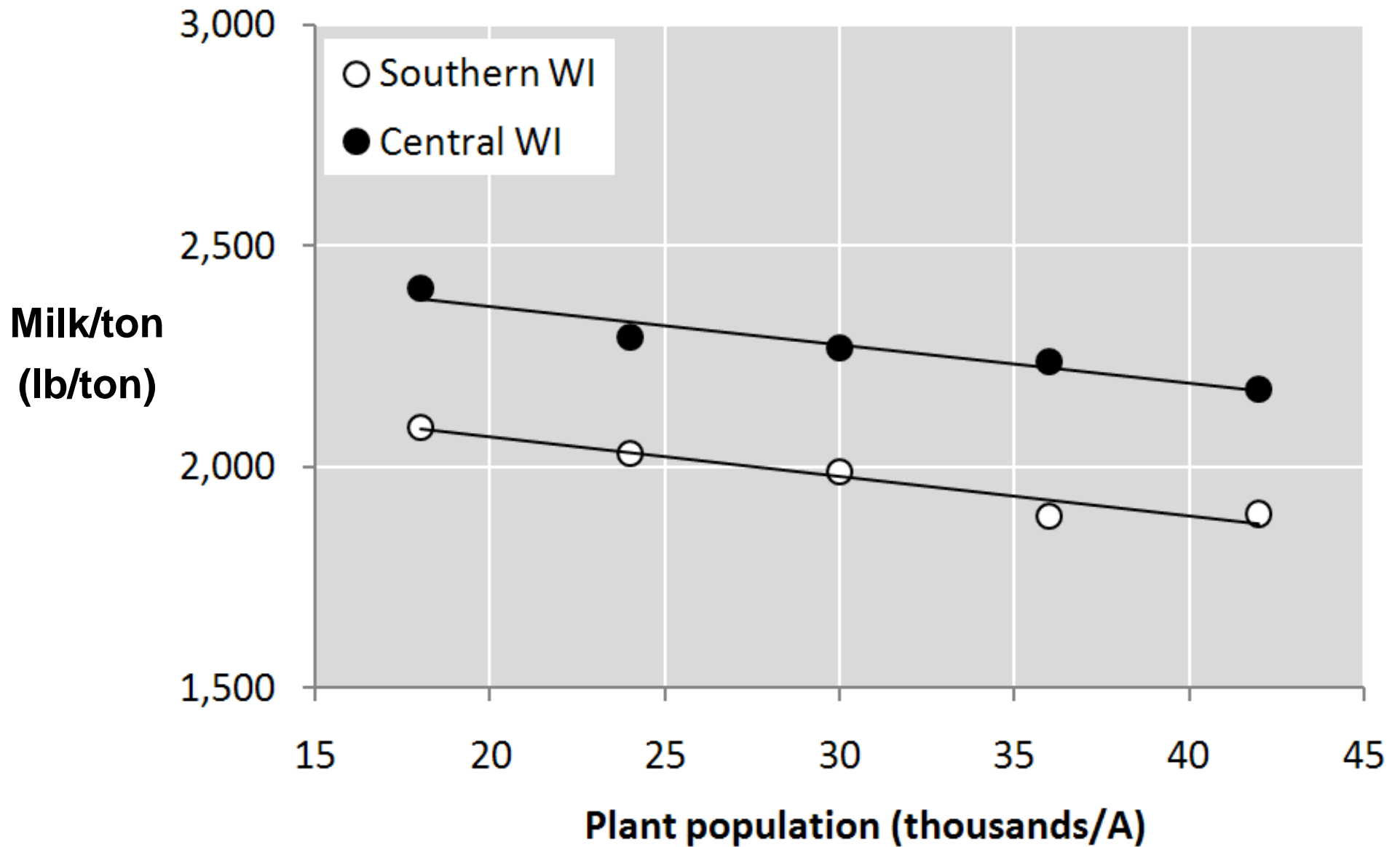
University of Wisconsin, 1994-1996



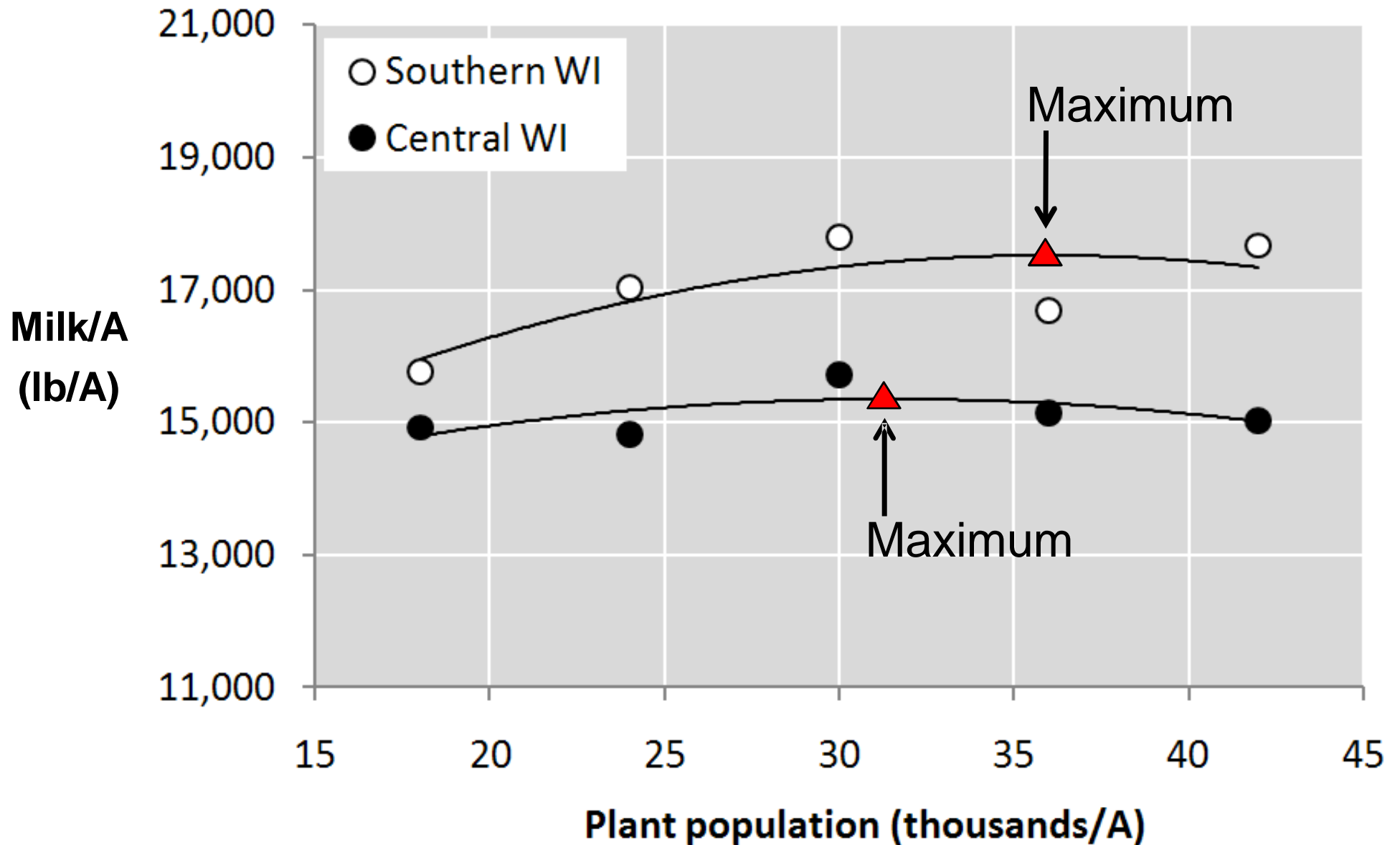
Wisconsin Corn Silage Trials, 1994-1996 (data averaged over 2 hybrids)



Wisconsin Corn Silage Trials, 1994-1996 (data averaged over 2 hybrids)



Wisconsin Corn Silage Trials, 1994-1996 (data averaged over 2 hybrids)



Data from Cusicanqui & Lauer, 1999

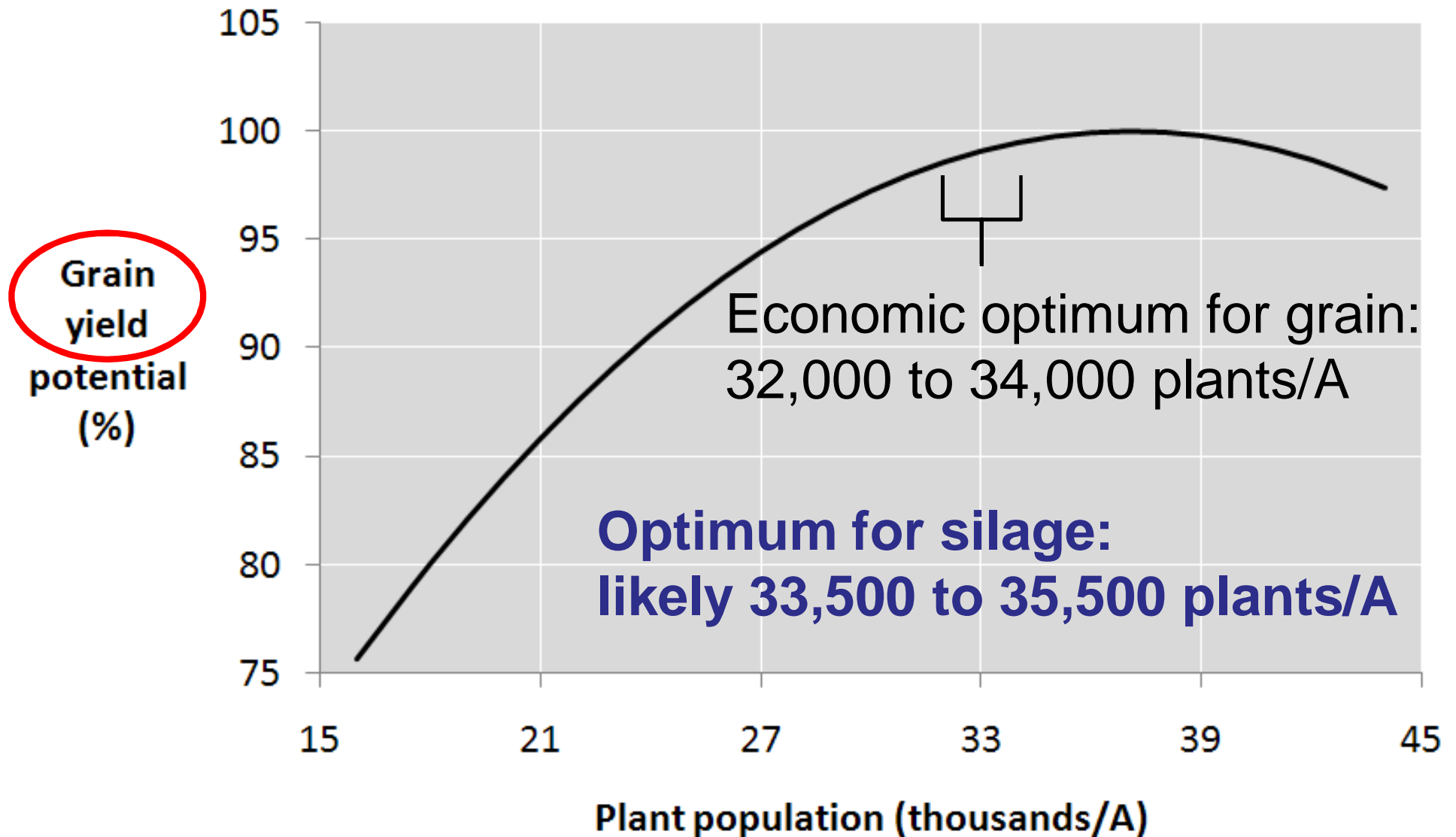
Corn Grain Plant Population Trials

University of Minnesota

- 34 trials from 2005-2008
- University of Wisconsin:
 - For silage, target populations that are 1,000 to 2,000 plants/A higher than those for grain



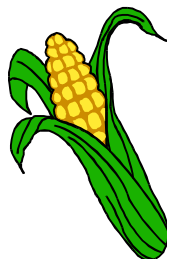
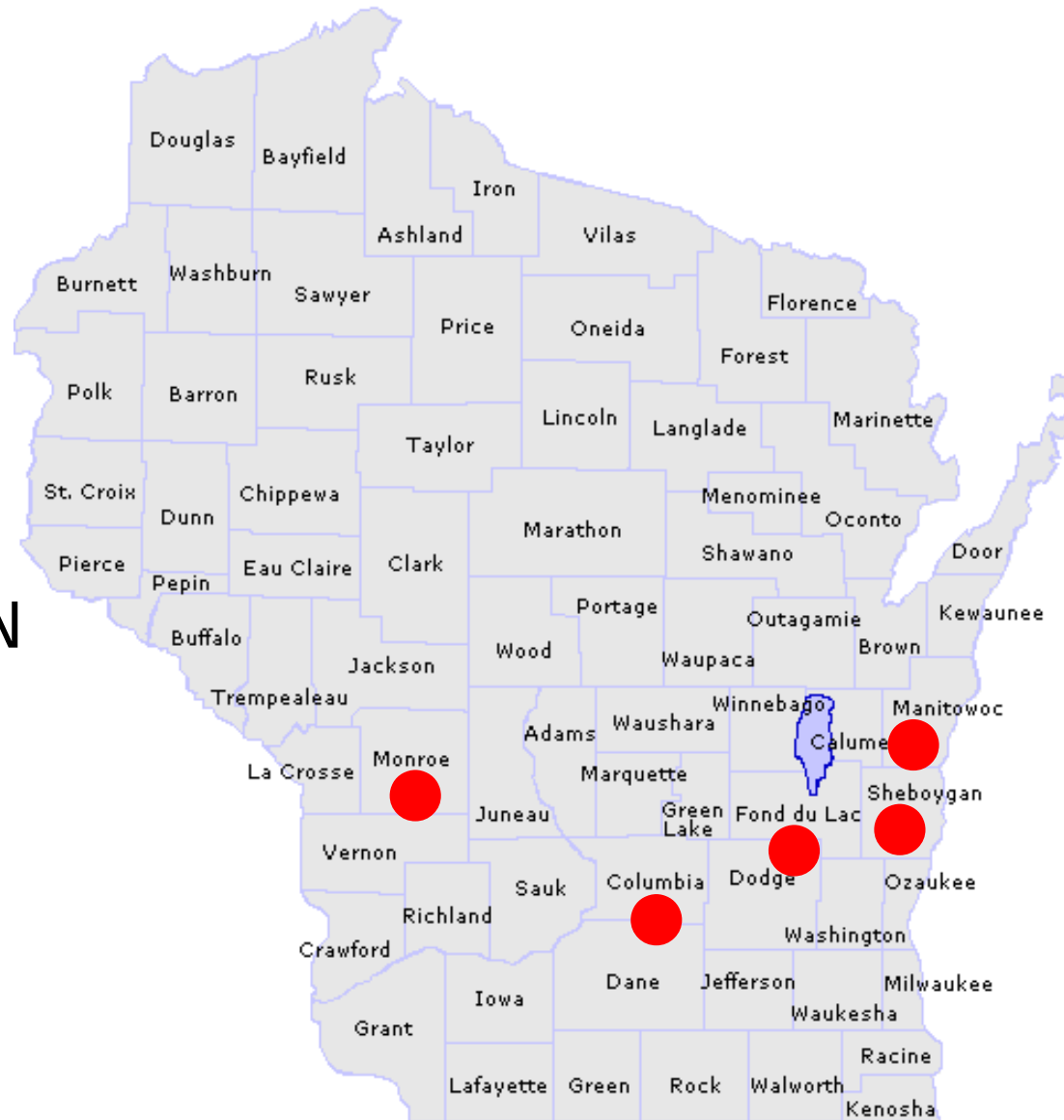
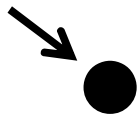
Average of 34 population trials from 2005-2008 at Lamberton & Waseca, MN



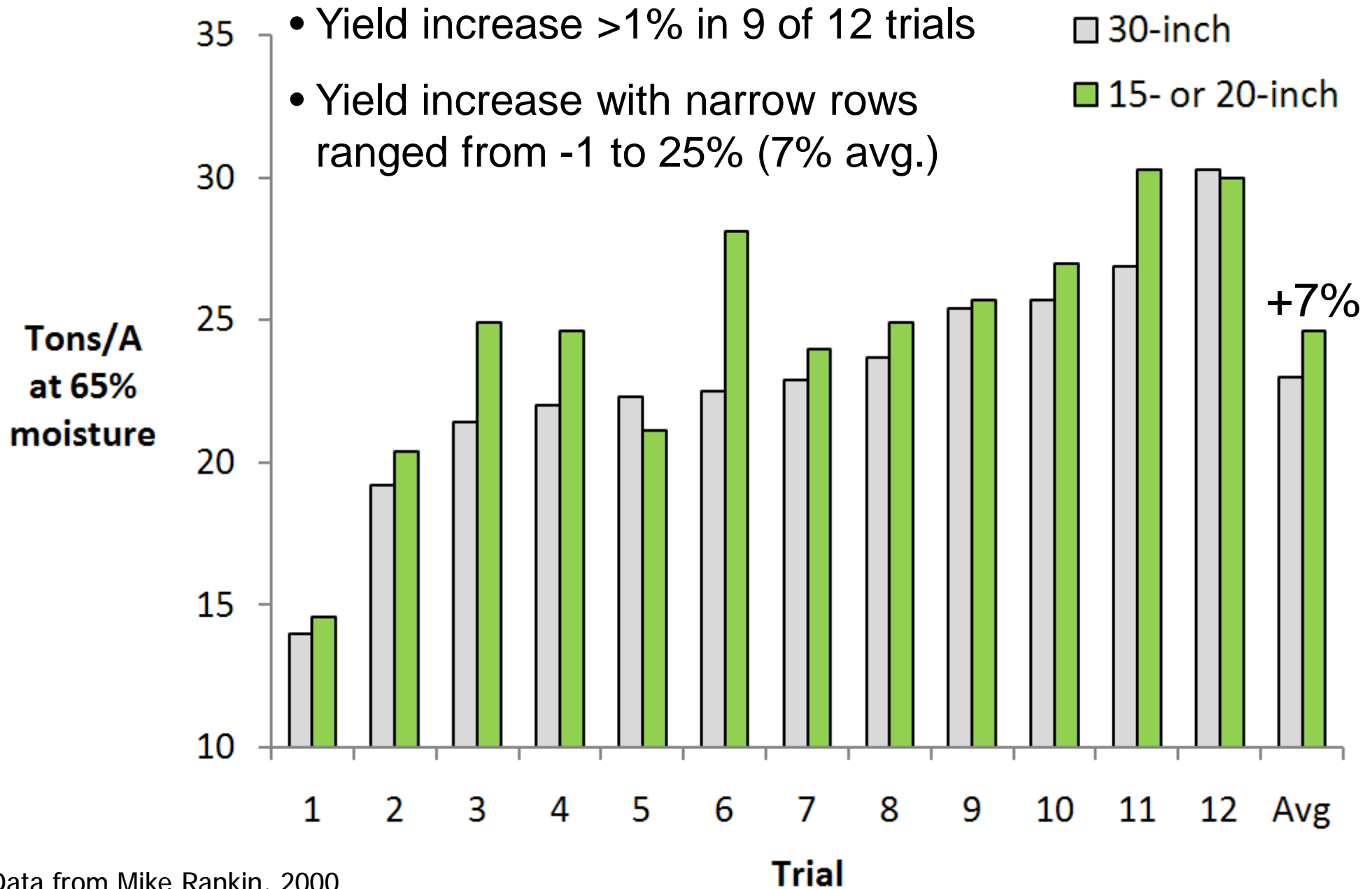
Corn Silage Row Spacing Trials

University of Wisconsin, 1997-1999

Rochester, MN



University of Wisconsin, 1997-1999



Additional Findings From the Wisconsin Row Spacing Study

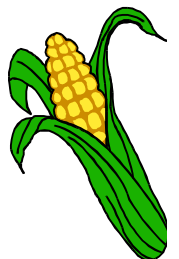
- Optimum plant population was similar for both row widths
- No benefit to populations above 35,000 plants/A
- These findings are consistent with those from trials in the northeastern U.S.



Additional Silage Trials Comparing 15- and 30-inch rows (1994-2000)

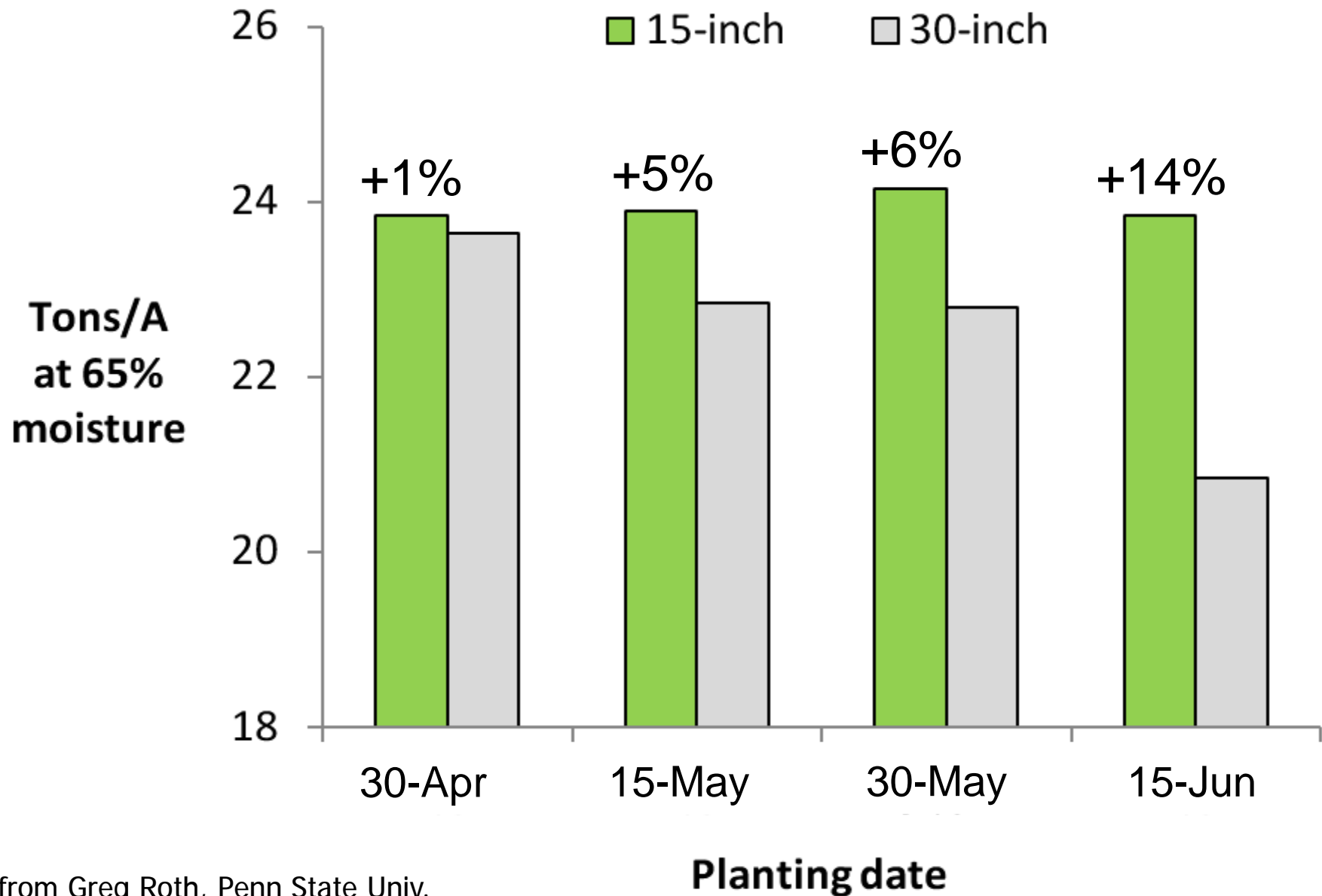
Location	# comparisons	Avg. increase in silage yield with 15" rows	Was forage quality impacted by row spacing?
New York	2	7%	No
New York	9	3%	No
Pennsylvania	4	5%	No
Pennsylvania	11	6%	No

Average = 5%



Lancaster, Pennsylvania: 1997-1998

(narrow rows had no impact on silage quality)



Additional Considerations for Narrow Rows

- Increased corn rootworm insecticide costs?
 - Not if using rootworm resistant hybrids
- Damage from wheel traffic with POST herbicide applications



30" rows



Twin-rows
7.5" / 22.5"

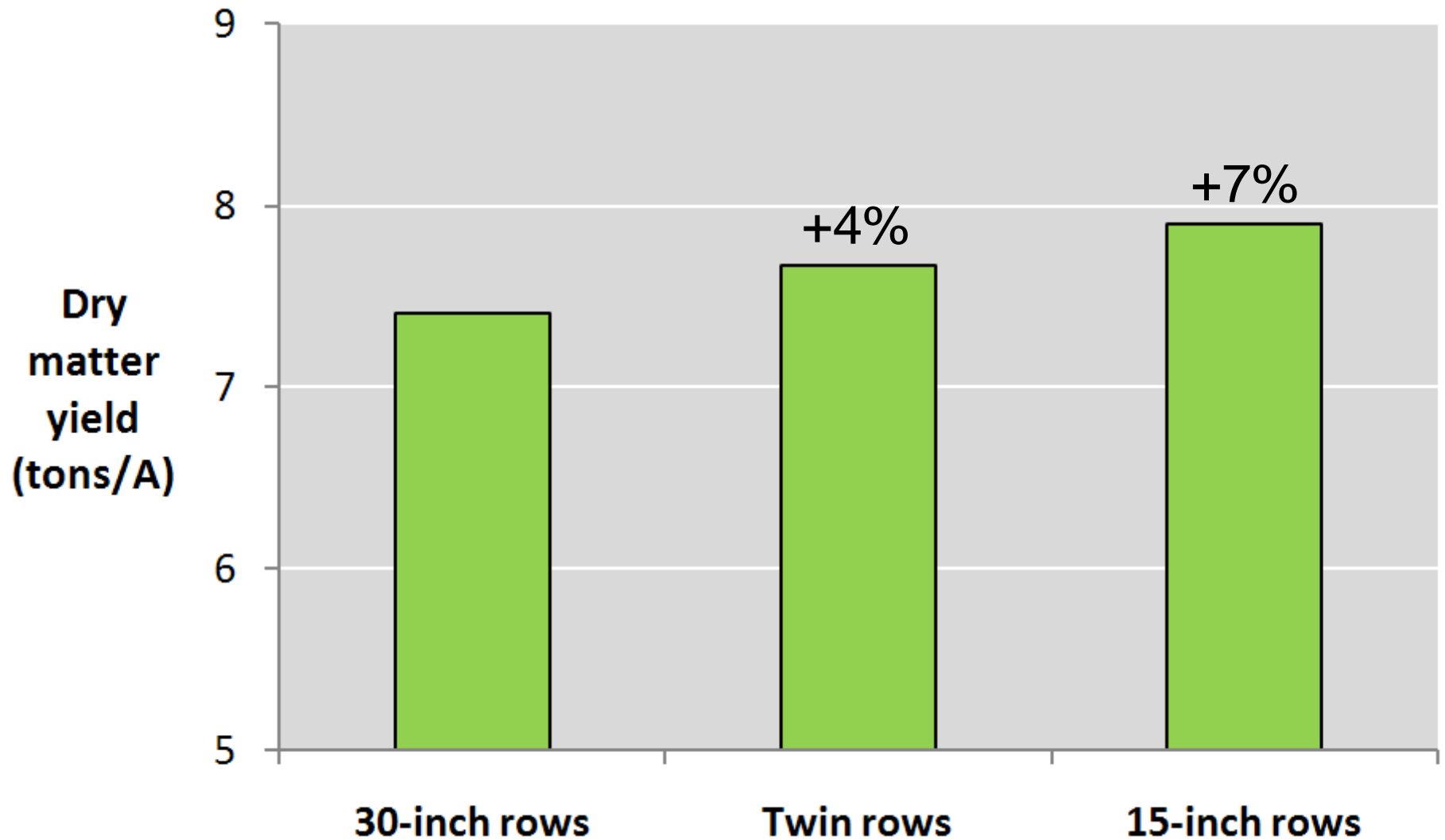


15" rows



Western New York: 2003-2004

(data averaged over 2 hybrids)

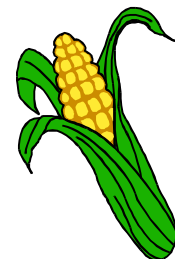
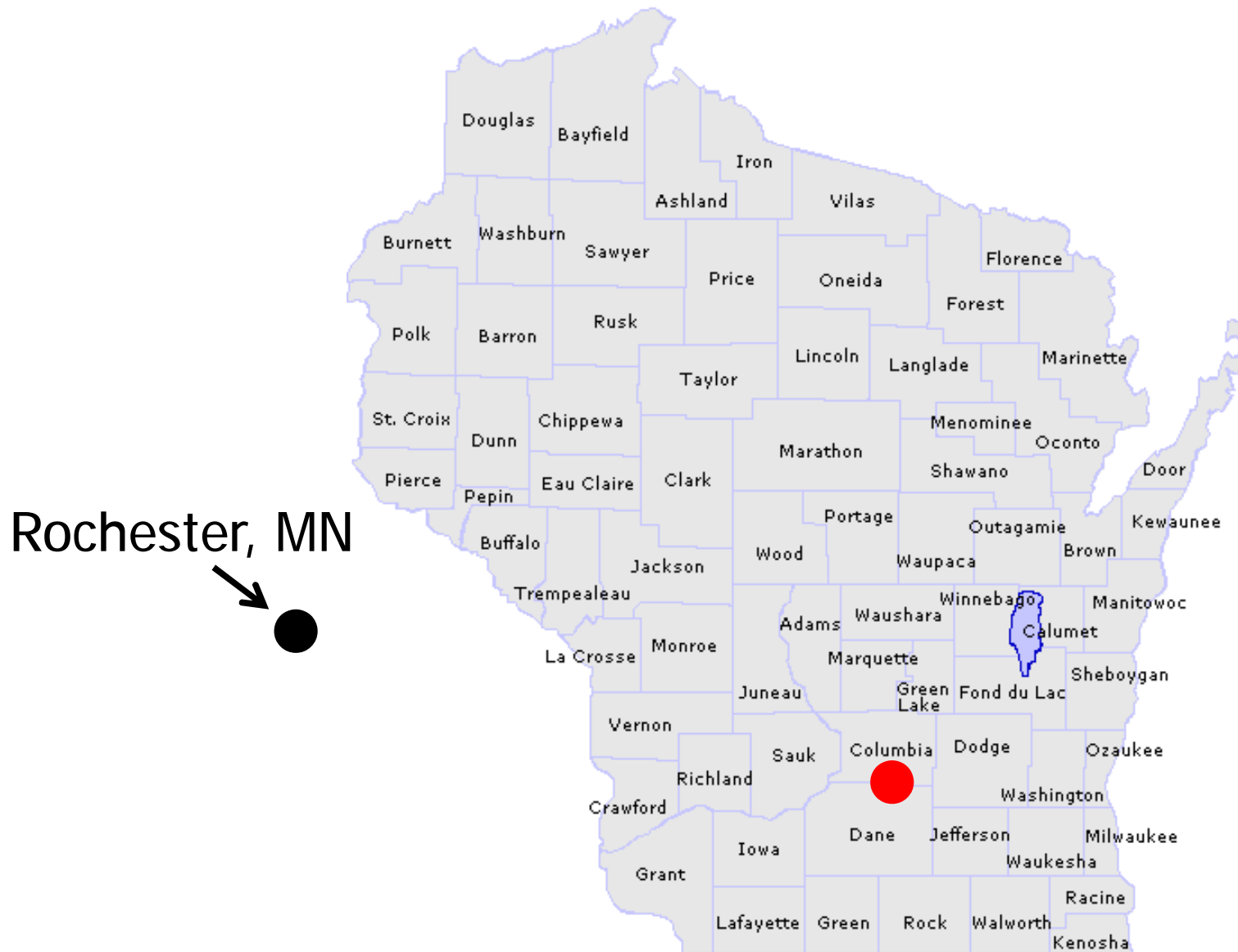


Data from Bill Cox et al., Cornell Univ.

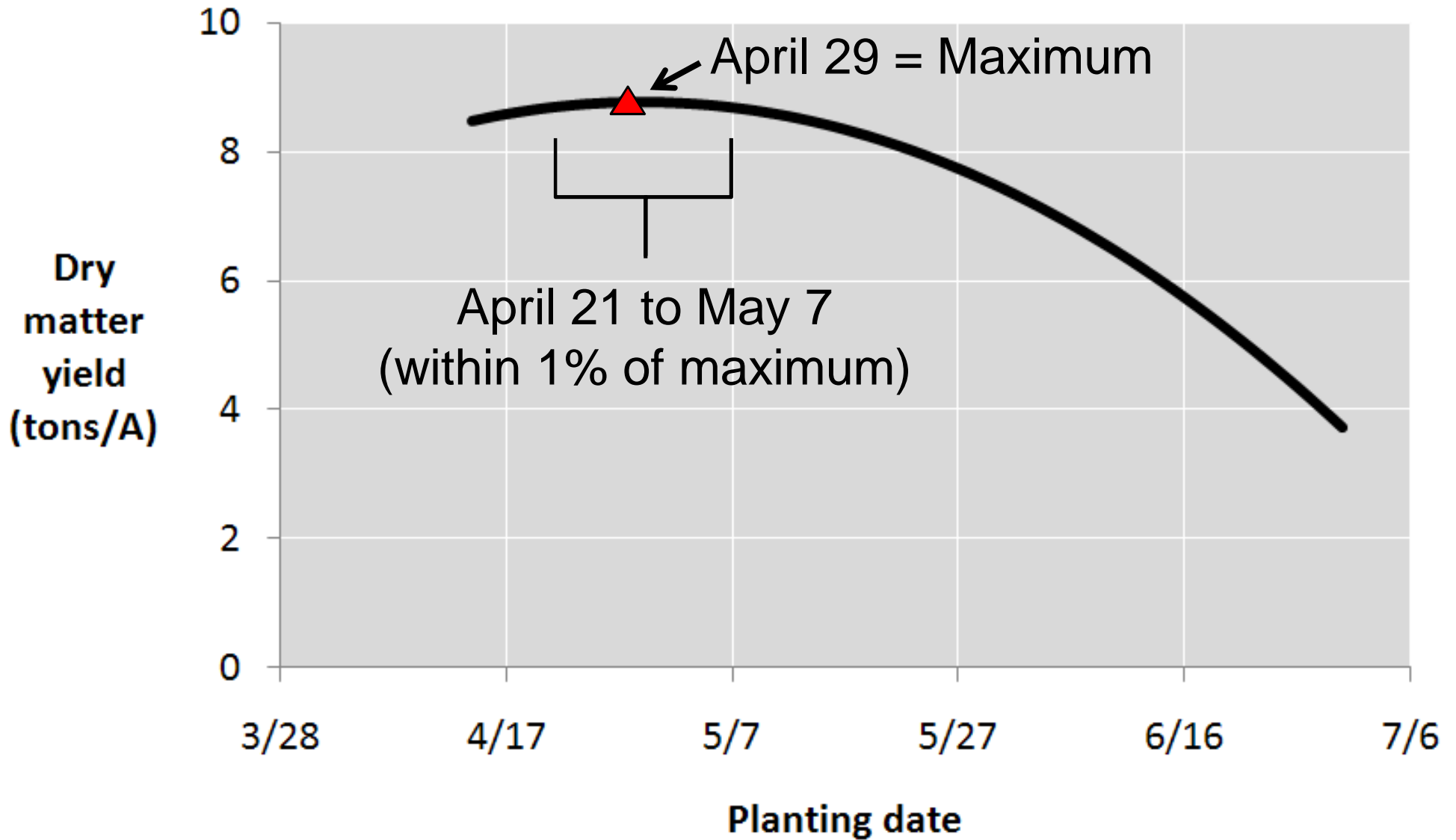
And... no differences in silage quality.

Corn Silage Planting Date Trials

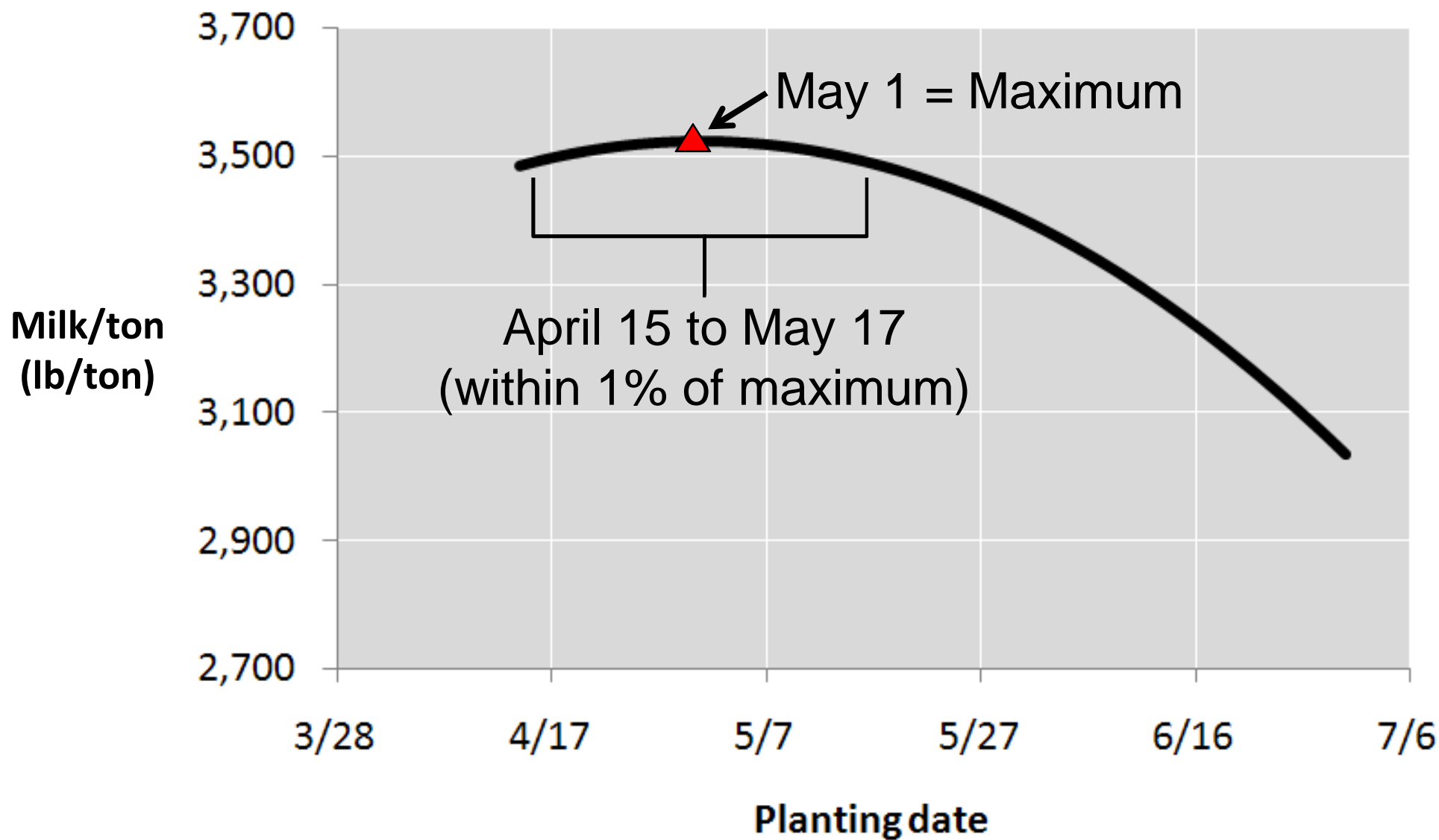
University of Wisconsin, 1997-2002



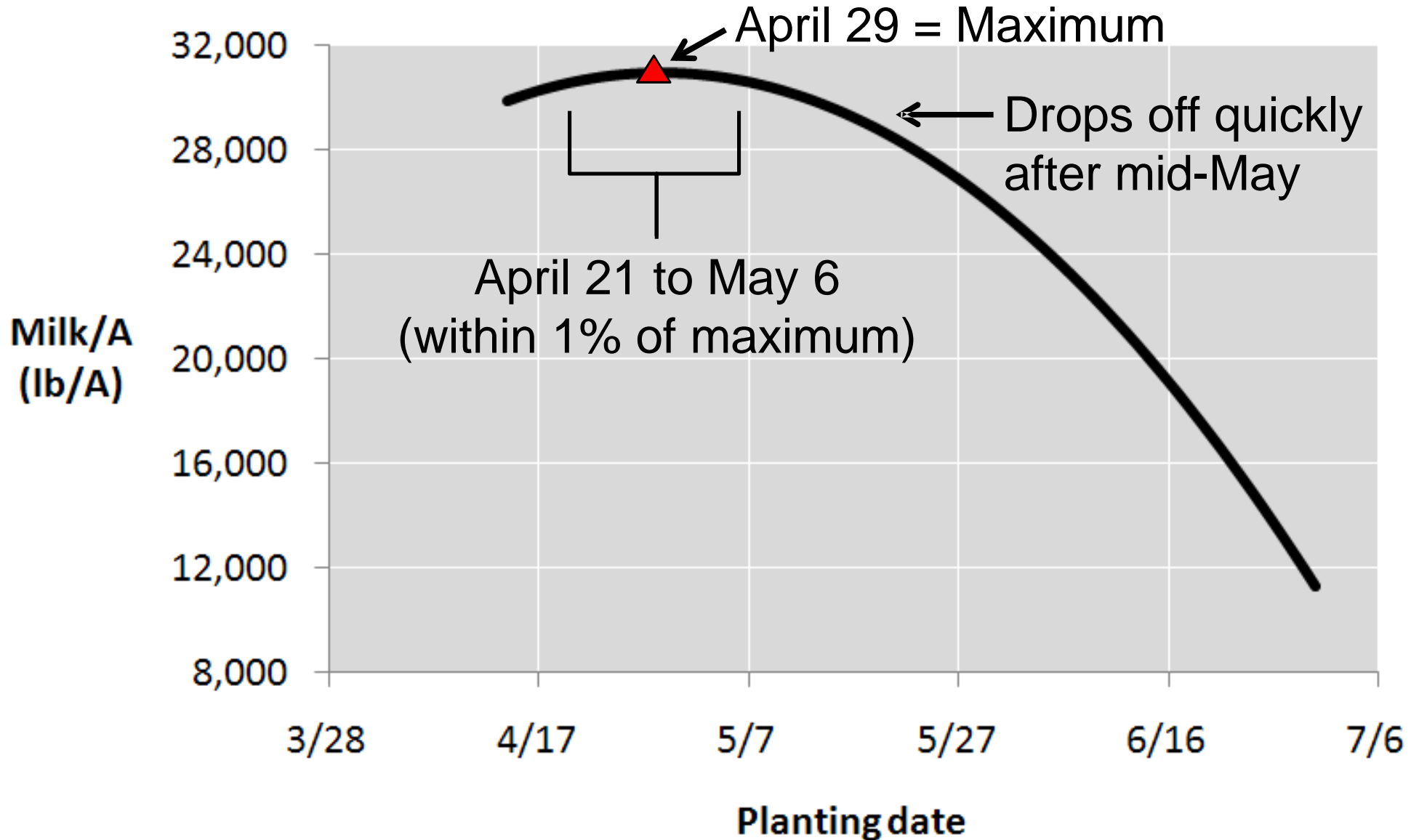
Arlington, WI: 1997-2002



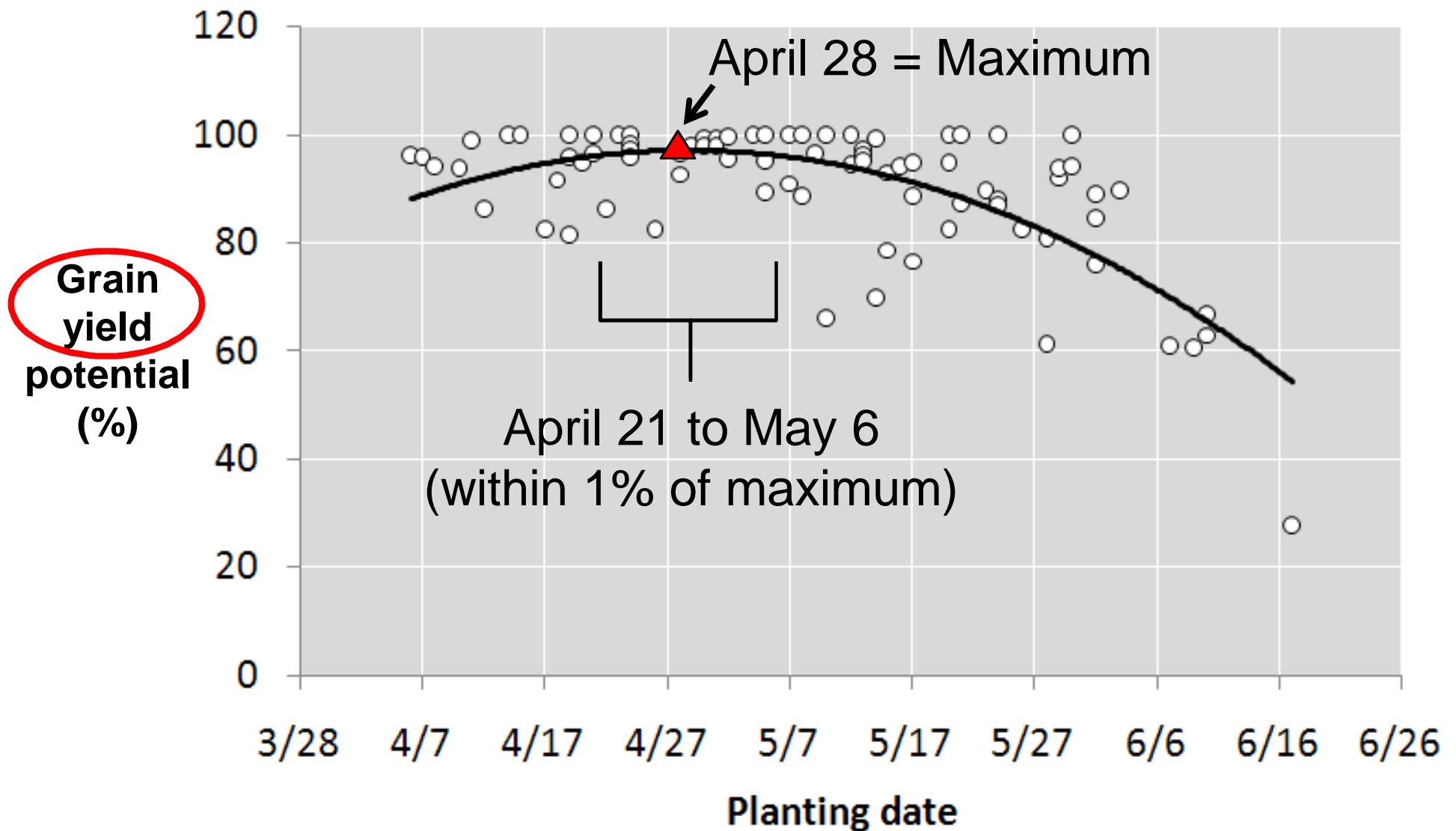
Arlington, WI: 1997-2002



Arlington, WI: 1997-2002



Lamberton, MN (1988-2003)



Data from Bruce Potter & Steve Quiring

Optimizing Corn Silage Production

- Hybrid selection (milk/ac & milk/ton)
- 1,000 to 2,000 more plants/ac than for grain
- Narrow rows?
- Management (same as for grain)
 - Plant early (late April or early May)
 - Control weeds and insects
 - Crop rotation
 - Adequate soil fertility
 - Avoid soil compaction during harvest and manure application

Questions or Comments?

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