



Stand Establishment for High-Yield Corn

Institute for Ag Professionals Field School

Lamberton, MN - July 21, 2010

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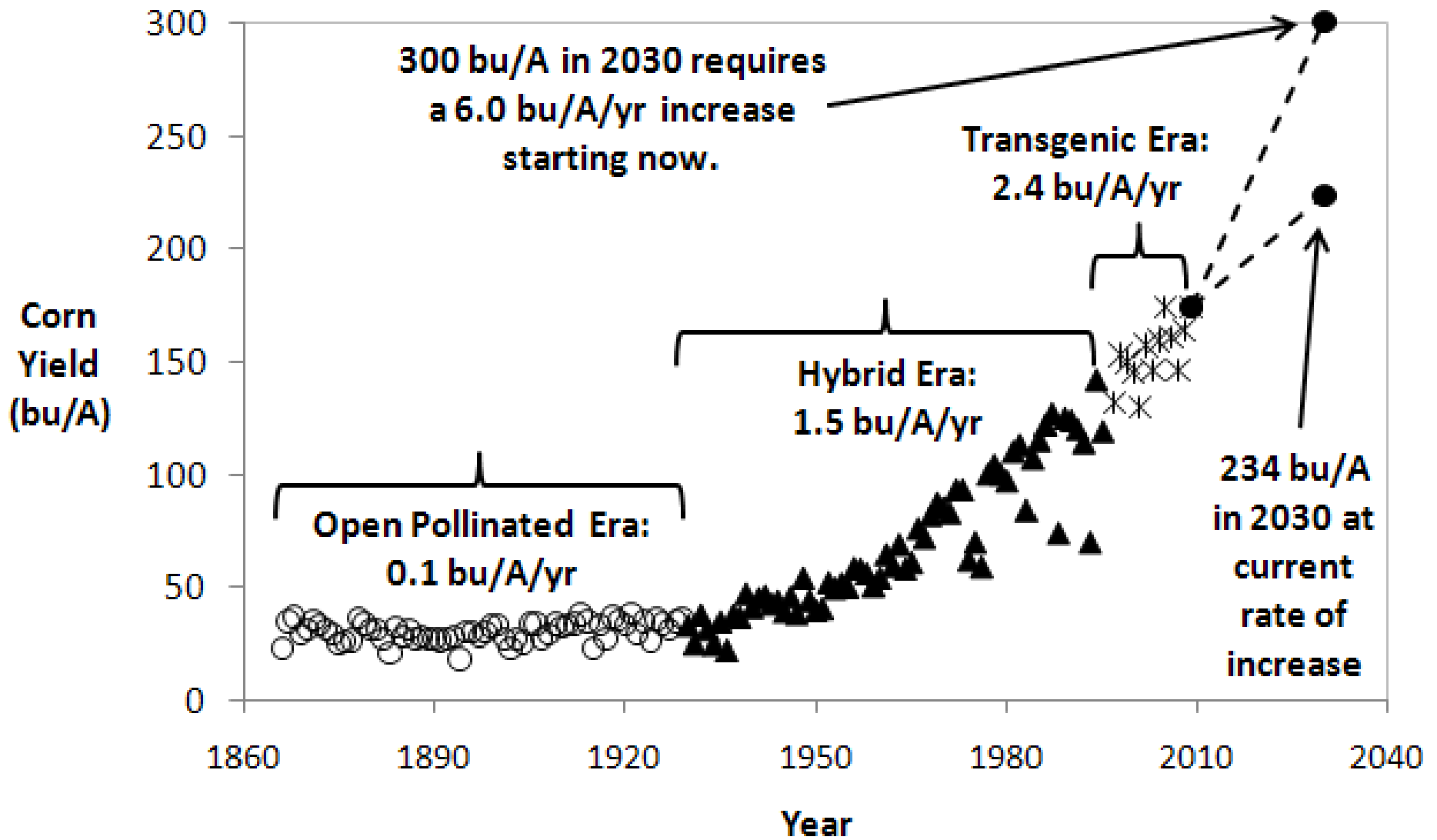
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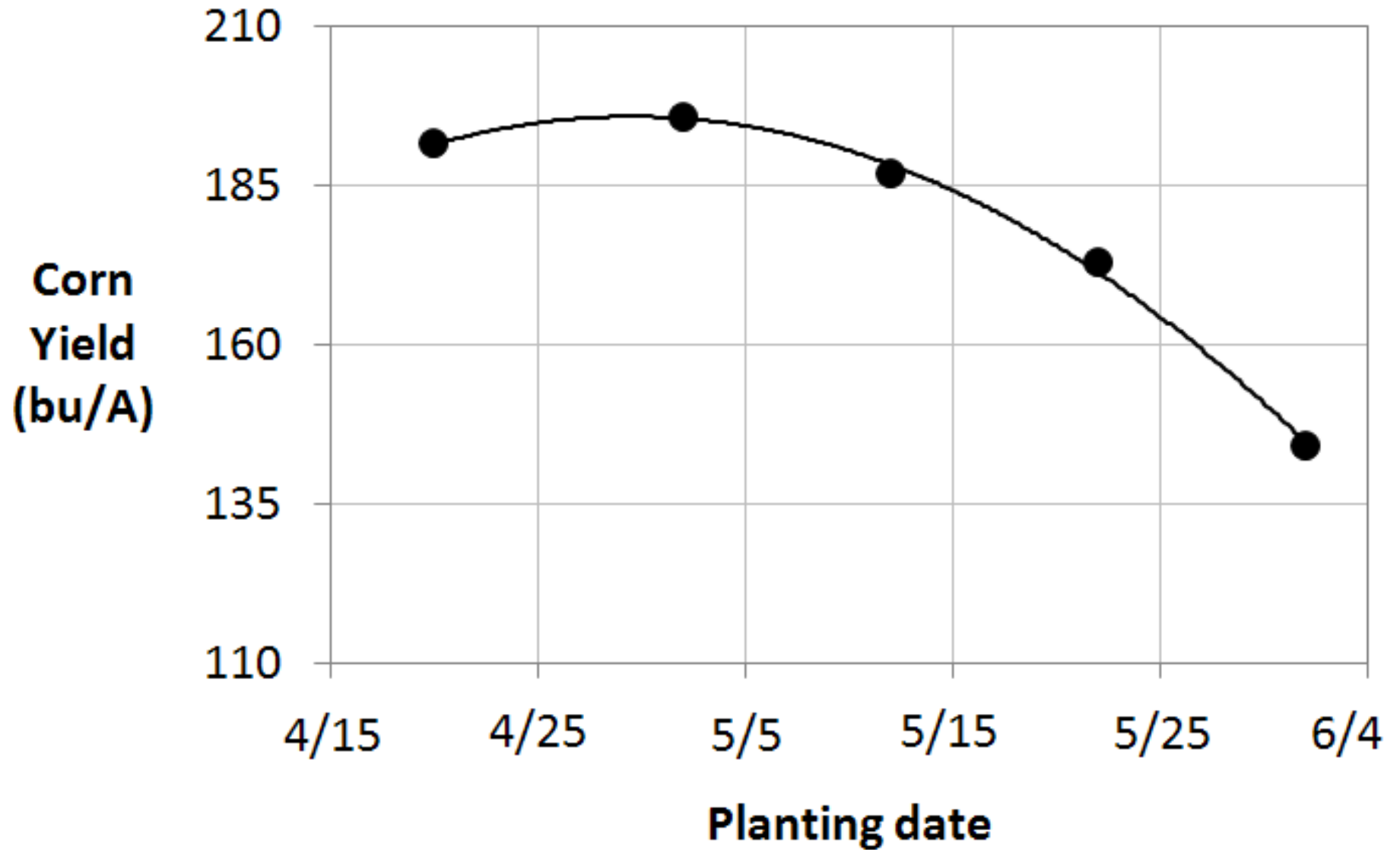
Minnesota Corn Yield: 1866 to 2030



Lamberton, MN - 2009 (Average of 6 Hybrids)

Planting date	Days to emergence	GDD lost for late planting	Silking date
April 22	21	0	July 26
May 2	14	58	July 26
May 12	10	138	July 29
May 22	8	259	Aug. 3
June 1	10	384	Aug. 9

Lamberton & Waseca - 2009 (Avg. of 6 Hybrids)



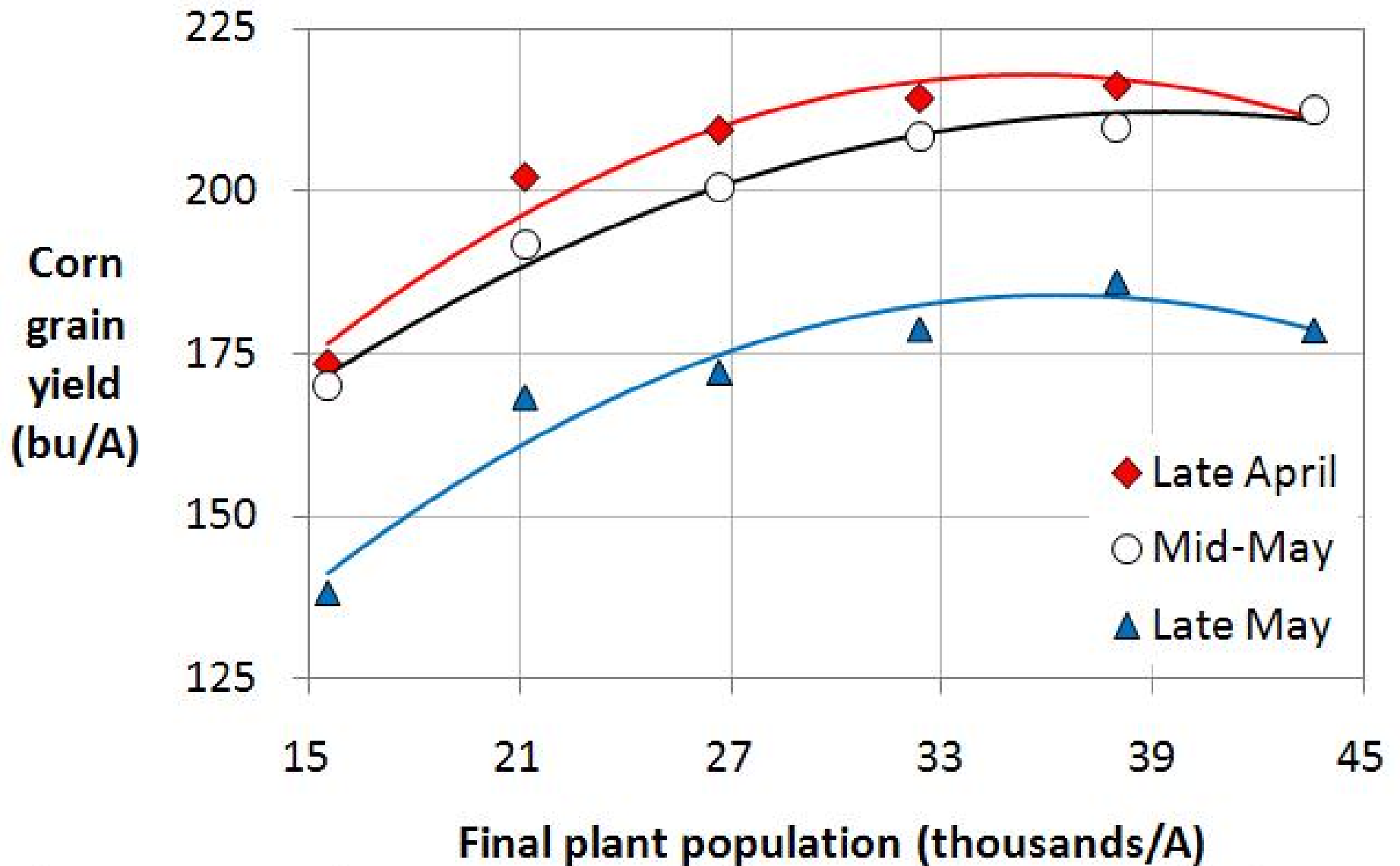
Corn Planting Date

- 1) Avoid planting ahead of snow or cold rain.
 - Avoids initial imbibition of cold water by seed.
- 2) Soil temps. greater than 50° F after planting reduce risk.

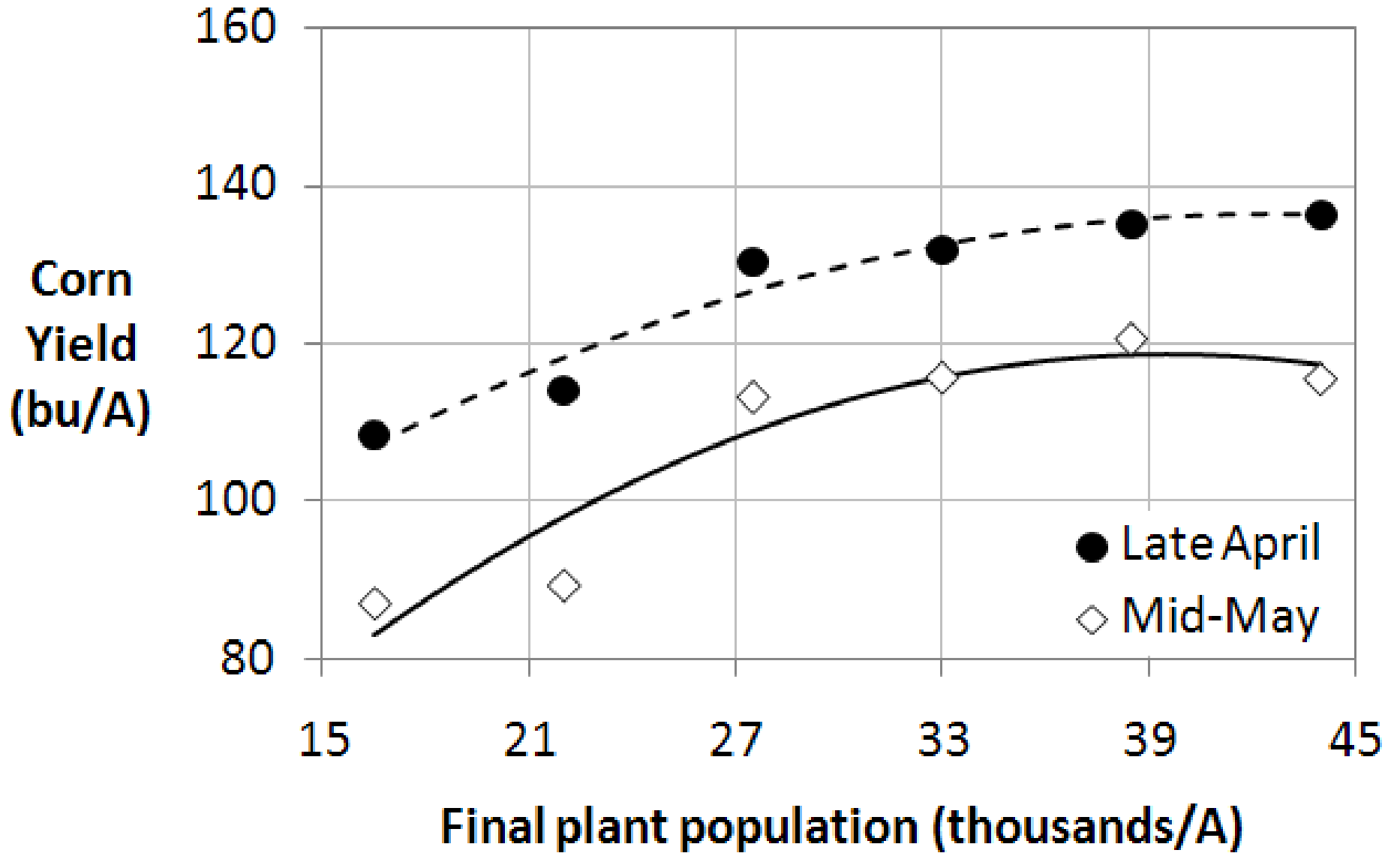
Avg. soil temp. during 4 weeks after planting	Emergence
56° F	90%
48° F	81%
41° F	61%

*Data from numerous hybrids in early-planted stress emergence trials in 2002 by Pioneer Hi-Bred.

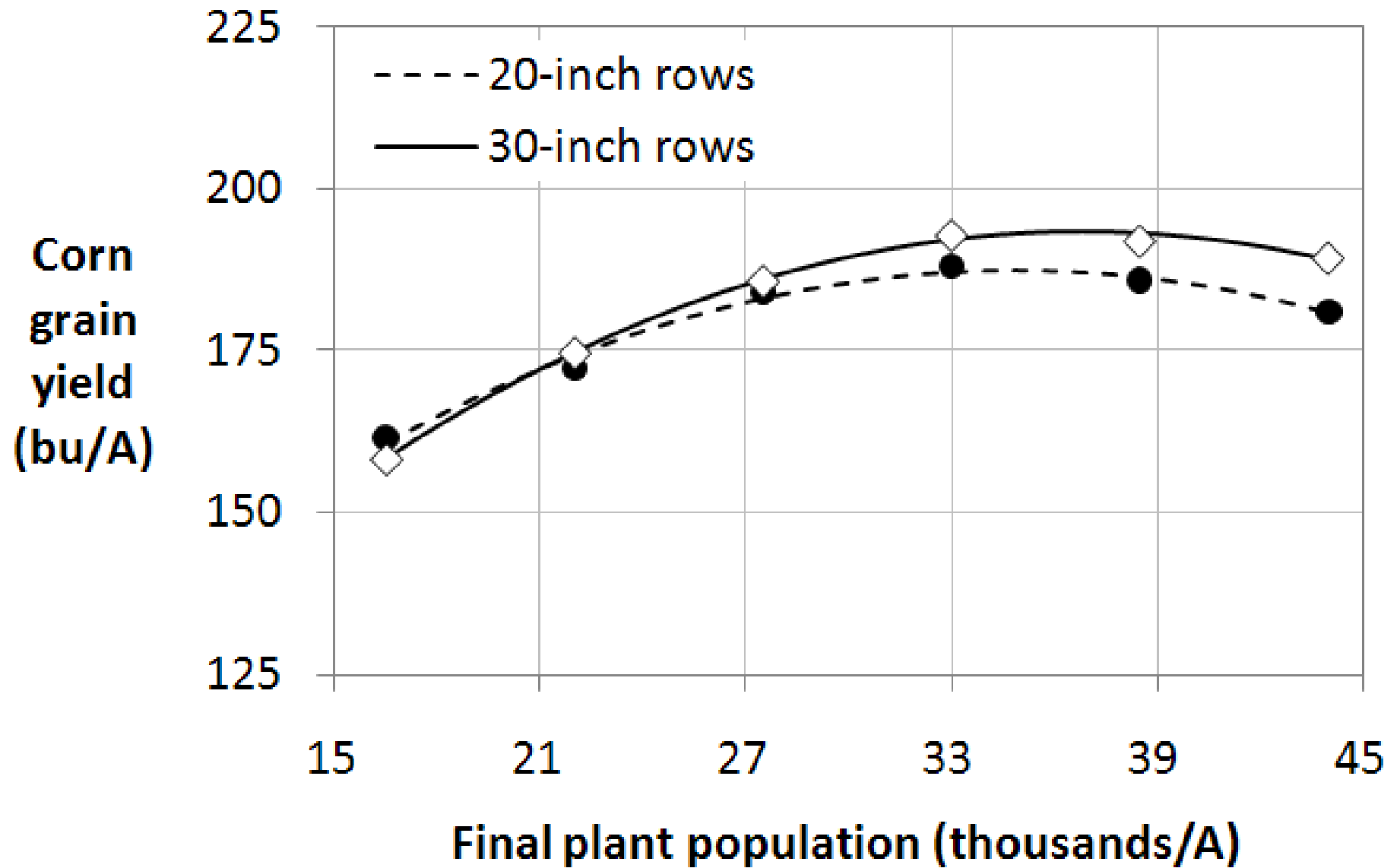
Lamberton & Waseca, MN - 2008 & 2009



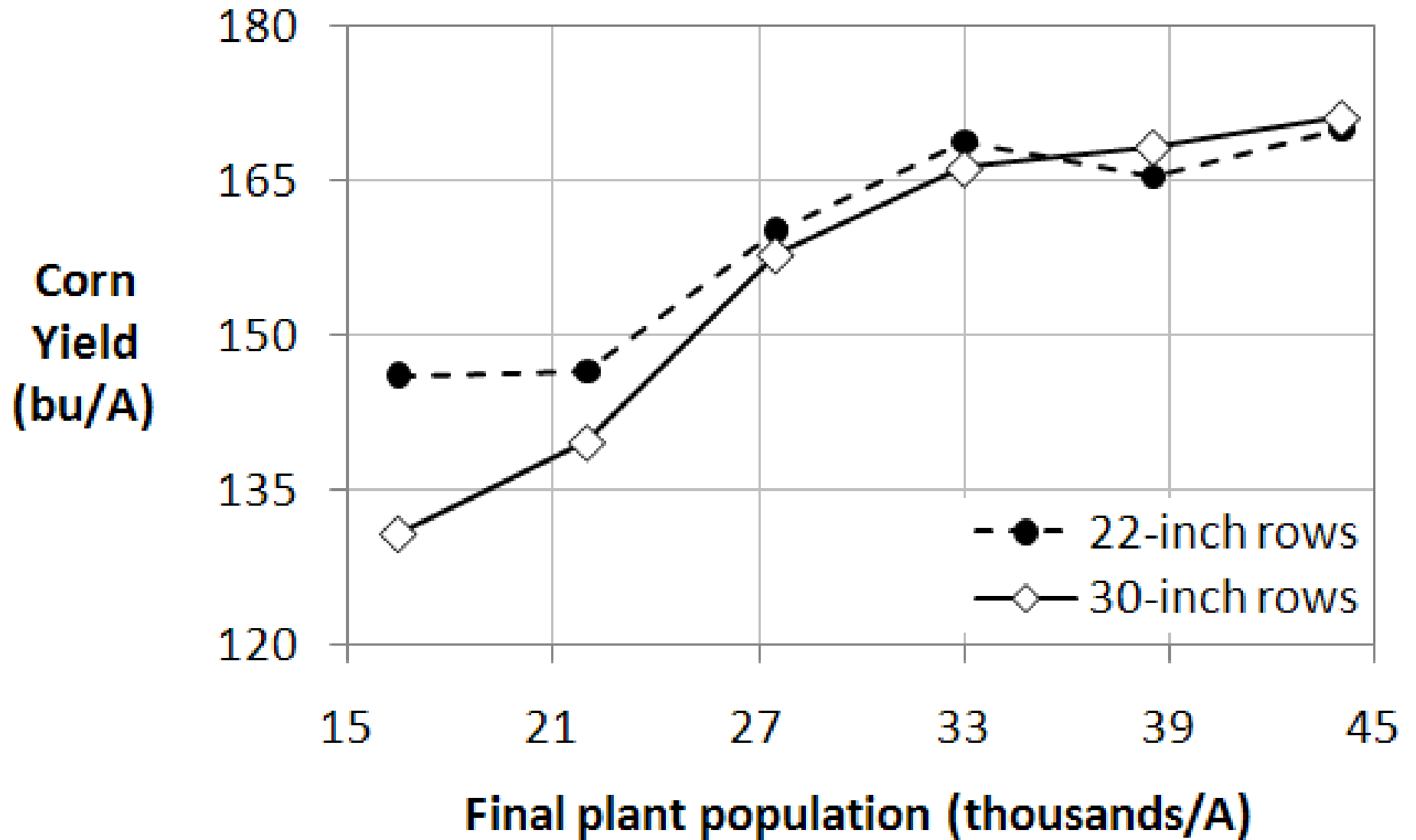
Morris, MN - 2009



Lamberton & Waseca - 2009 (Avg. of 3 Hybrids)



Crookston, 2009 - Pioneer 39V07 (80-day)



Seedbed Preparation

1) Don't till or plant when wet:

- Soil in depth of operation should crumble.

2) Firm seedbed is important for:

- Accurate planting depth.
- Soil moisture: emergence & nodal root establishment.

3) Conserve moisture in the seed zone:

- Prepare seedbeds close to planting.
- Avoid tillage deeper than 3 to 4" in spring.
- Consider rolling baskets to seal in moisture.

Use Row Cleaners if Residue is Present

- 1) Ensures that planter depth wheels run on soil and not residue = uniform planting depth.**
- 2) Warmer soil temp. in seed zone = quicker emergence.**
- 3) Residue in the seed furrow can:**
 - Cause seed-to-residue contact rather than seed-to-soil.
 - Cause shallow seed placement.
 - Dry out soil in the seed zone.
 - Favor diseases.

Planting Depth and Speed

- 1) Place the seed in moisture.**
 - 1.75" or 2" in most situations.
 - As deep as 2.5" if very dry.
- 2) Planter maintenance and adjustment for soil conditions are critical.**
- 3) Seal in moisture with closing wheels, but avoid compaction in wet soils.**
- 4) Avoid fast planting speeds (>5.5 mph) for uniform seeding depth and seed spacing.**

Avoid Sidewall Compaction

- 1) If possible, don't plant when wet.
- 2) Reduce down pressure on gauge wheels and closing wheels when wet.
- 3) Consider spoked closing wheels to fracture side walls when wet.
- 4) Consider a coulter in front of the double-disk openers.

Lamberton - 1984 to 1989 (32,000 plants/A)

Emergence pattern	Avg. of all plants	Early plants	Late plants
— Yield (% of control) —			
Uniform	100%	---	---
1 leaf-stage delay on every other plant	94%	107%	80%
2 leaf-stage delay on every other plant	83%	118%	49%
Every other plant missing	73%	---	---

Ford and Hicks, 1992 (*Journal of Production Agriculture*)

2 locations in Ontario - 2001 & 2002 (27,000 plants/A)

Emergence pattern	Avg. of all plants	Early plants	Late plants
— Yield (% of control) —			
Uniform	100%	---	---
2 leaf-stage delay on every 6th plant	95%	103%	65%
4 leaf-stage delay on every 6th plant	91%	107%	28%

Liu et al., 2004 (*Agronomy Journal*)

Uneven Spacing Study - 2 locations in Ontario 2000 & 2001 (27,000 plants/A)

Plant spacing	Avg. of all plants	Plant next to gap	Avg. of plants in double or triple
——— Yield (% of control) ———			
Uniform	100%	---	---
1 double in 6	99%	110%	92%
1 triple in 6	98%	110%	91%

Liu et al., 2004 (*Agronomy Journal*)

Standard Deviation (STDEV) of Plant Spacing

Example 1	Example 2
Space between plants (inches)	Space between plants (inches)
6	8
6	5
7	5
7	7
6	4
6	7
6	5
6	9
Avg. = 6.3	Avg. = 6.3
STDEV = 0.5	STDEV = 1.8

- A STDEV of 2.0 inches is about the best one can achieve in the field.
- Each 1.0 inch in STDEV above 2.0 reduces yield by 2.5 bu/A to 4.2 bu/A (Purdue Univ. & Pioneer Hi-Bred, respectively).

**Thanks to the
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Thanks!



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