Strip-till Research Results: Rotation, Automatic Guidance, and Fertilizer Placement

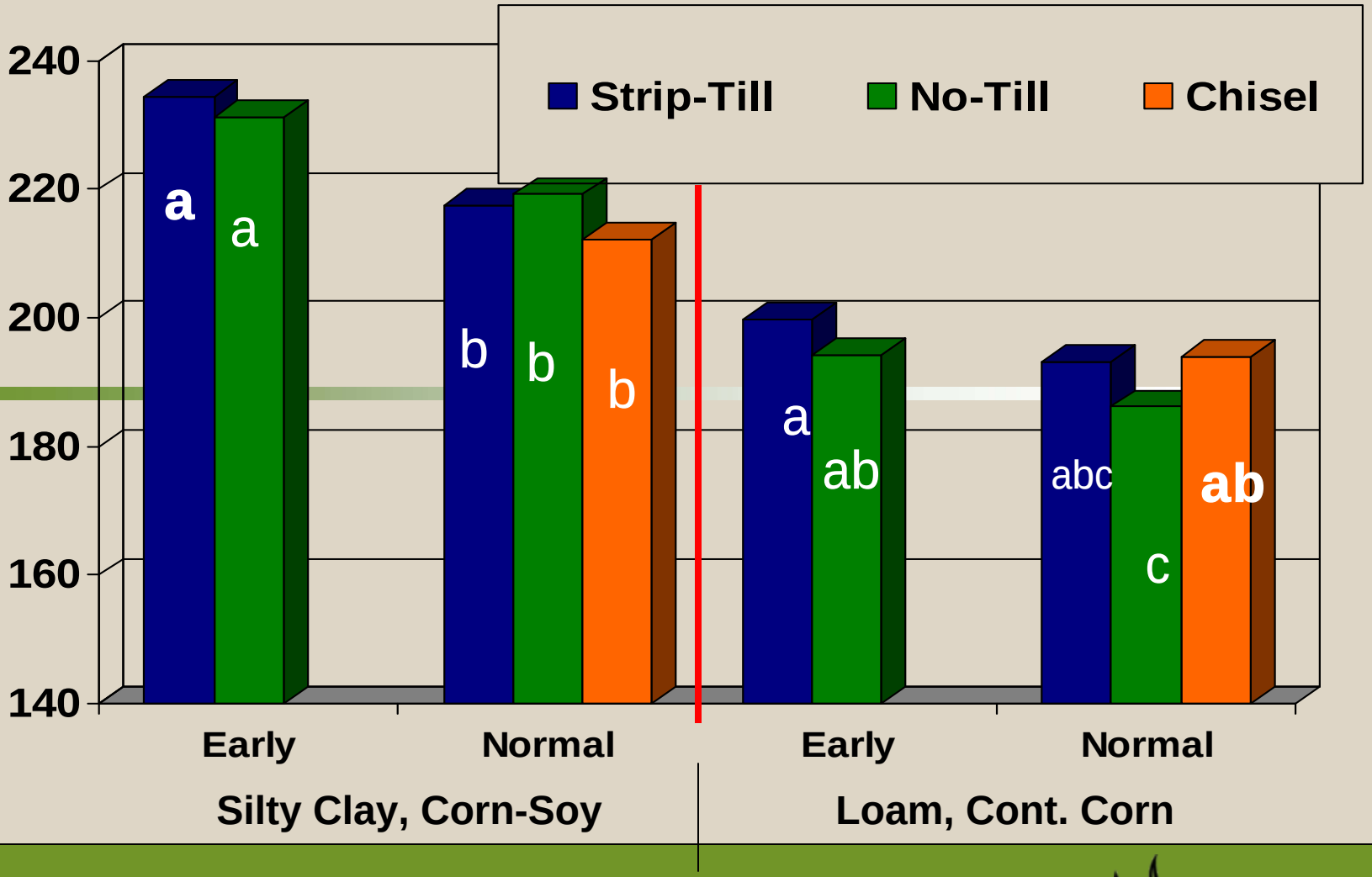
Tony J. Vyn & Graduate Students, Colleagues & Farmers

Berms after Soybean Harvest

Berm Heights in Spring after Successful Strip Tillage

No-till vs. Strip-till Following Soybean
Wanatah, IN, 2008

Corn Yield Response to Tillage and Planting Date in Indiana, 2003-04



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Spring Strip-till Berms

Other Spring Tillage Options?

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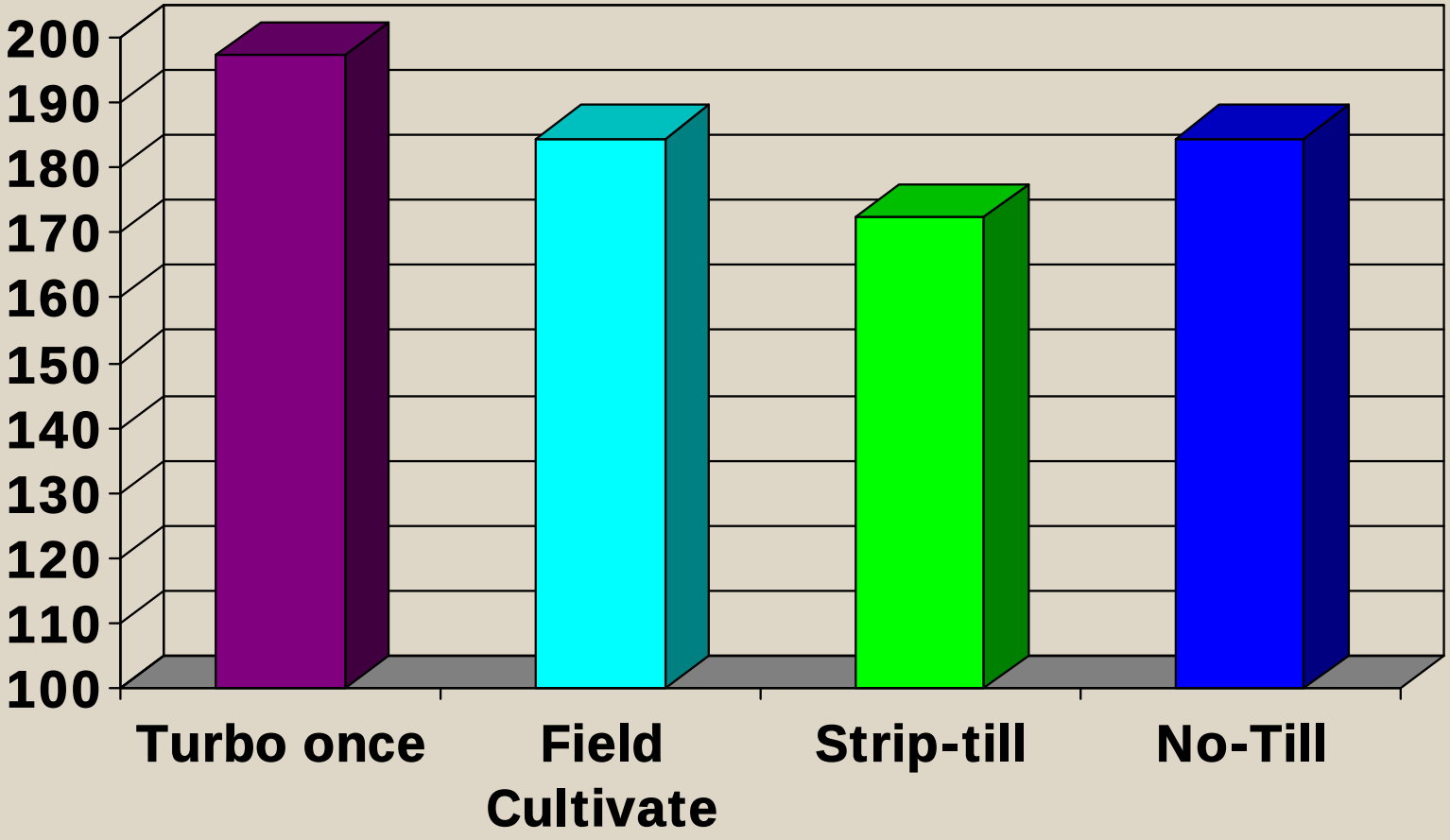
Spring Strip-Till vs. Turbo-Till® or FC

North-East Purdue Ag Center, Columbia City (2004)



Courtesy: Phil Walker and Allen County SWCD

Fall Strip Tillage

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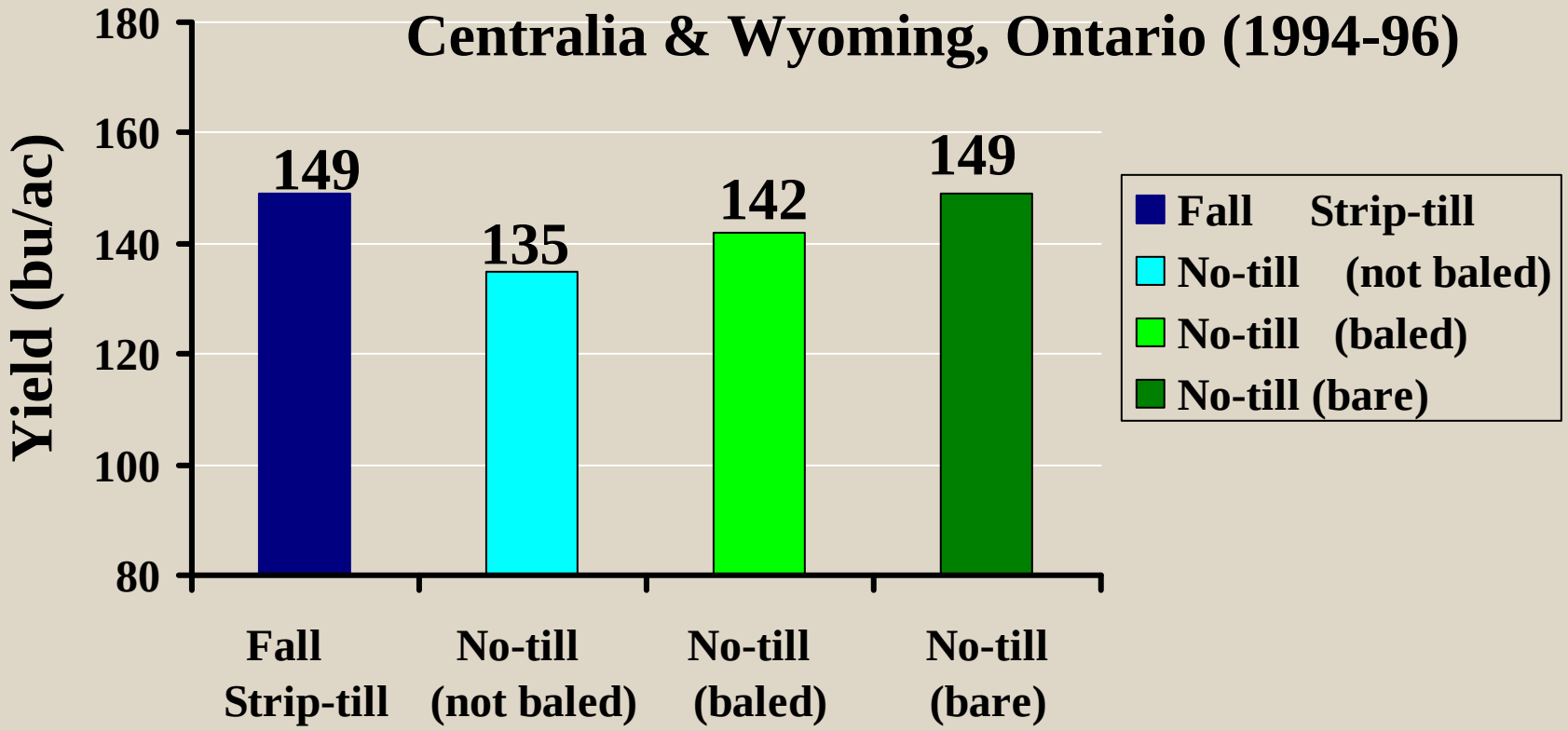
Strip-till versus No-till Corn after Wheat (Ontario)

Wheat Residue Effect on No-till Corn vs. Strip-till Corn



Opoku, Vyn & Swanton (Agron. J. 89:549)

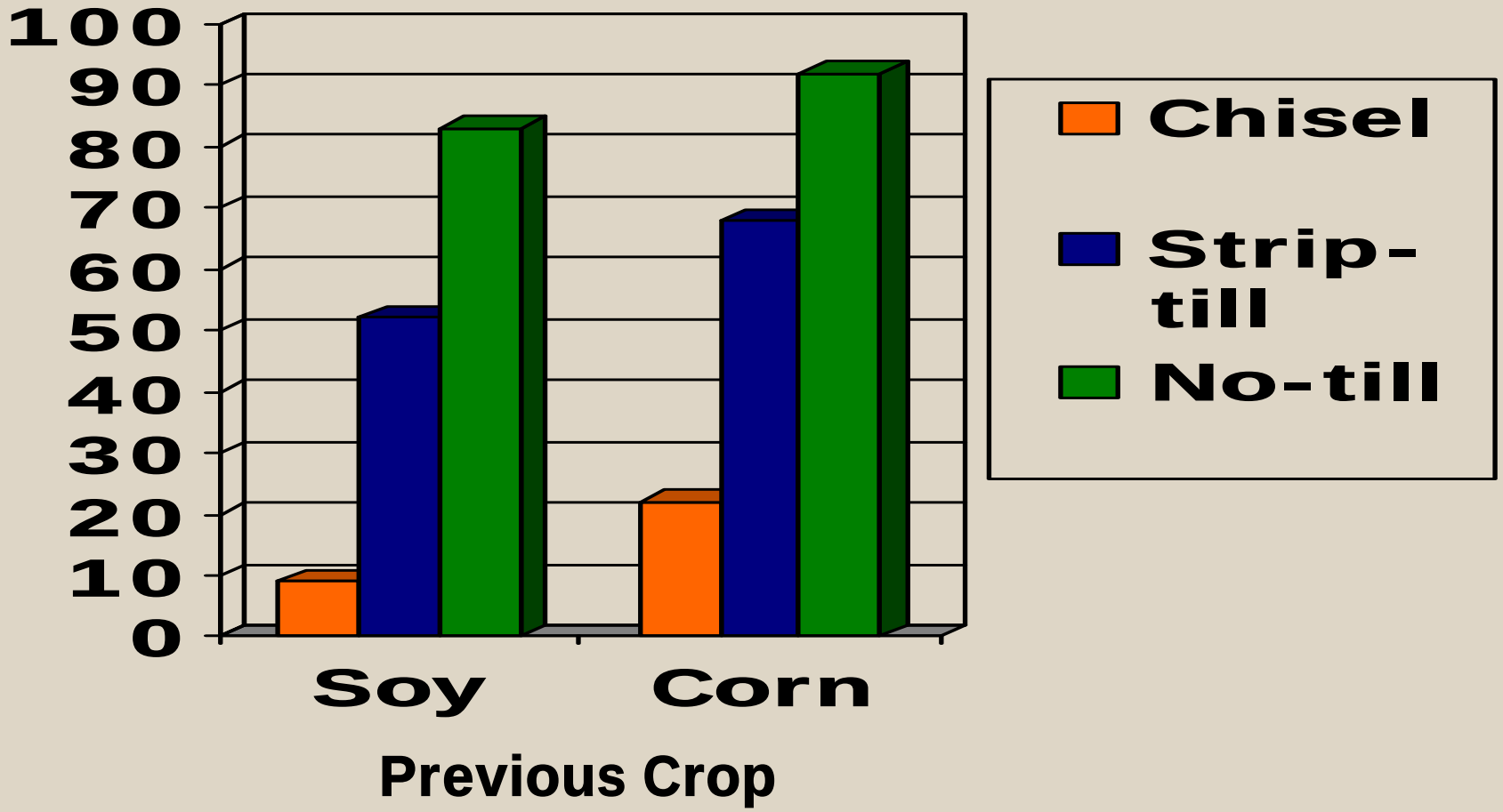
Strip Tillage for Corn after Corn?

Strip-Till Corn after Corn

Source: Norm Larson, Elburn Co-op, IL

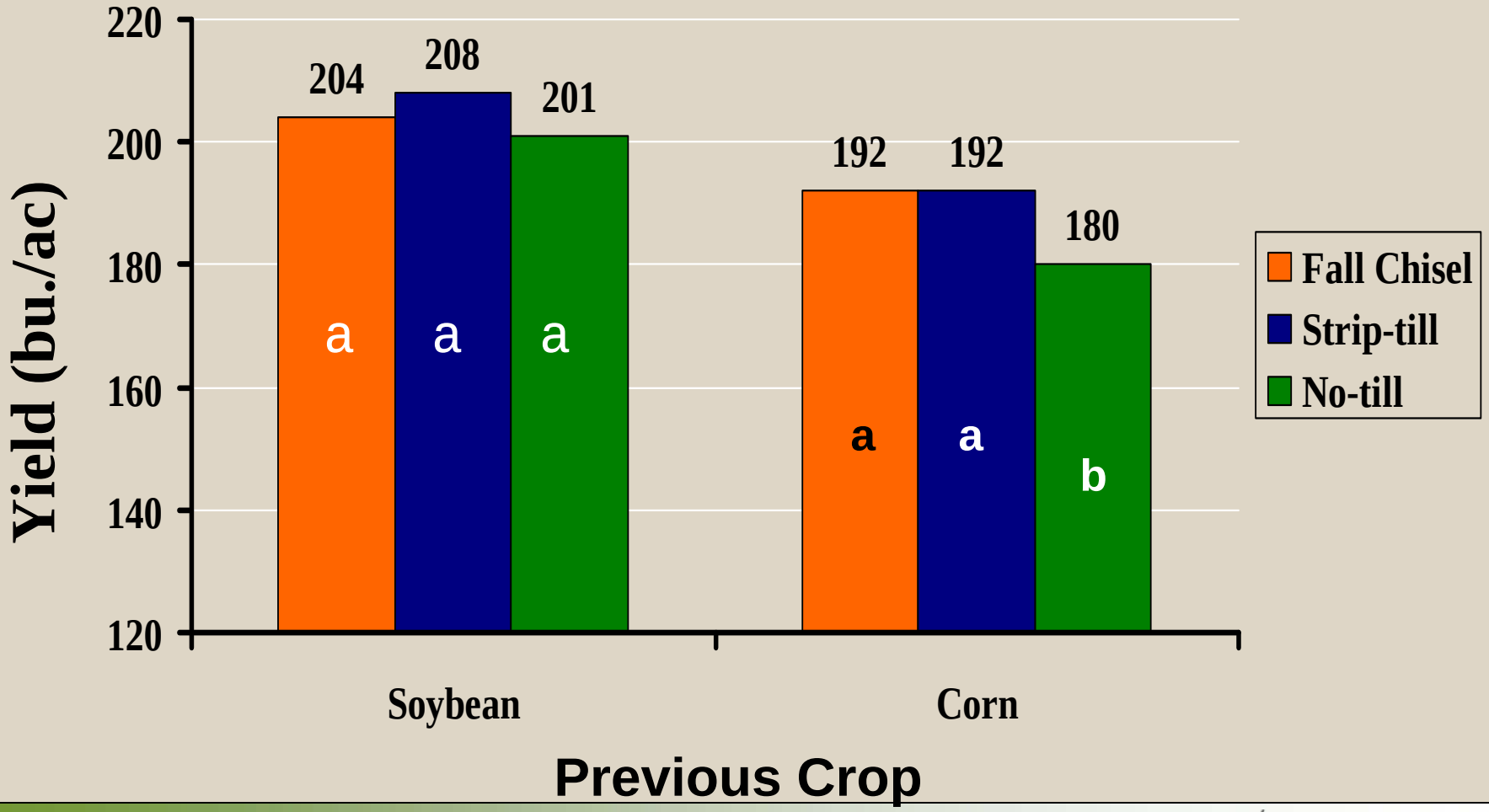
Split the middle w/o guidance

Surface Residue Cover (%) after Planting
Loam Soil, Wanatah, IN, 2001-2005



No-Till vs. Strip-till following Corn (Wanatah, IN, 2008)

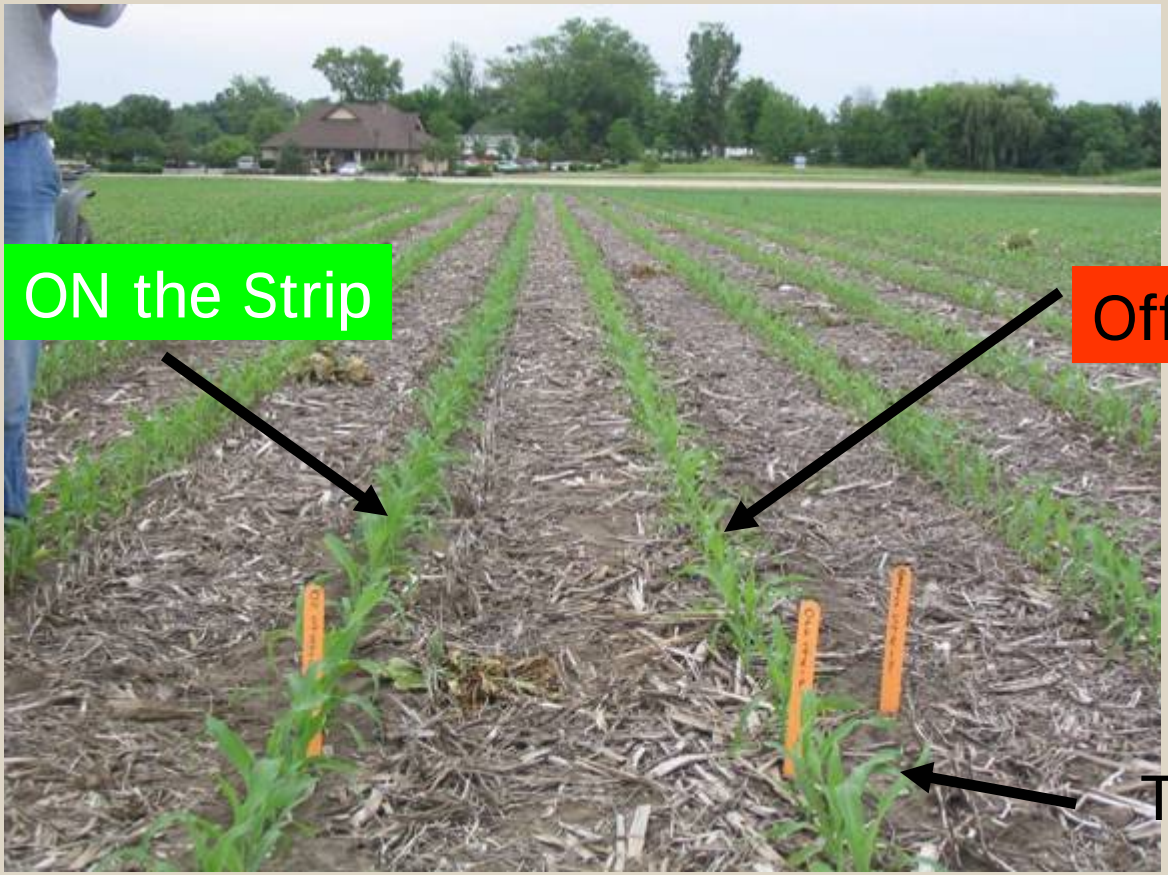
Strip Tillage for Corn after Soybean and Corn in N. Indiana, Loam Soil (2001-07)



RTK Automatic Guidance

Precision of Planting Following Strip Tillage ?

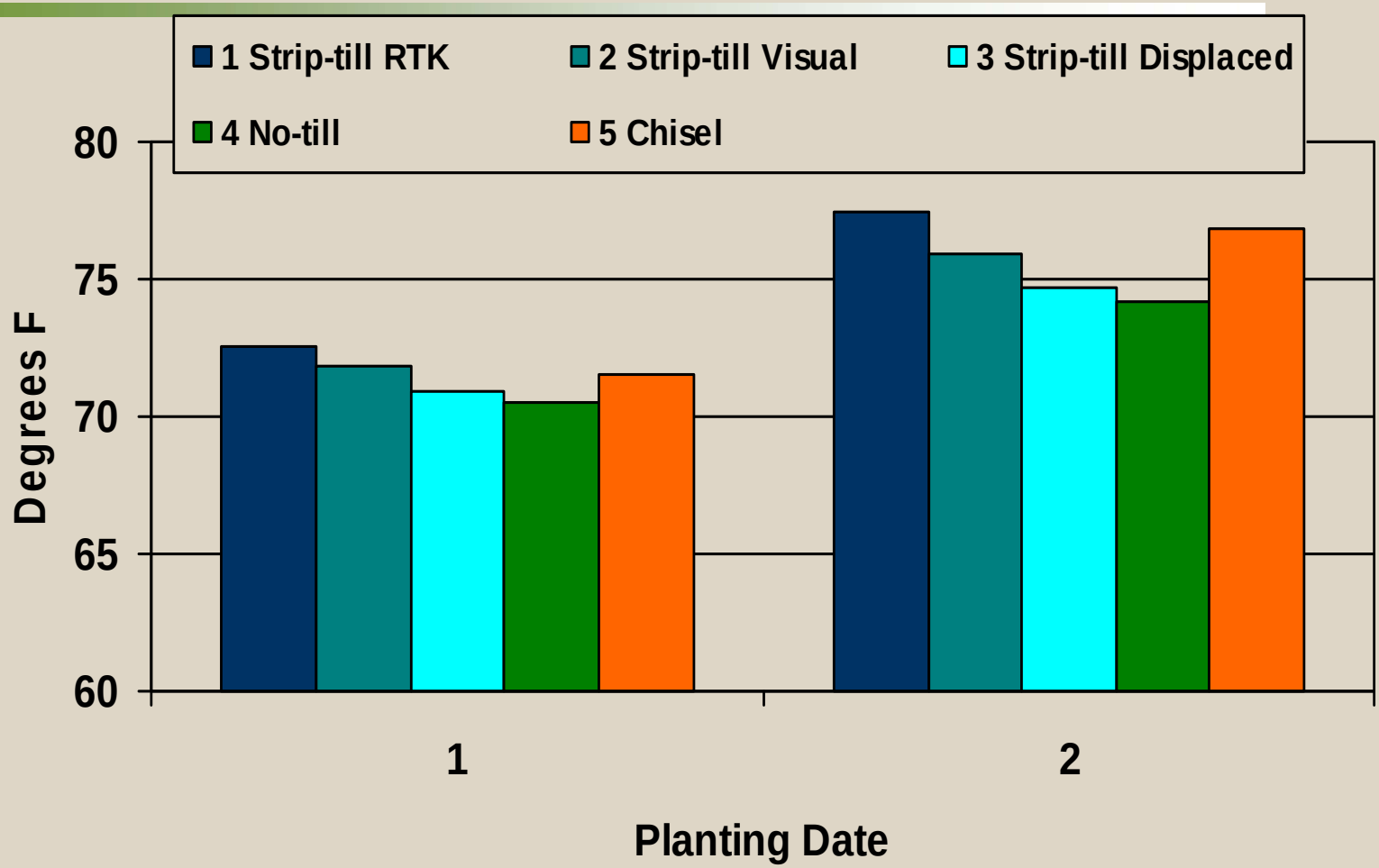
Row Position is Critical



Source: Norm Larson, Elburn Co-op, IL

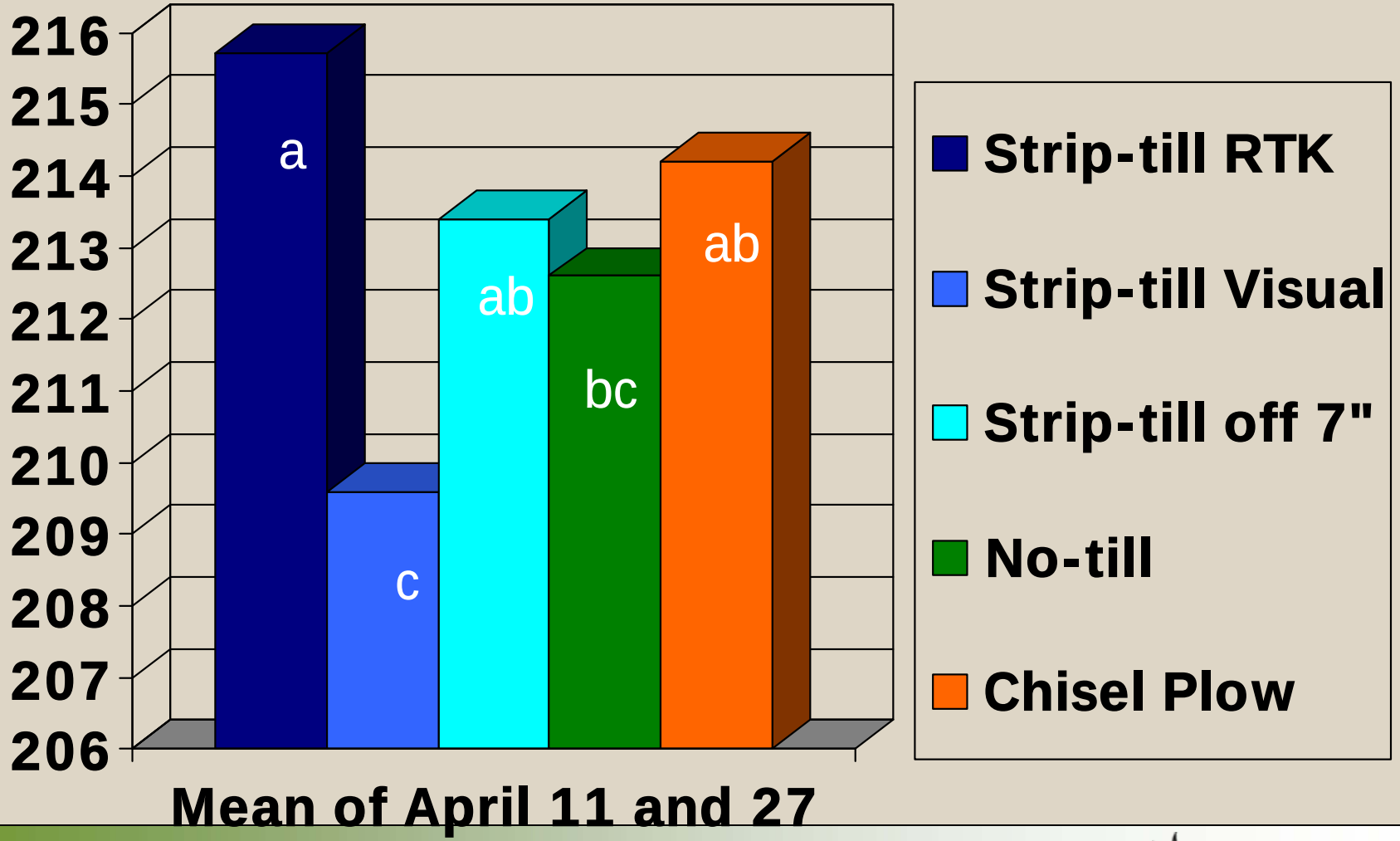
RTK Planting after Strip-Till
(West Lafayette, 2006)

Maximum soil temperature at 2-inches deep in row, first 2 weeks after planting, ACRE, 2007



RTK Plot Harvest 2006

Average Corn Yield Response to RTK Precision at West Lafayette, IN, 2006-2007



RTK + Pre-plant UAN Application 2006

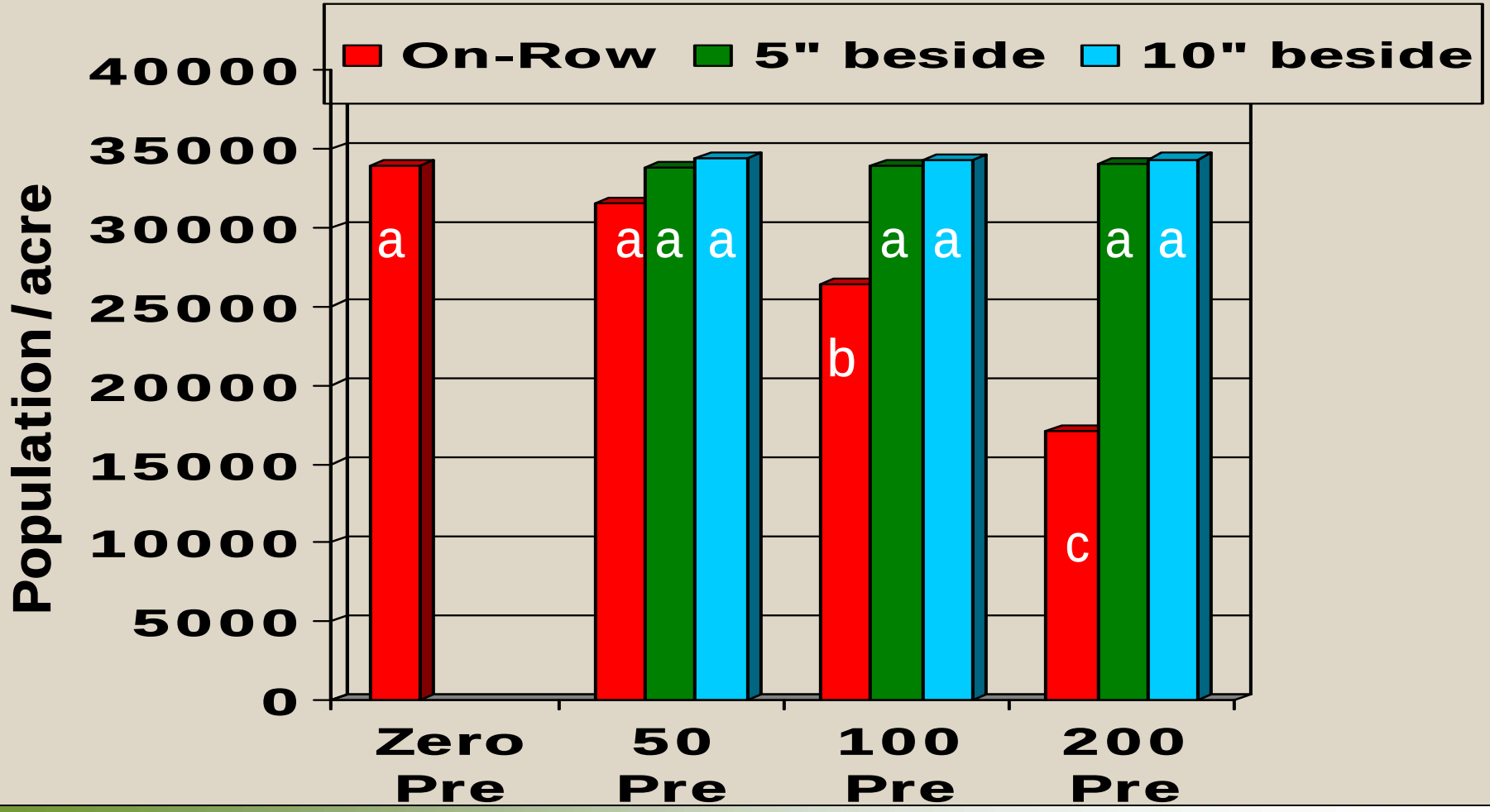
RTK Planting after Pre-plant UAN
(West Lafayette, 2006)

RTK and Pre-plant UAN at Wanatah, IN, 2006

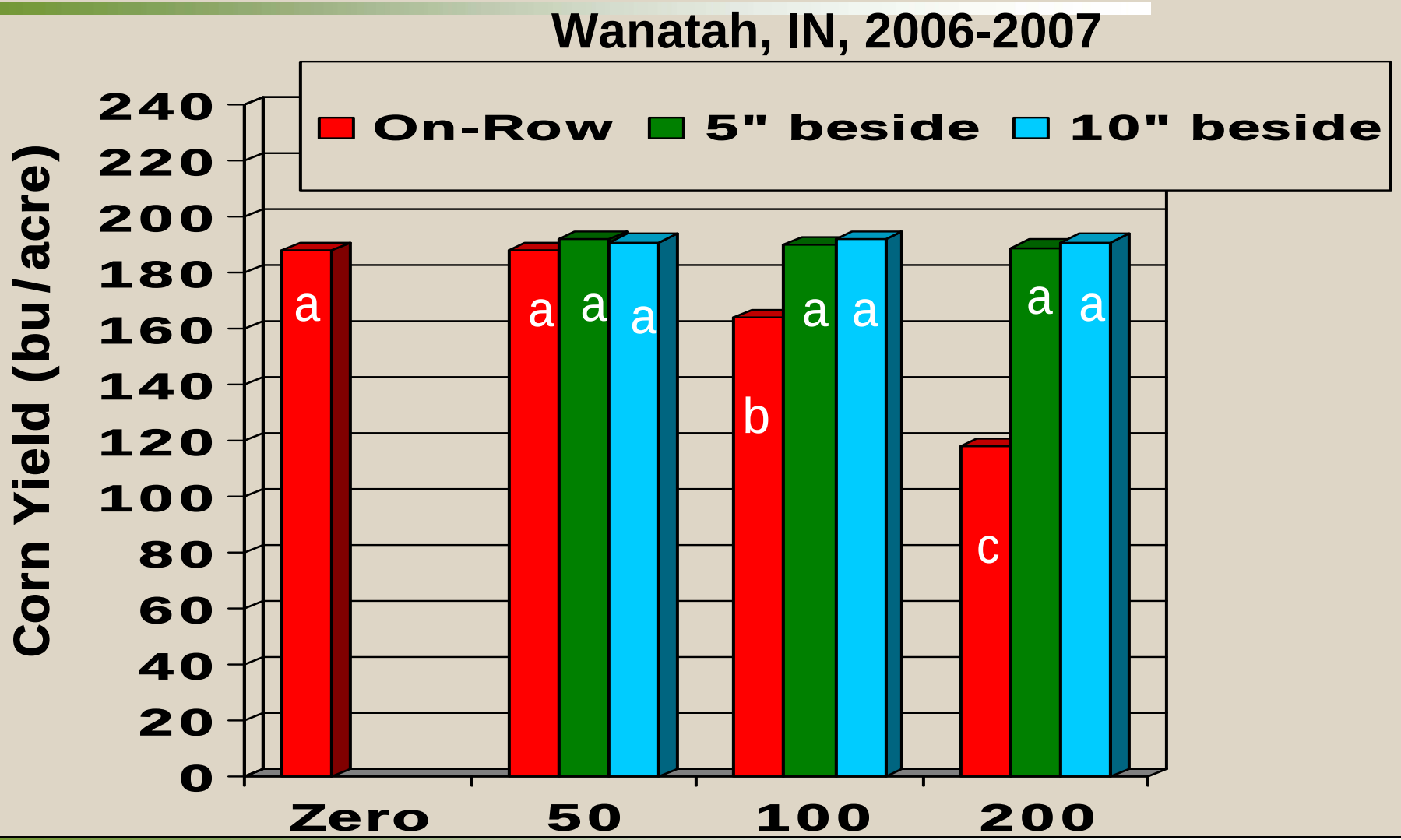
200 N at 5” versus 200 N at 0”

200 N at 5” (background) vs.
200 N at 0” (foreground)

RTK Row Position Effects on Plant Population Response to Pre-Plant UAN Rates Wanatah, IN, 2006-2007



RTK Row Position Effects on Corn Yield Response to Pre-Plant UAN Rates



Strip Tillage with Fertilizer Banding

Strip-till Corn Yield Results in Illinois

(Mean of 11 site years 1999-2002)

Source: Guebert, Hoeft et al, 2003 IL Fert. Conf. Proc.

ARLINGTON, WI STRIP-TILLAGE PROJECT

- **Tillage/rotation study since 1997**
  - **Plano silt loam soil**
  - **Strip-till added in 2000**
  - **Cont. corn, Soybean/corn, Corn/soybean**
  - **PK fertilizer: None, broadcast, deep, and row-placed at crop removal rate**
  - **Summarize 2001 – 2004, strip-till only**

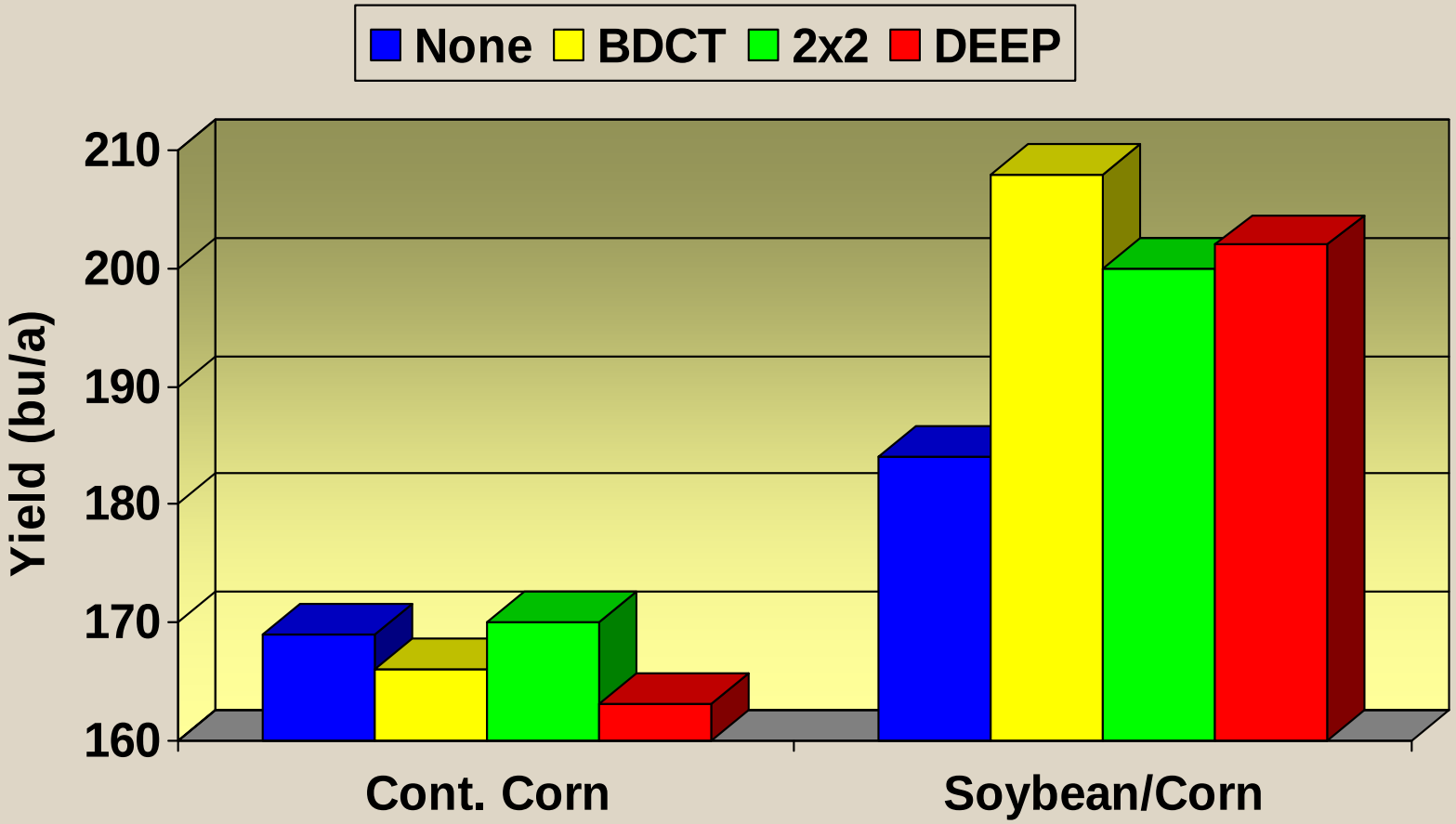
ARLINGTON SOIL TEST

Year	pH		Soil test P (ppm)		Soil test K (ppm)	
	None	Bdct.	None	Bdct.	None	Bdct.
2001	6.7	6.7	41	51	99	110
2005	6.7	6.6	38	56	91	120

Source: D. Wolkowski, University of Wisconsin, 2007

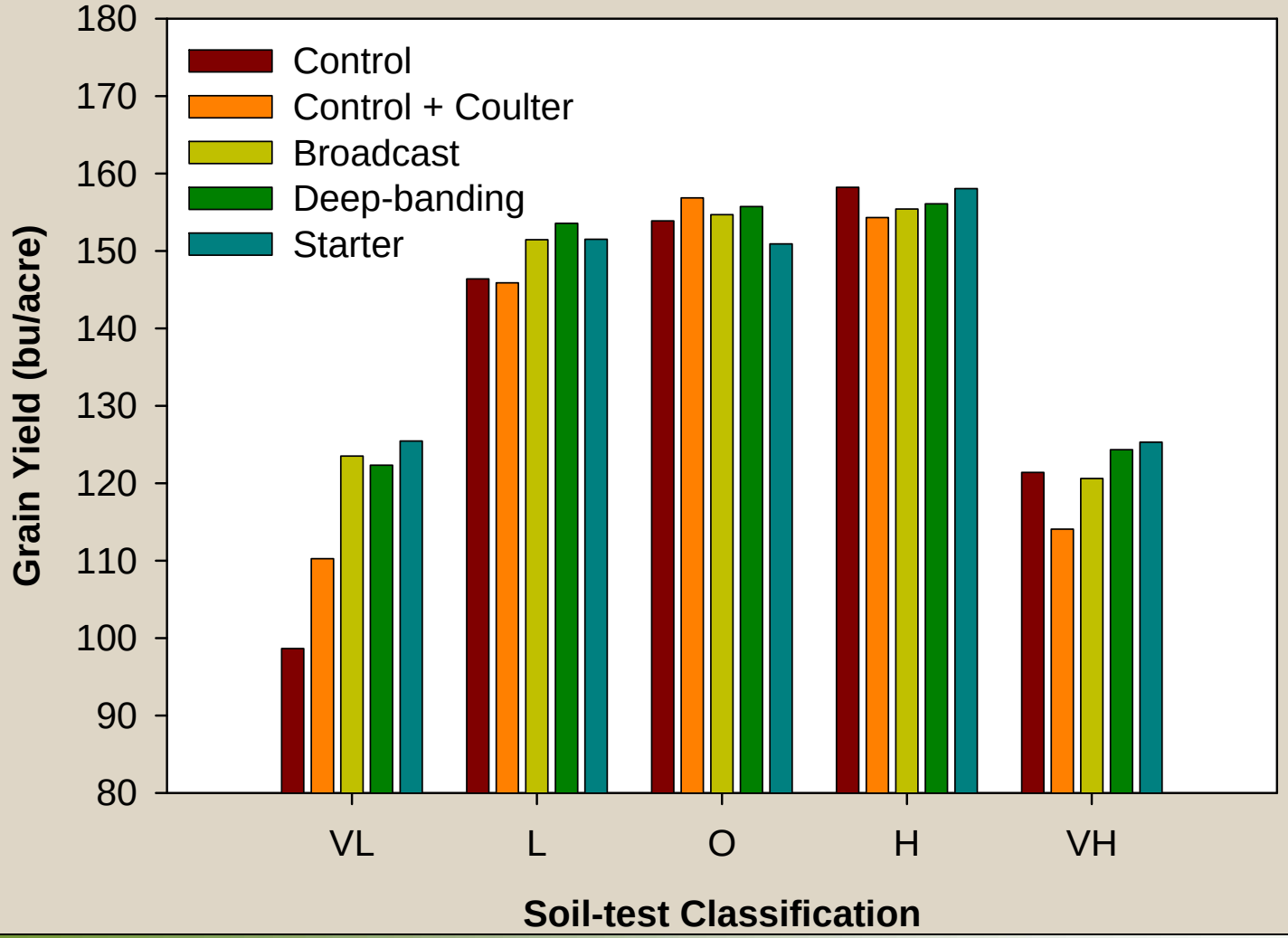
CORN GRAIN YIELD AS AFFECTED BY FERTILIZER PLACEMENT IN STRIP-TILL

Four Year Avg. (2001 - 2004)



Source: D. Wolkowski, University of Wisconsin, 2007

Corn Response to P Fertilizer Placement in Iowa (Malarino et al.)



Strip Tillage with Nutrient Banding in Small-plot Research (West Lafayette, IN)

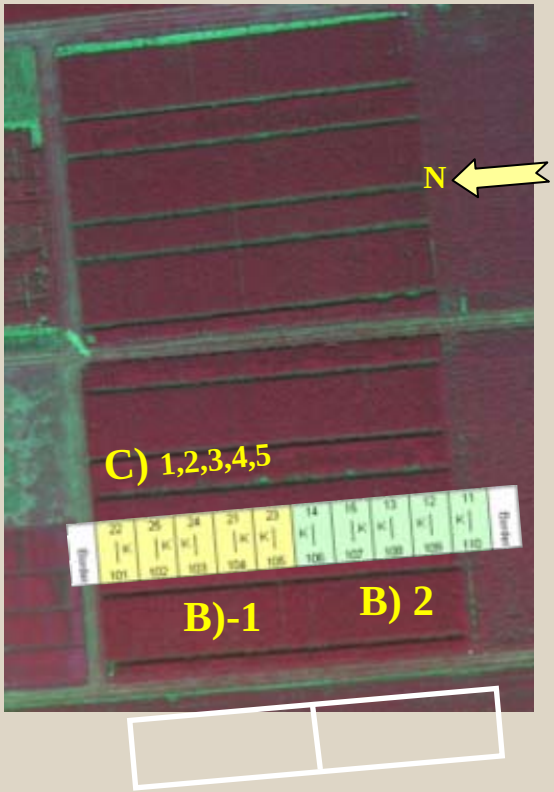
Note: P_2O_5 rate = 88 pounds/acre, and K_2O rate = 115 pounds/acre

All plots received a uniform 2 x 2” starter of 14 – 28 – 14 (N,P,K), plus a total N rate of 250 pounds/acre.

Corn Response to Deep Banding at 6” Depth

2005 – 2006 Experimental design

Field 54-55 July 7, 2006



Split-split Plot Design

A) Block -2005: 5 - 2006: 6

B) Hybrid
1_ Pioneer 31N28 (119 CRM)
2_ Pioneer 31G68 (118 CRM)

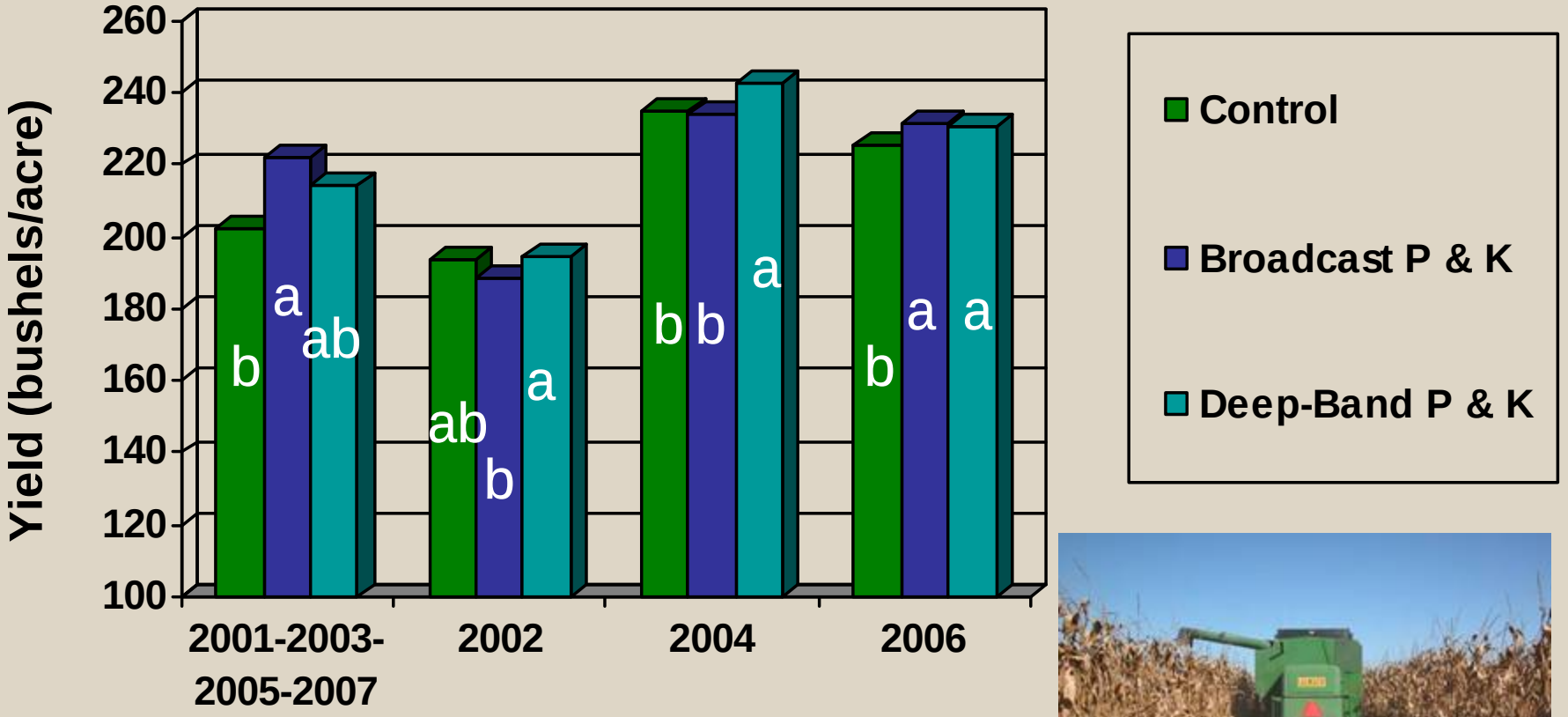
C) Fertility Placement
1_ Check
2_ Broadcast P+K
3_ Banded P+K
4_ Banded P
5_ Banded K
(applied in the previous fall)

Residual Effects of Fertilizer P and K Placement in Corn on Subsequent No-till Soybean (2002-2006)

Planting 5/10/04

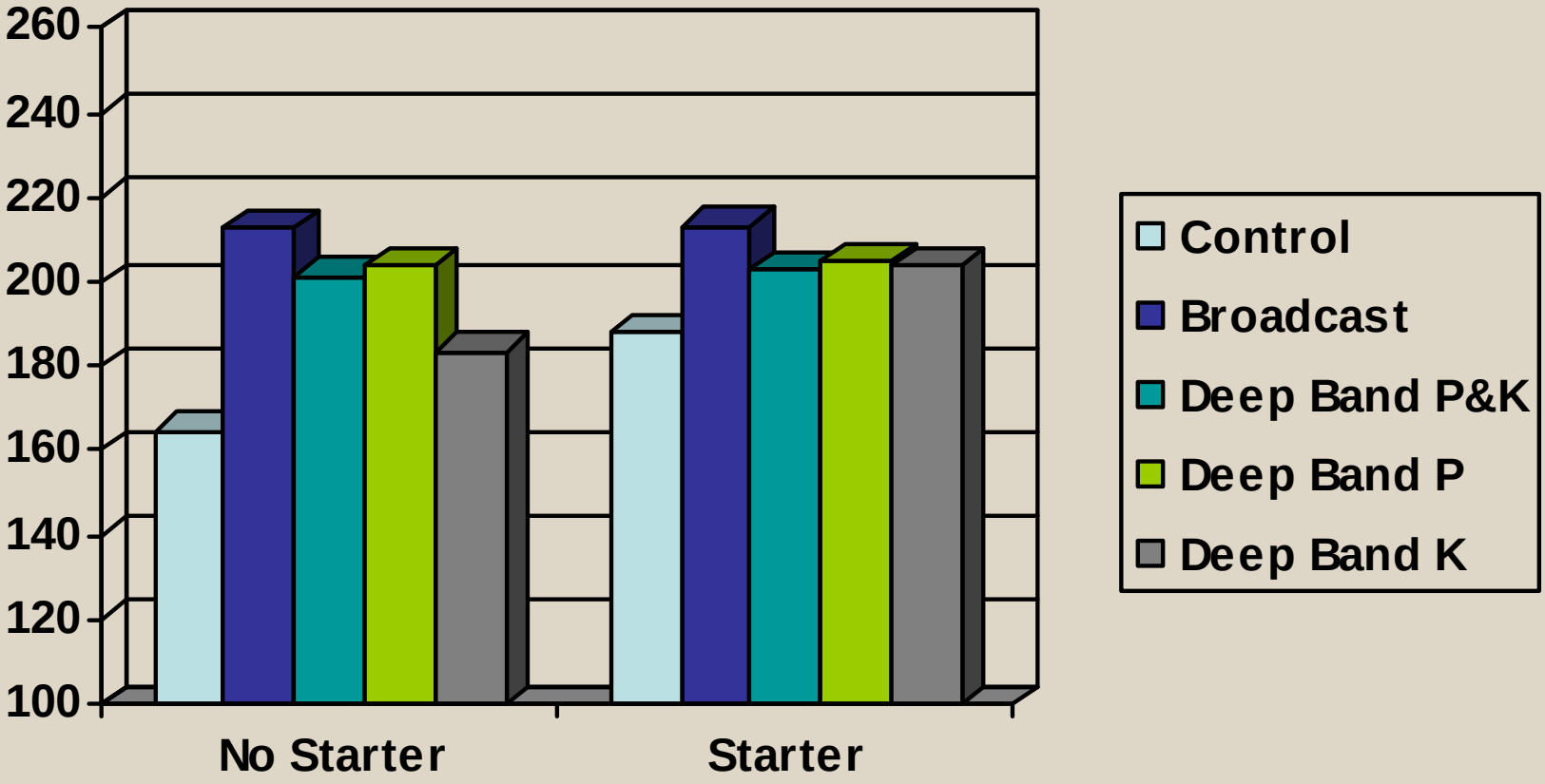
Soil sampling (June/04)

Six inch Band P and K Placement Effects on Strip-till Corn Yield (mean of 2 hybrids, 2001-2006)



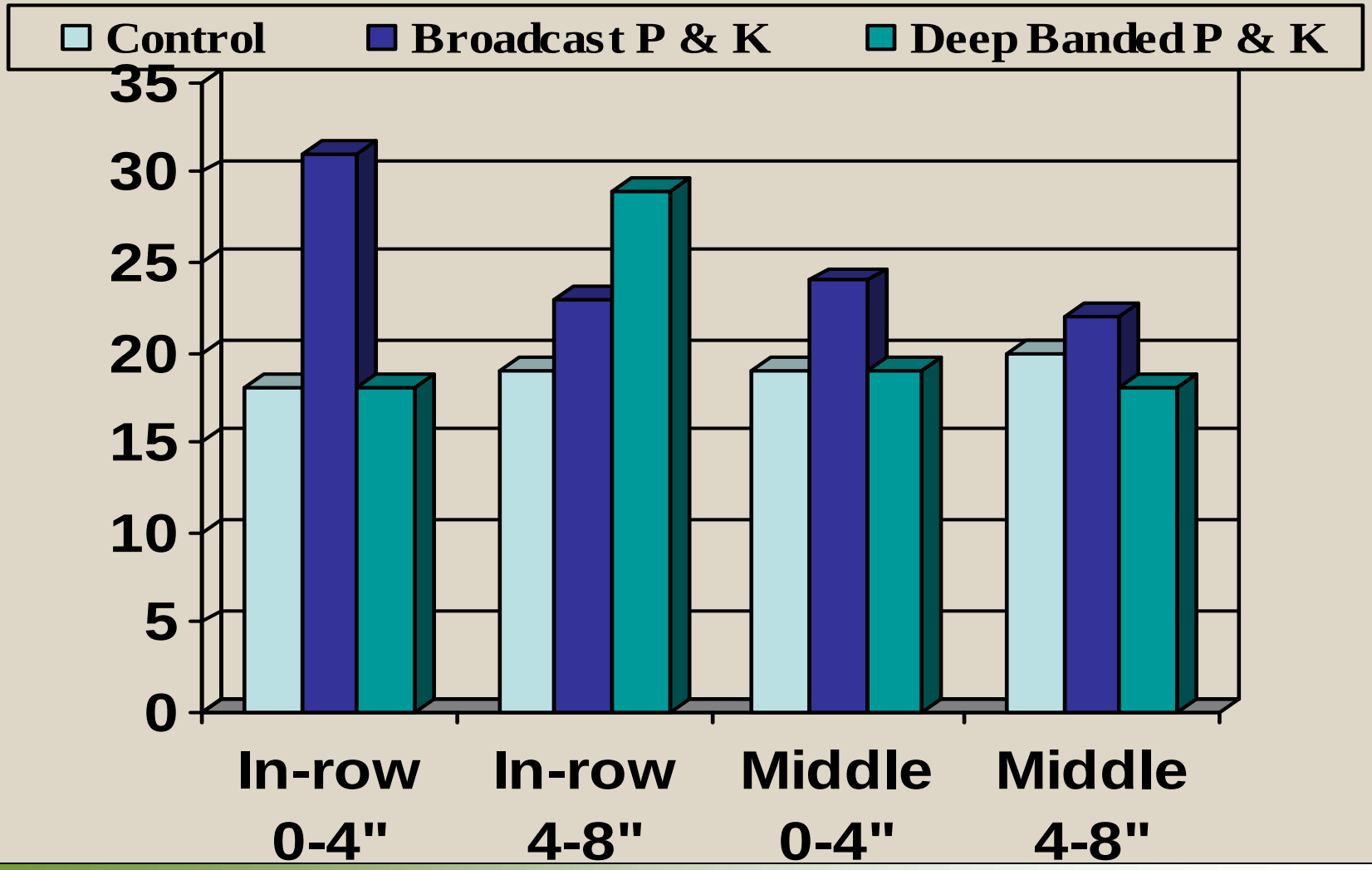
Soil-test P	(0-4”):	22	104
	(4-8”):	21	94
Soil-test K	(0-4”):	186	164
	(4-8”):	94	125

Starter Fertilizer* Influence on Corn Response to Deep Banding (2007)

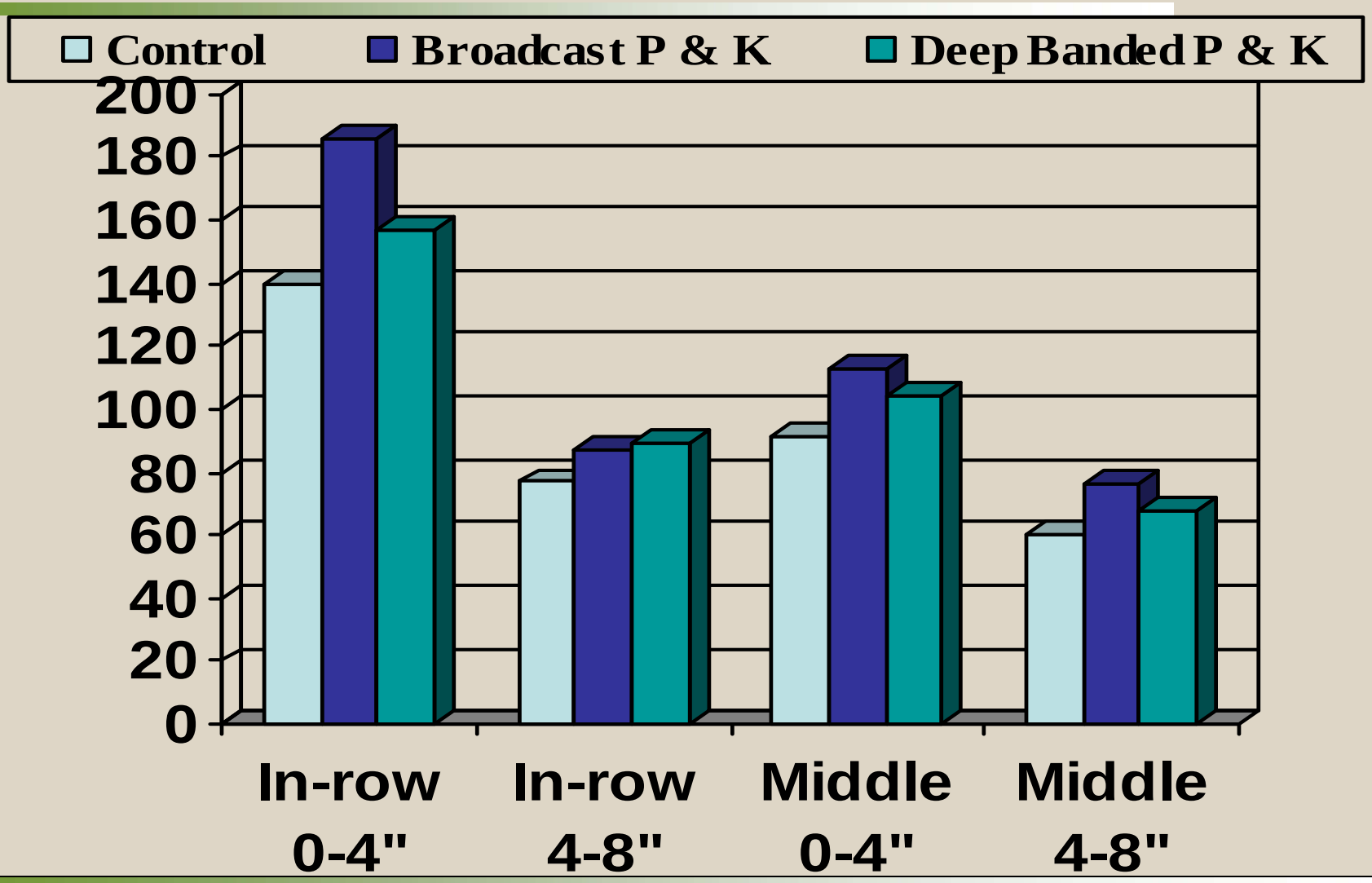


* Starter was 10-34-0

Soil P conc. (ppm) in spring 2008 following third strip-till corn cycle for a corn-soybean rotation



Soil K conc. (ppm) in spring 2008 following third strip-till corn cycle for a corn-soybean rotation



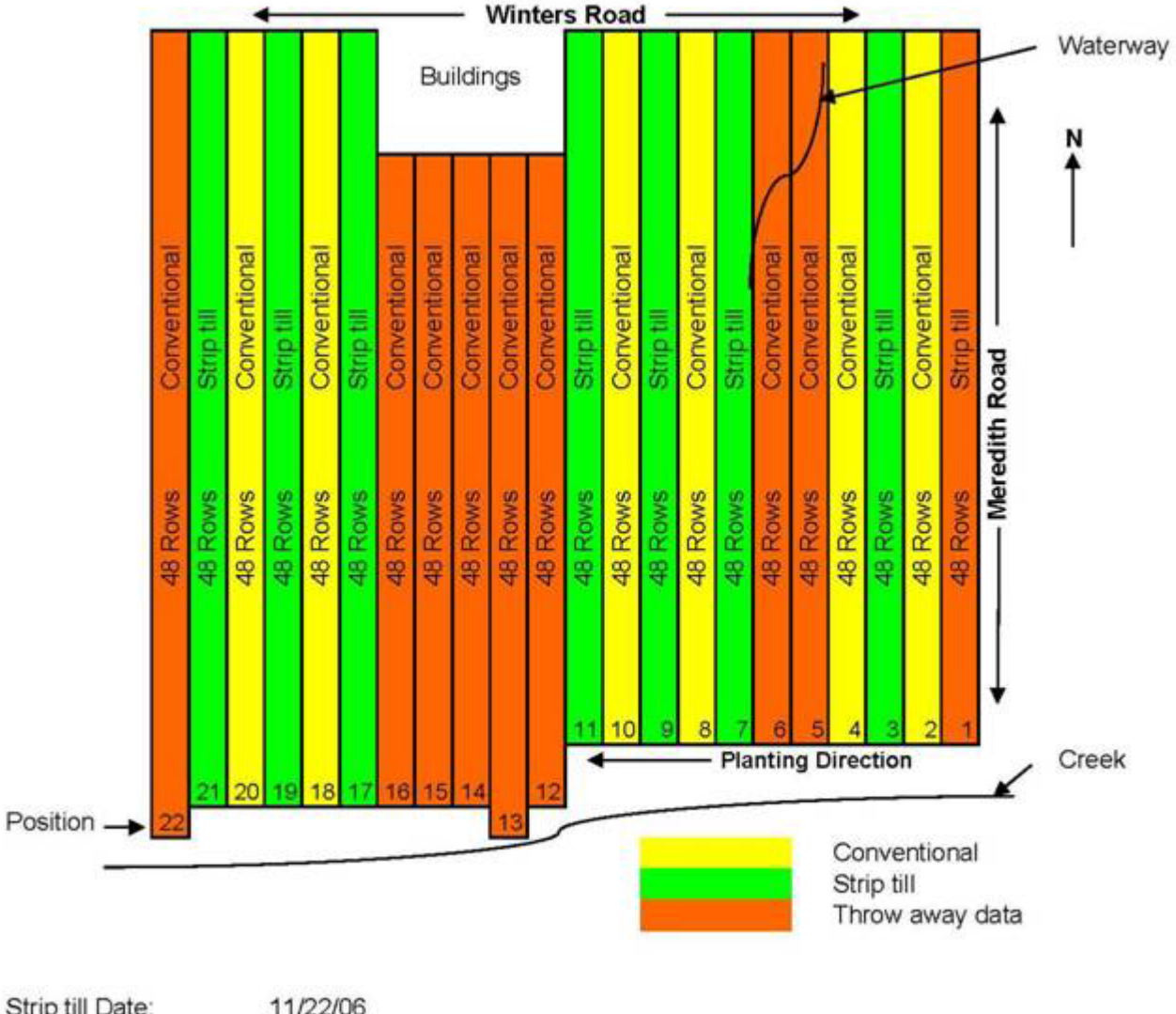
Root zone optimization in Strip-till?

1. P and K fertilizer placement: Can deep-band replace broadcast altogether? Should deep-band always be in the same position? Can deep-band replace starter? Can P and K rates be lowered? Soil sampling position?

2. RTK Guidance may be beneficial for centering on the berm even when fertilizer is not deep banded.

3. Spring Pre-plant N application in the row area?

4. Who is going to do the Research!



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John Deere & Co.

Equipment:

John Deere Cropping Systems Unit
Case-DMI (Goodfield, IL)
Remlinger (Kalida, OH)

Seed:

Pioneer Hi-Bred, Int.

Thanks!

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