Seven years of Research with Skip Row Corn in Southwest Nebraska to Improve Drought Tolerance

Robert N. Klein
Jeffrey A. Golus

University of Nebraska Lincoln

IANR

What Spurred My Interest in Rainfed Skip – Row Corn

- 2002 at North Platte- lowest precipitation since records were started in 1907
- A sorghum breeder asked me to plant experimental grain sorghum hybrids in area
  - Only grain produced in Hayes County plot was where sorghum rows were missing (missing grows were result of some experimental hybrids not producing viable stands) the adjoining rows would have sorghum
- Many rainfed producers in area last corn crop was in 1999
- With Roundup Ready Corn, weeds could be controlled economically

Skip Row Corn for Improved Drought Tolerance in Rainfed Corn WCREC 2003

	Population (plants/a)	Yield (bu/a)	Pct increase
30” rows	19,500	41	-
30” rows*	14,700	41	-
30” rows*	11,200	45	10
2 - skip 1*	13,700	48	17
2 - skip 2*	9,700	54	32

*Plants and rows removed July 2

2005 Grant, NE

2005 Grant, NE

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2005 Grant, NE

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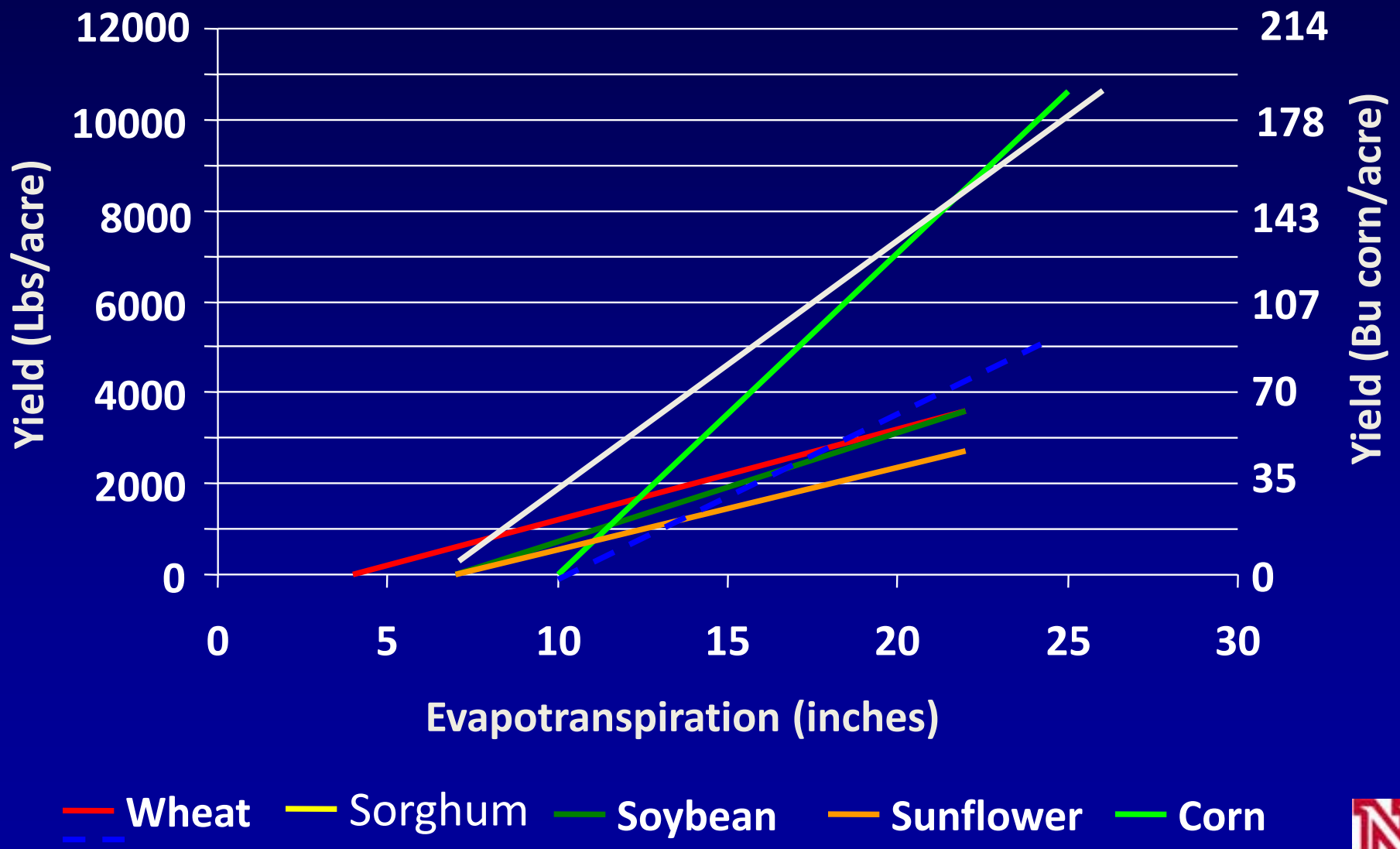
2005 Grant, NE

Elwood Reservoir

How Much Water Does It Take?



Red Willow County
October 27, 2006

Red Willow County
October 27, 2006

Red Willow County
July 4, 2007

Red Willow County
July 4, 2007

2007 Red Willow County Rainfed Winter Wheat Variety Trial

Brand	Variety	Yield
AGRIPRO	Art	87.8
AGRIPRO	TAM 111	86.5
-----	NE01604	86.2
AGRIPRO	Hawken	85.2
-----	Hallam	83.0
-----	NH03614	82.5
-----	Overley	81.5
-----	Infinity CL	81.4
-----	NI04420	81.3
AGRIPRO	PostRock	81.3
AGRIPRO	NuDakota(W)	80.0
-----	NE02584	79.7
WESTBRED	Smokey Hill	79.4
Average of 42 Varieties		75.4

Red Willow County
September 3, 2008
Plant 2 Skip 2

Red Willow County
September 3, 2008
Plant 2 Skip 2

Red Willow County
September 3, 2008
Plant 2 Skip 2

Red Willow County
September 3, 2008
Plant 2 Skip 2
Ears in 3 Feet of Row

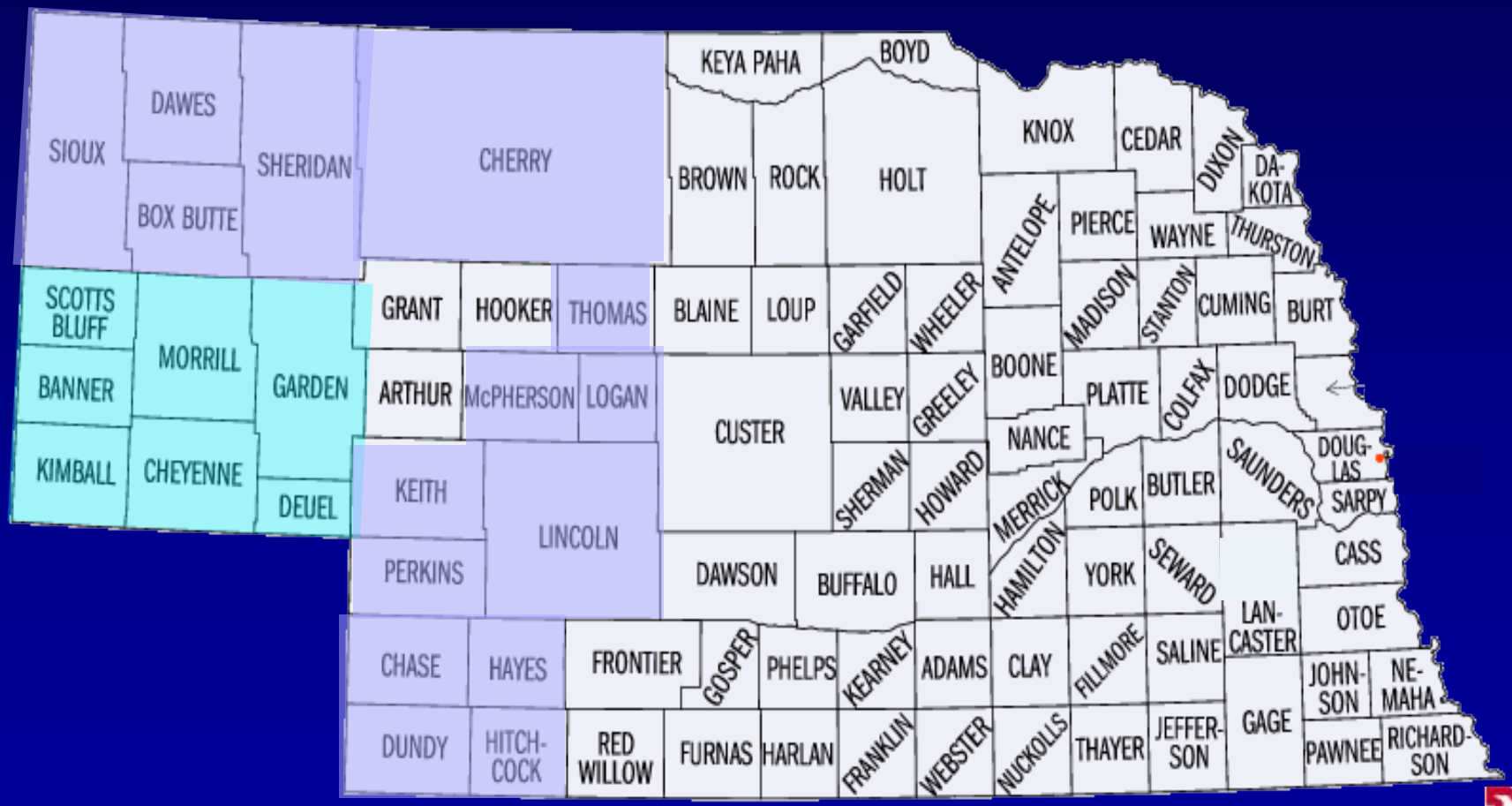
Red Willow County No-Till Rainfed Plant 2 Skip 2 Corn Hybrid Test -2008

BRAND	HYBRID	Yield	Moisture	BushelWt	Stand in 2 Rows out of 4
Popular Entry	LG Seeds LG2619	149.7	16.5	57.1	24010
Mycogen	2T804	148.7	16.7	56.6	24290
Kruger	6213VT3	142.7	17.5	56.0	25490
Kruger	8112RR/HX	140.0	16.6	57.4	25700
Popular Entry	DeKalb DKC 61-69	140.0	17.0	56.7	27460
Kruger	9414RR/HXT	139.7	17.1	56.3	23950
Kruger	6011TS	136.6	15.7	58.7	22590
Kruger	5116YGCB	138.9	17.3	56.1	25870
Mycogen	2T789	137.7	17.3	56.2	24870
Kruger	6210TS	137.9	17.5	56.6	27150
Popular Entry	AgVenture 8401	137.9	17.8	55.8	24420
Average of 25 Hybrids		134.7	17.1	56.5	24810
LSD .05		9.2	0.8	1.1	4110

Crop Insurance

2008-2009 Nebraska Non-Irrigated Skip-Row

Banner, Cheyenne, Deuel, Garden, Kimball, Morrill, Scotts Bluff



Red Willow County
October 27, 2006

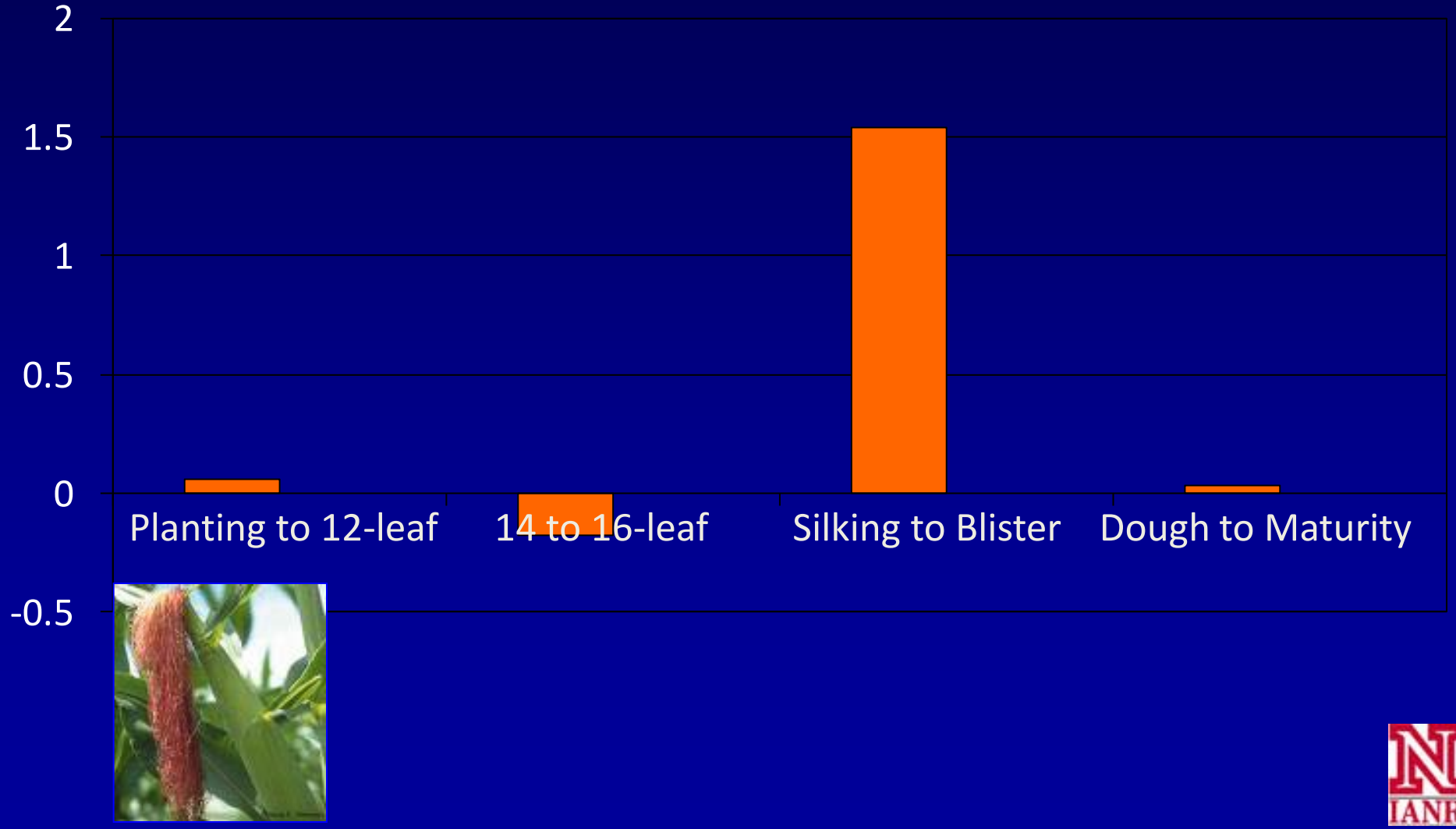
Red Willow County
September 3, 2008

Red Willow County
September 3, 2008

Red Willow County
September 16, 2008

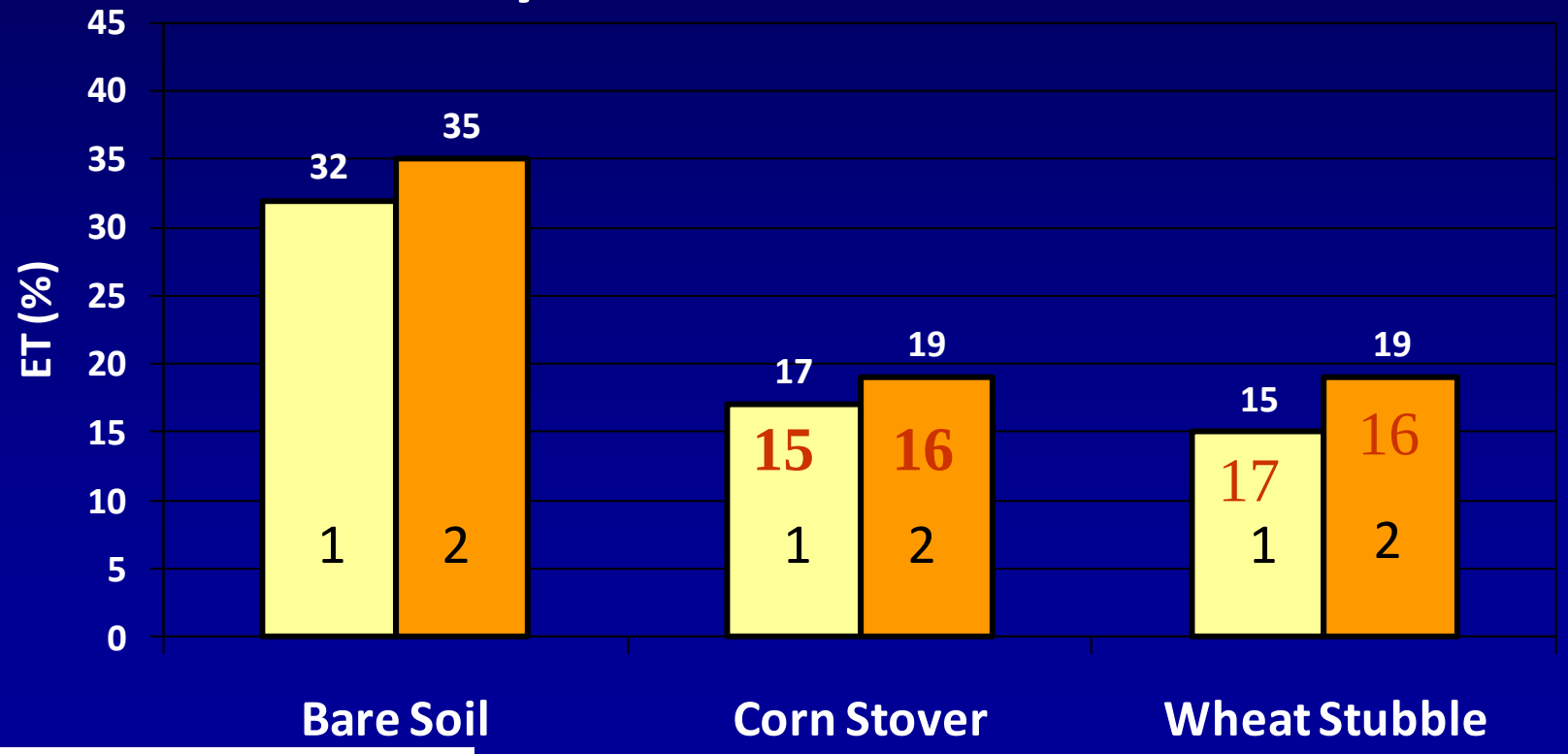
North Platte, NE 2002
Water is the most limiting factor in NE crop production!

Drought Sensitivity Coefficient for Corn (from Meyer et al. 1993)



Projected Growing Season Evaporation on Corn

Garden City, KS – N.L. Klocke, 2004



1 – Irrigated Once a Week
2 – Irrigated Twice a Week

Savings over Bare Soil

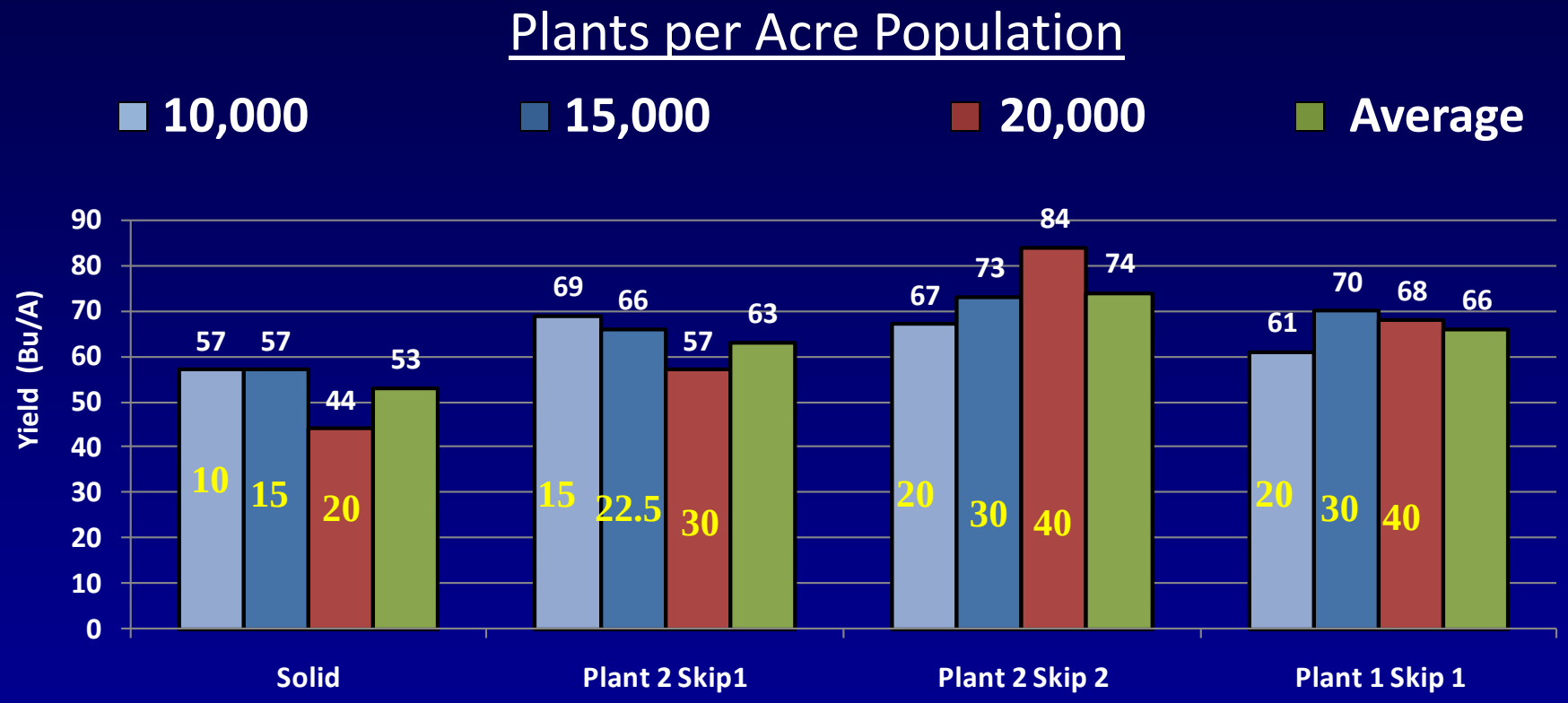
Residue Management

2004 Madrid, NE

Narrow Gage Wheel (From Drill)

2004 Madrid, NE

Skip-Row Rainfed Corn 2005 - Trenton



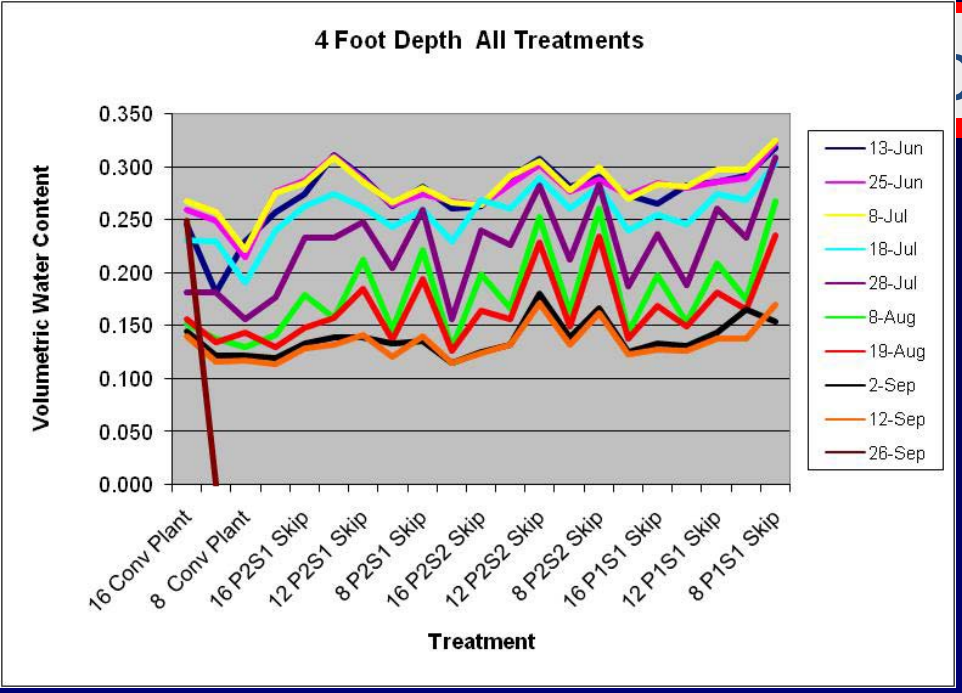
Yield

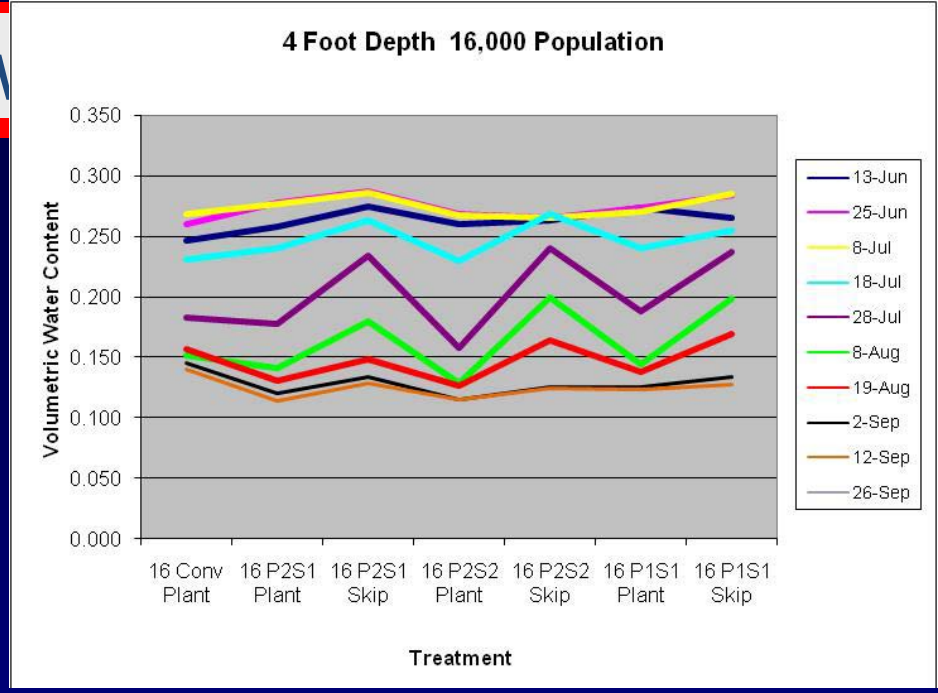
In-row populations in 1,000's

Trenton Skip-Row
September 3, 2008

Trenton Skip-Row
September 3, 2008

Trenton Skip-Row
September 3, 2008


4 Foot Depth All Treatments
Volumetric Water Content
0.350
0.300
0.250
0.200
0.150
0.100
0.050
0.000
16 Conv Plant
8 Conv Plant
16 P2S1 Skip
12 P2S1 Skip
8 P2S1 Skip
16 P2S2 Skip
12 P2S2 Skip
8 P2S2 Skip
16 P1S1 Skip
12 P1S1 Skip
8 P1S1 Skip
Treatment
13-Jun
25-Jun
8-Jul
18-Jul
28-Jul
8-Aug
19-Aug
2-Sep
12-Sep
26-Sep


4 Foot Depth 16,000 Population
Volumetric Water Content
0.350
0.300
0.250
0.200
0.150
0.100
0.050
0.000
16 Conv Plant
16 P2S1 Plant
16 P2S1 Skip
16 P2S2 Plant
16 P2S2 Skip
16 P1S1 Plant
16 P1S1 Skip
Treatment
13-Jun
25-Jun
8-Jul
18-Jul
28-Jul
8-Aug
19-Aug
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12-Sep
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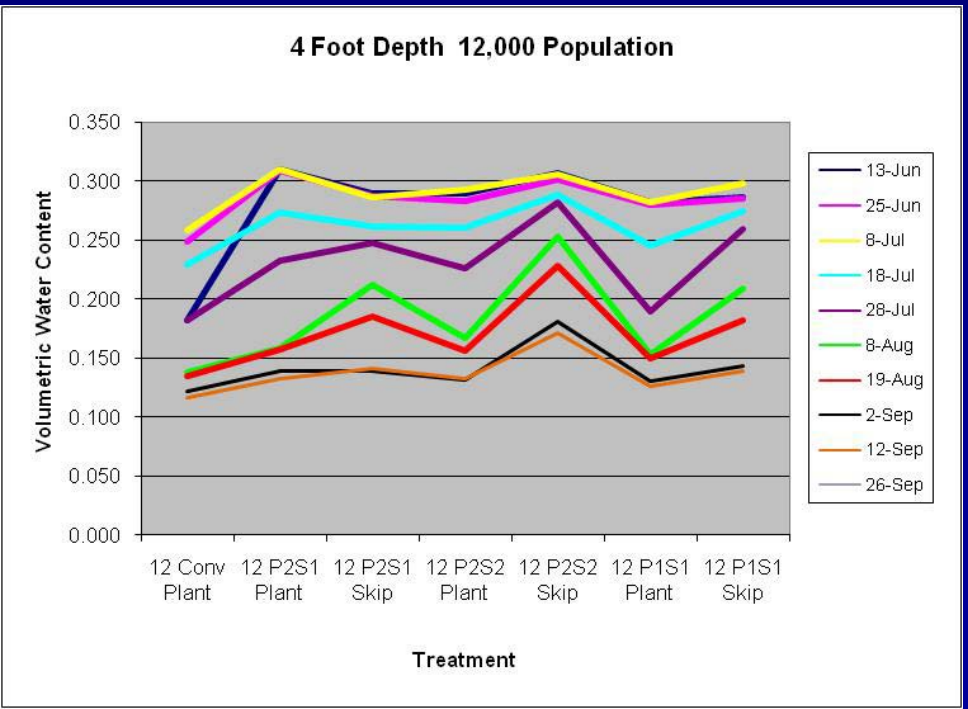
4 Foot Depth 12,000 Population
Volumetric Water Content
0.350
0.300
0.250
0.200
0.150
0.100
0.050
0.000
12 Conv Plant
12 P2S1 Plant
12 P2S1 Skip
12 P2S2 Plant
12 P2S2 Skip
12 P1S1 Plant
12 P1S1 Skip
Treatment
13-Jun
25-Jun
8-Jul
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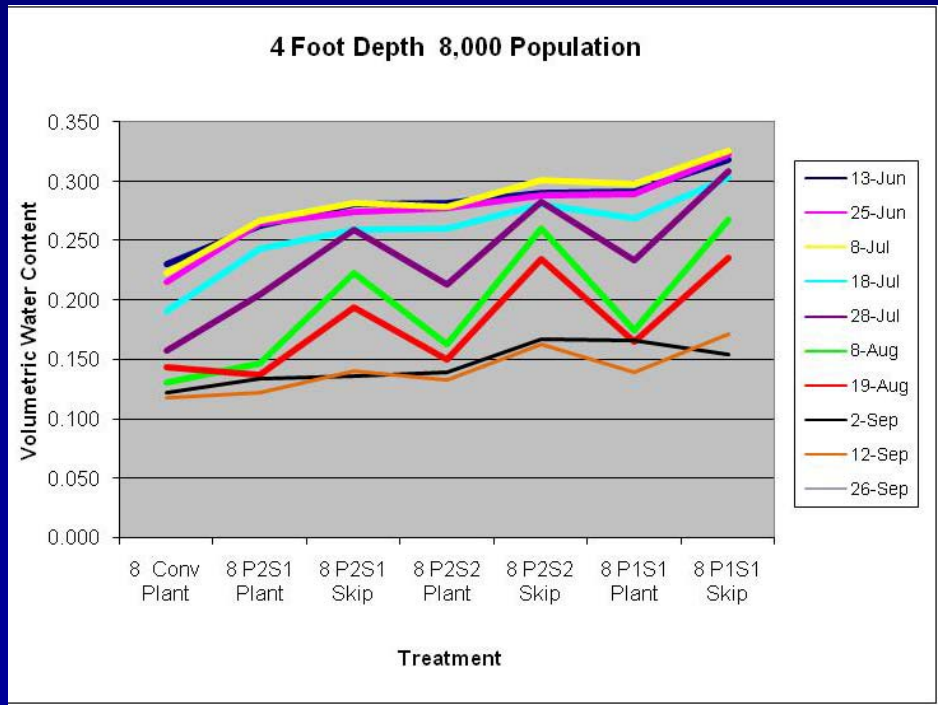
4 Foot Depth 8,000 Population
Volumetric Water Content
0.350
0.300
0.250
0.200
0.150
0.100
0.050
0.000
8 Conv Plant
8 P2S1 Plant
8 P2S1 Skip
8 P2S2 Plant
8 P2S2 Skip
8 P1S1 Plant
8 P1S1 Skip
Treatment
13-Jun
25-Jun
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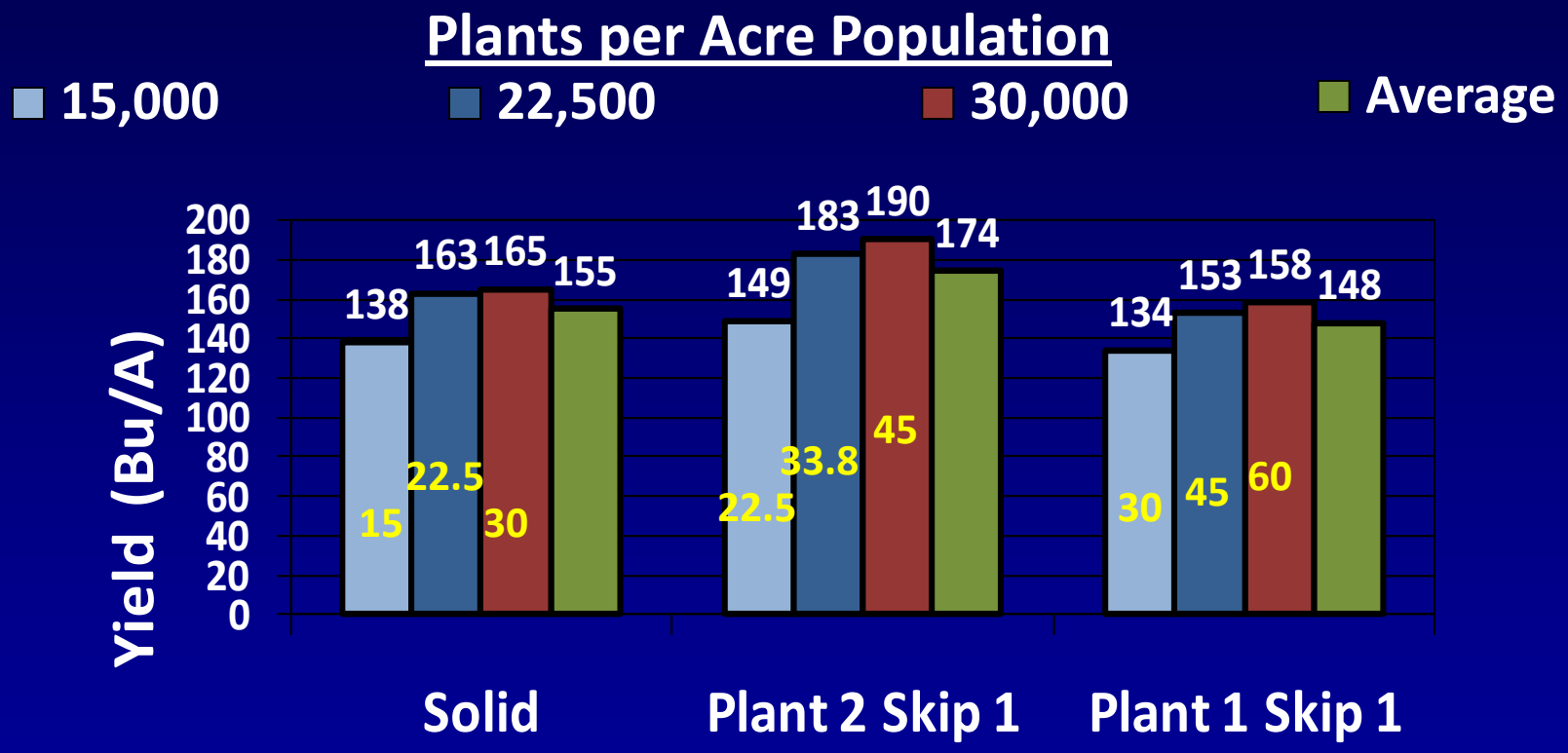
Skip-Row Rainfed Corn 2006

30” Rows – Wheat Stubble - SCAL



Yield

In-row population in 1,000’s

Treatment

"Planting skip row corn will greatly increase the consistency of raising a profitable dryland crop without sacrificing yield potential. It allows the crop to keep thriving when summertime rains are less than timely. It won't be long until all dryland acres in this part of the country are planted in this fashion."

Marty Shurr,
Maywood, NE
-September 2007

"Skip row corn is a program that really works and it has proven to be successful in both dry years and years with above average moisture."

Doug and Don Criswell,
Chappel, NE
-September 2007

"With the limited moisture we have been getting, we have been about to raise corn. We can reduce the corn population and, if we have moisture, we can still raise 80 bushel corn."

Ray and Tammy Wooten,
Potter, NE
-September 2007

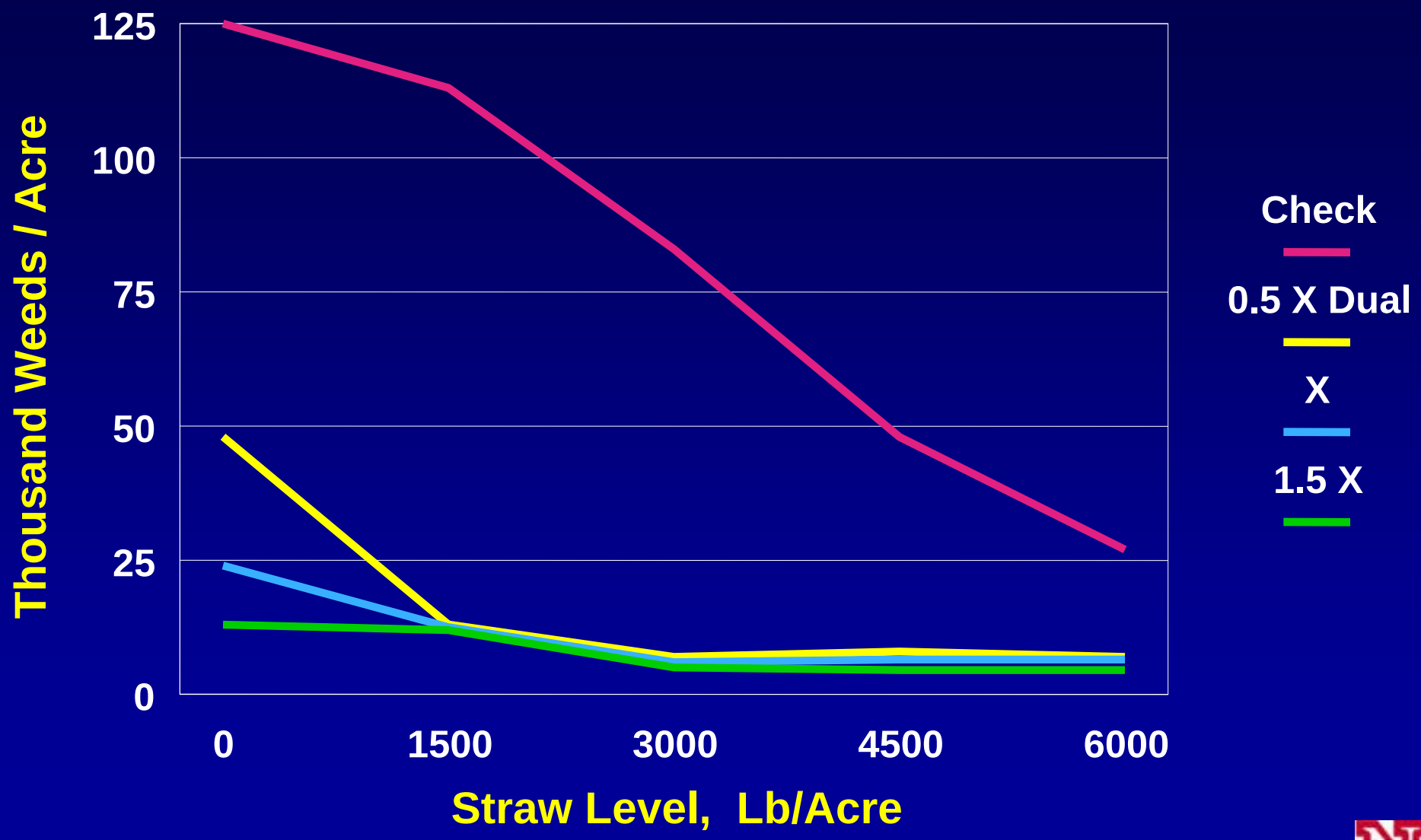
Harvested For Silage

Harvested For Grain

Know how. Know **now.**

117 bu/A
Straw Spread

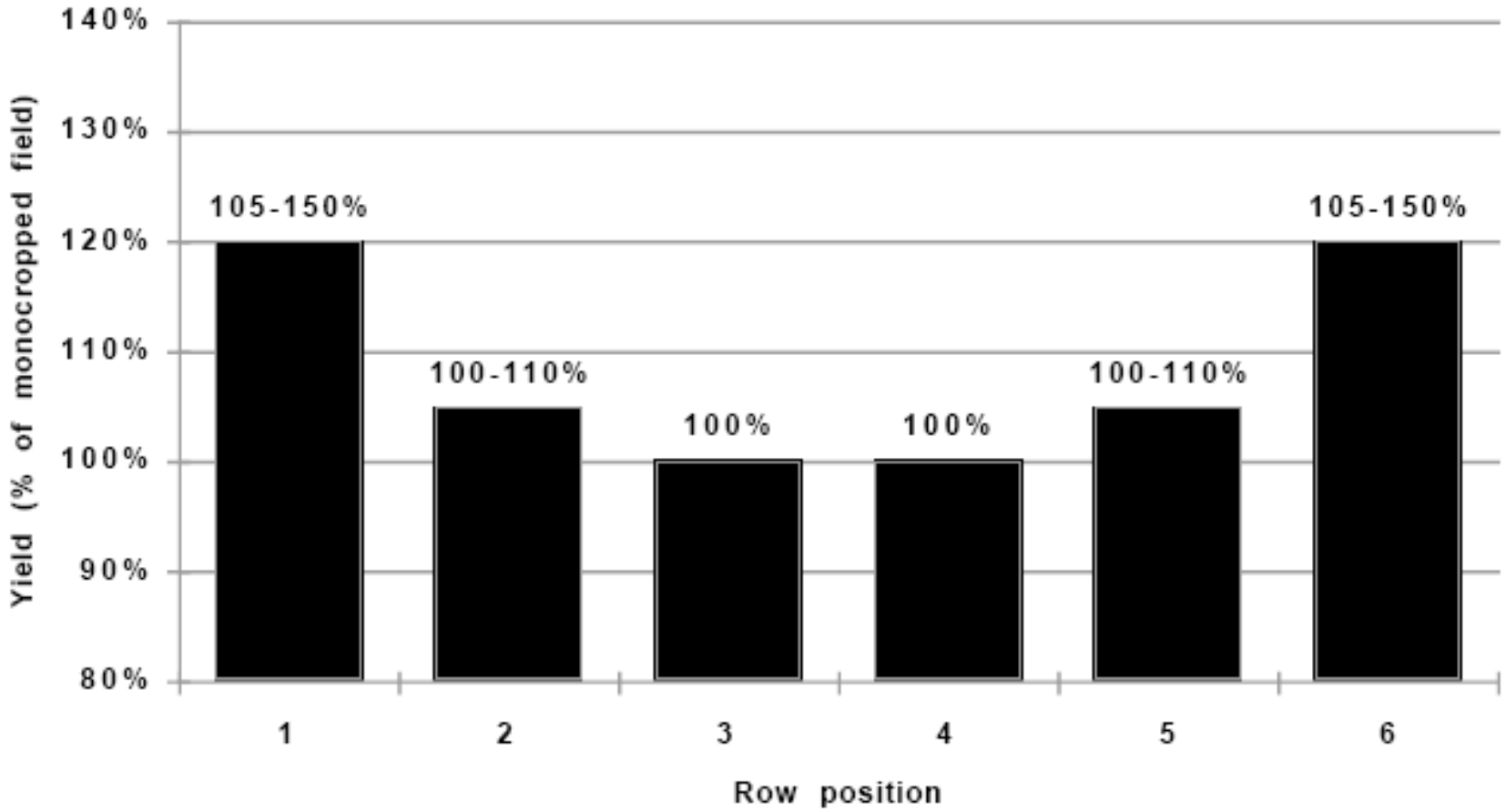
97 bu/A
Straw Not Spread
and Baled


125
100
75
50
25
0
Thousand Weeds / Acre
0
1500
3000
4500
6000
Straw Level, Lb/Acre
Check
0.5 X Dual
X
1.5 X

2005 Grant, NE

9660STS
JOHN DEERE
Shelbourne

Figure 1. Effect of corn row position (for a six-row strip) on corn yield, expressed as a percent of yields typically observed with monocrop corn management. The number on top of each column indicates the range of yields (compared with monocropped yields) observed at each position.



No Irrigation

Partial Irrigation

Full Irrigation