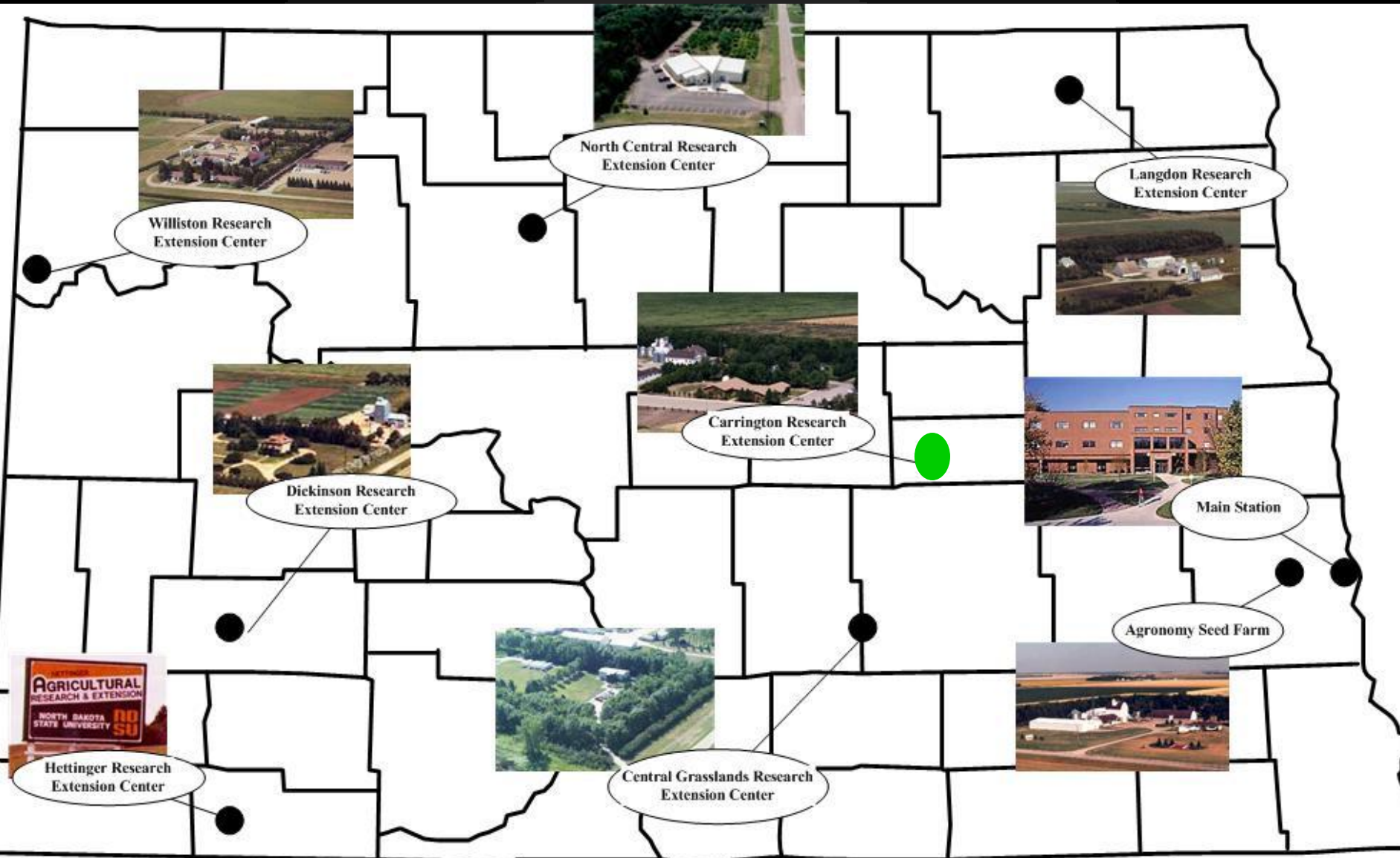


Corn Tillage and Plant Nutrition Research, NDSU Carrington Research Extension Center

Greg Endres, NDSU Extension area agronomist
Carrington Research Extension Center
gregory.endres@ndsu.edu; 701-652-2951

North Dakota State University



Corn tillage and placement of fertilizer study, 2007-2009.



Strip Till for Field Crop Production

Equipment*Production*Economics (AE-1370)

- Available at NDSU Extension Service offices or www.ag.ndsu.edu/pubs/machine.html



Materials and Methods (corn)

- Heimdal-Emrick loam with 2.6-3.6% o.m.
- Previous crop: spring wheat
- Strip till
 - 'Yetter'
 - fall: Oct-Nov; spring (2007): April
 - tillage: 4-7 inch depth and 8-10 inch wide strips
 - 30-inch rows
 - plots: 10-15 ft wide x 30-40 ft deep
- RCB design with 4 reps

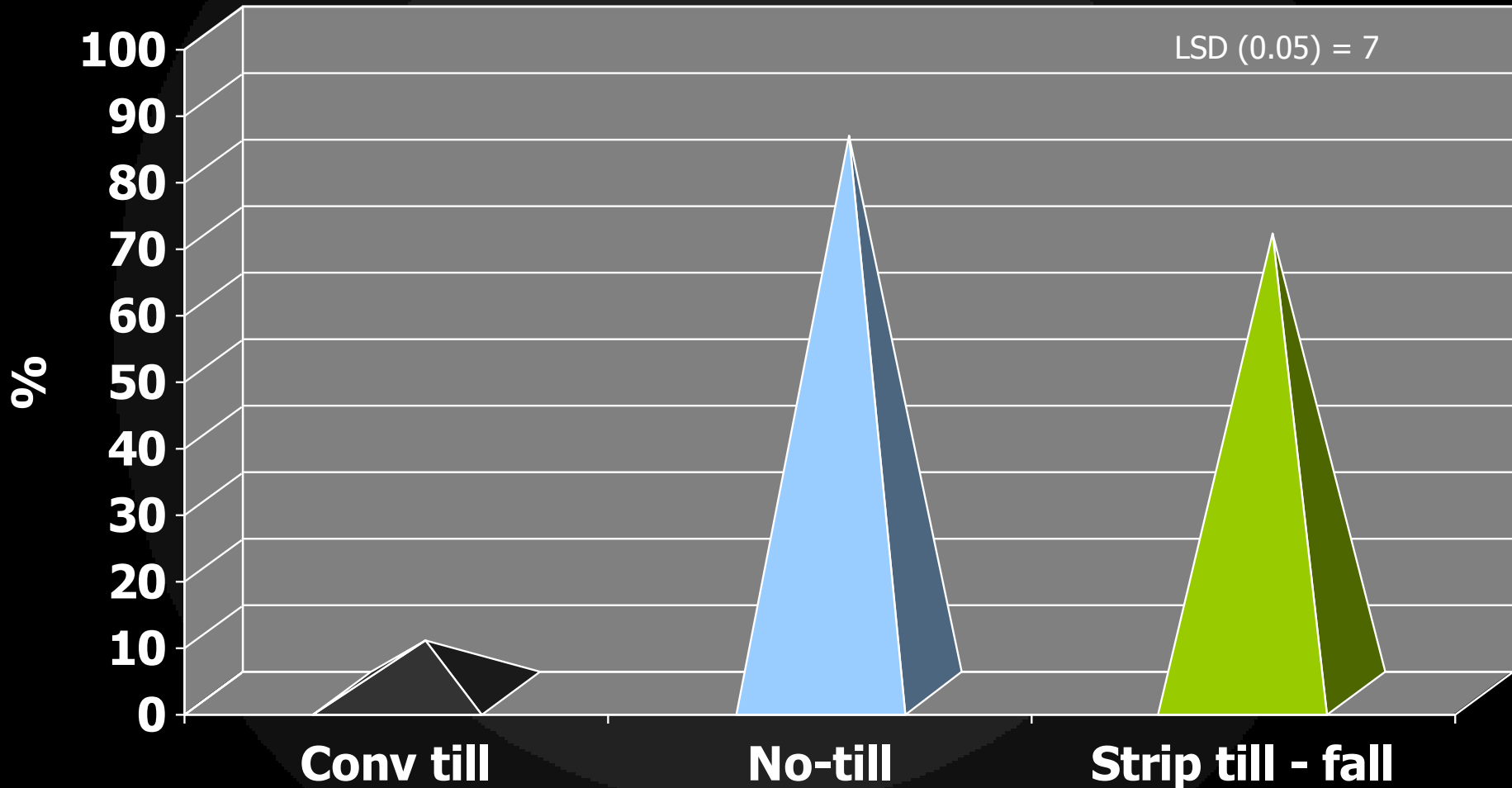
CREC strip till research:

Tillage treatments

1. conventional
2. no-till (direct seed)
3. strip till (fall)

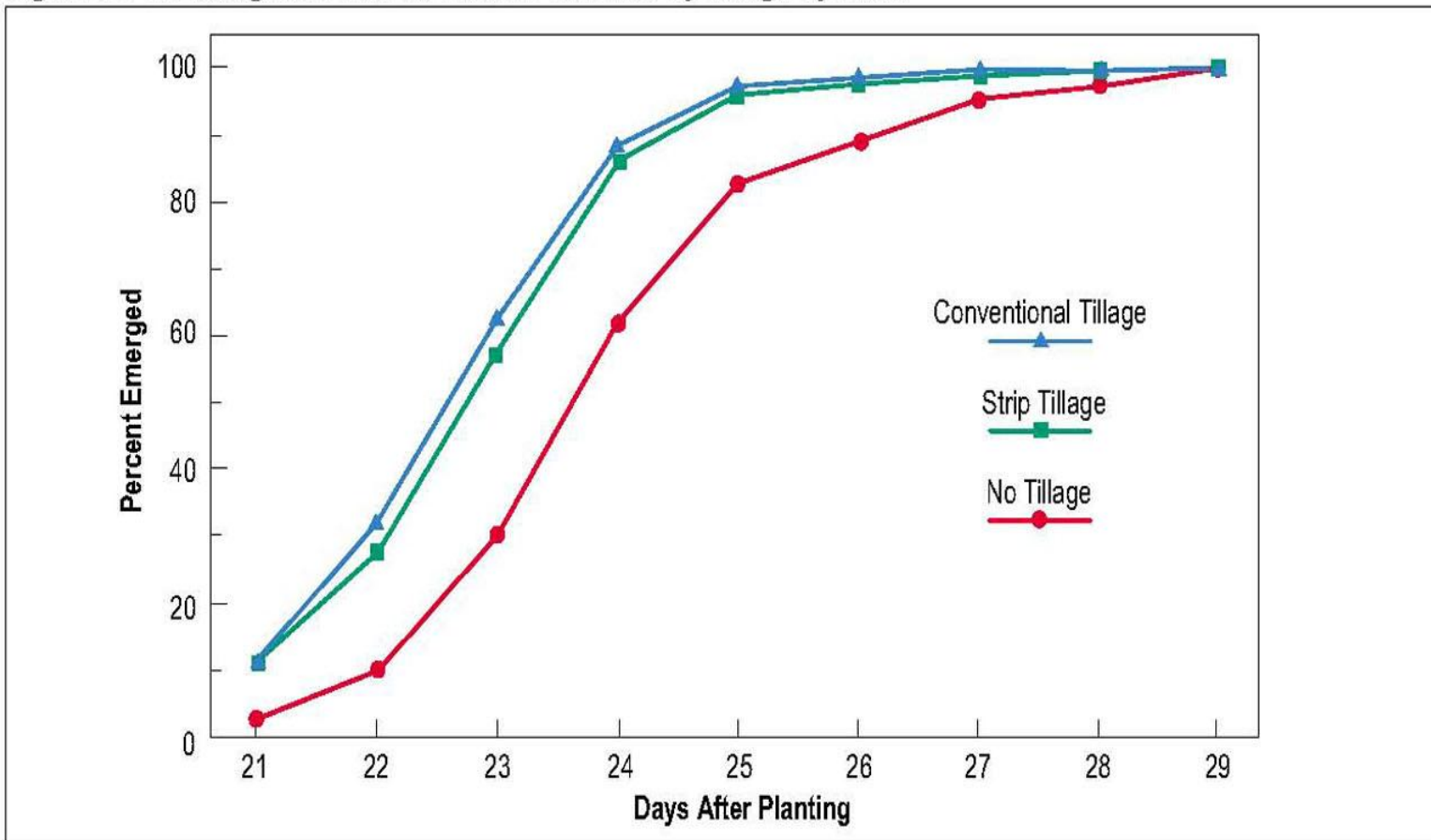


Wheat residue levels among tillage systems in corn trial, Carrington, 2009*.



*Taken after corn planting using line-transect method.

Figure 23-5. Emergence rate of corn as affected by tillage system.



Conservation Tillage Systems and Management
Midwest Plan Service no. 45

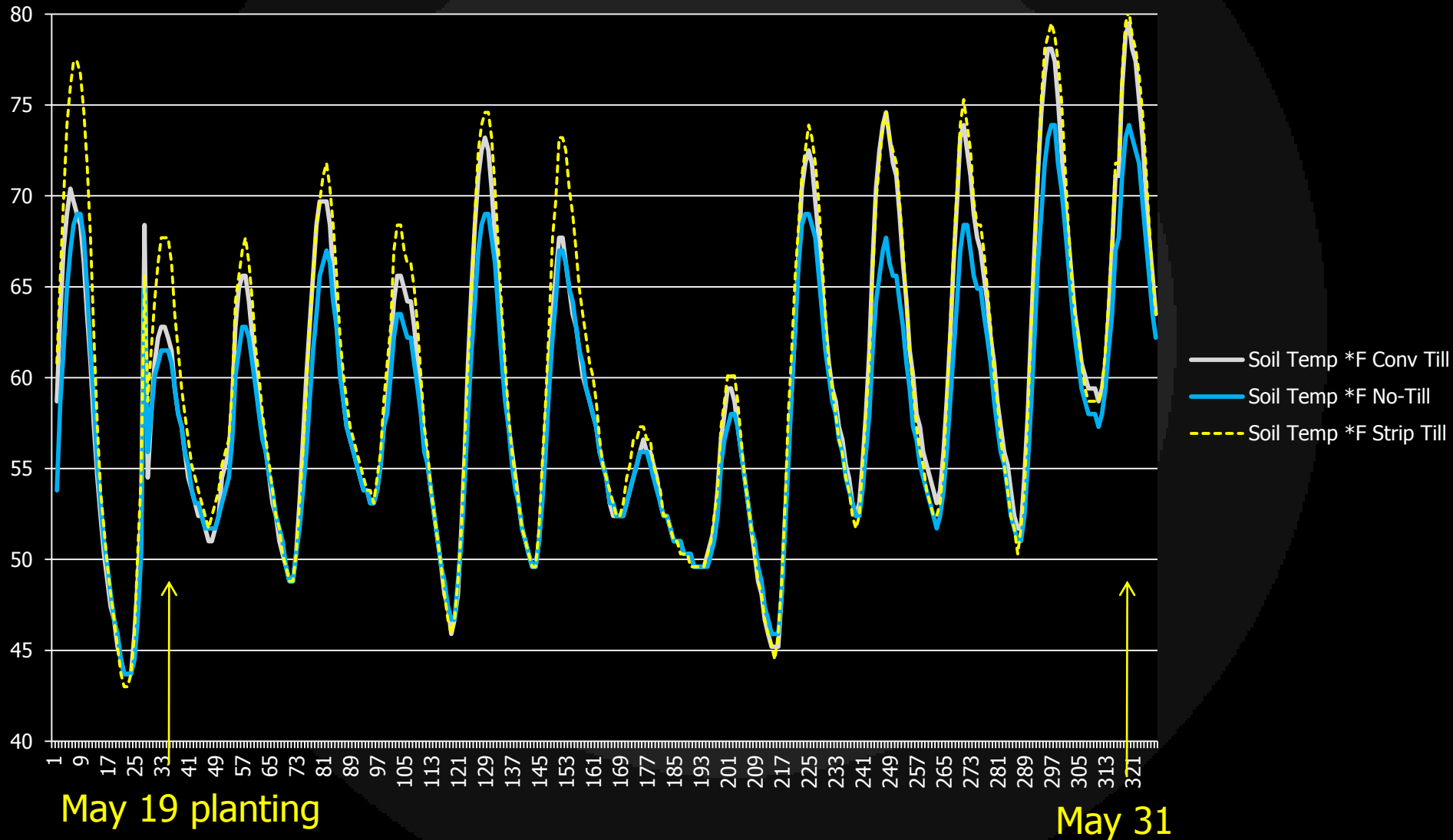


No-till

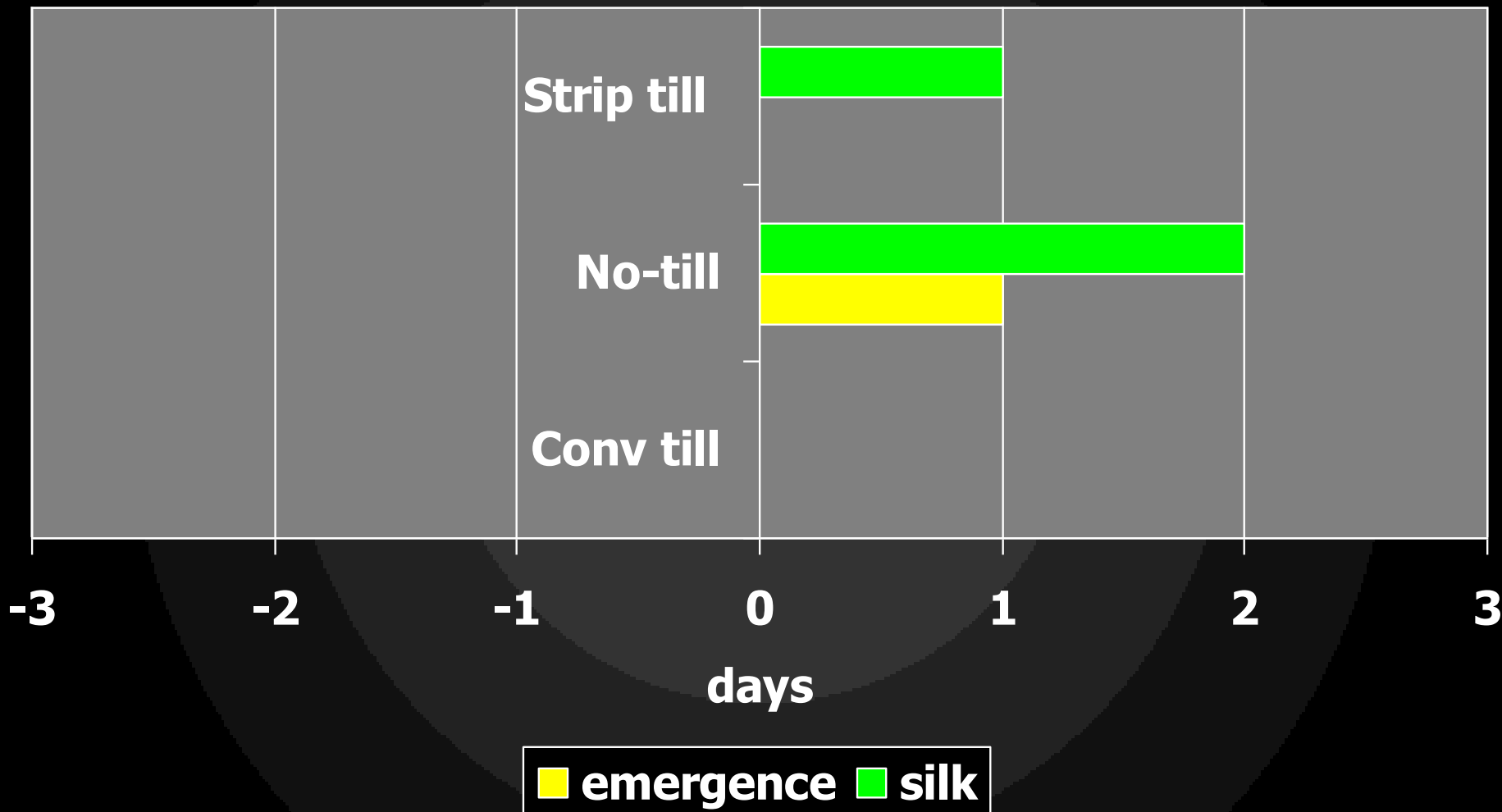
Fall strip-till

Carrington corn tillage trial: Planted May 8, 2007. Picture taken July 9.

Corn tillage system soil temperatures (2-inch depth), Carrington, May 18-31, 2009.

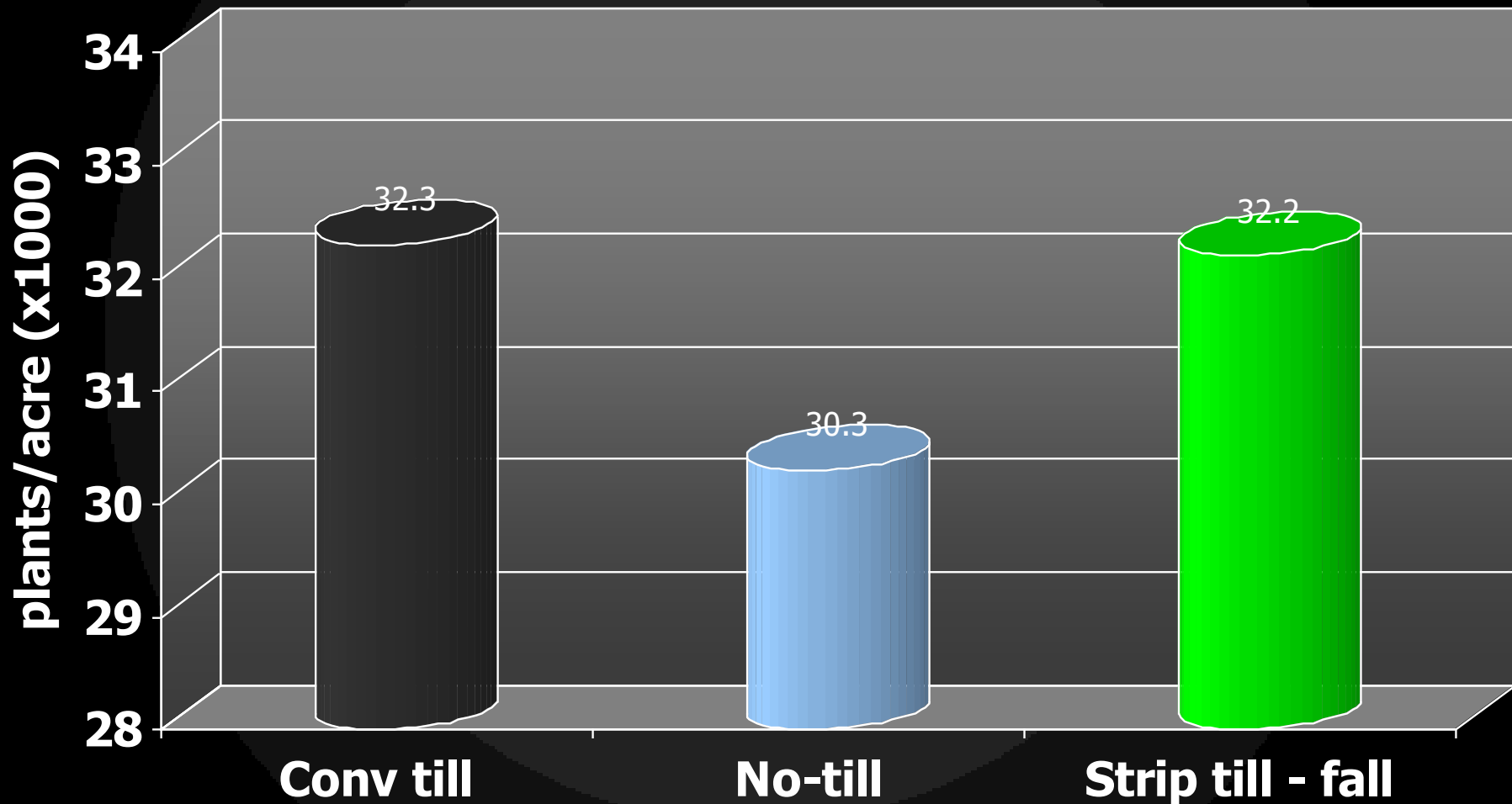


Corn plant development differences among tillage systems, Carrington, 2007-09*.



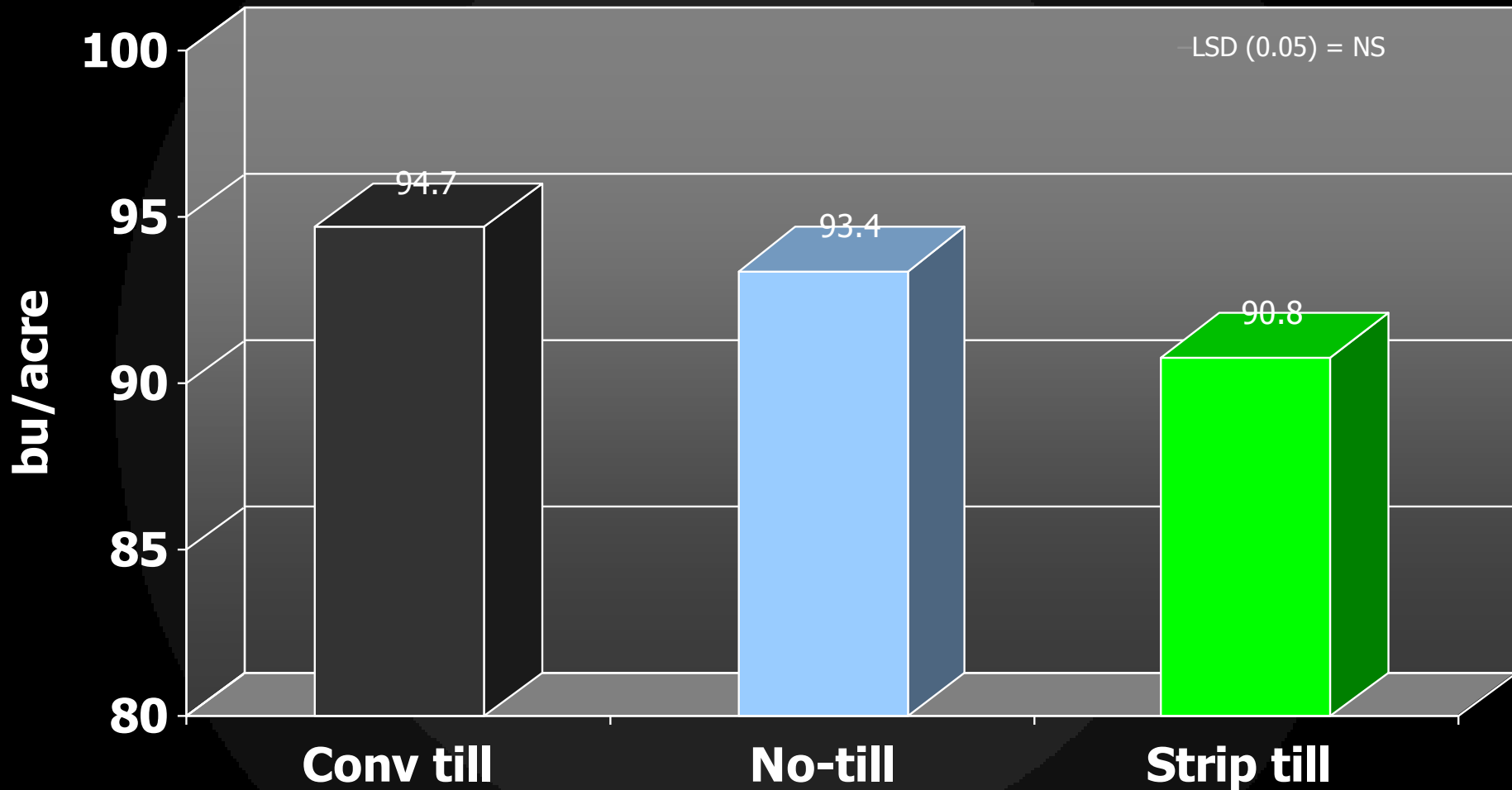
*Statistically significant (LSD=0.05): emergence=2007 and 2009; silk=2007-09

Corn stand among tillage systems, Carrington, 2007-09*.



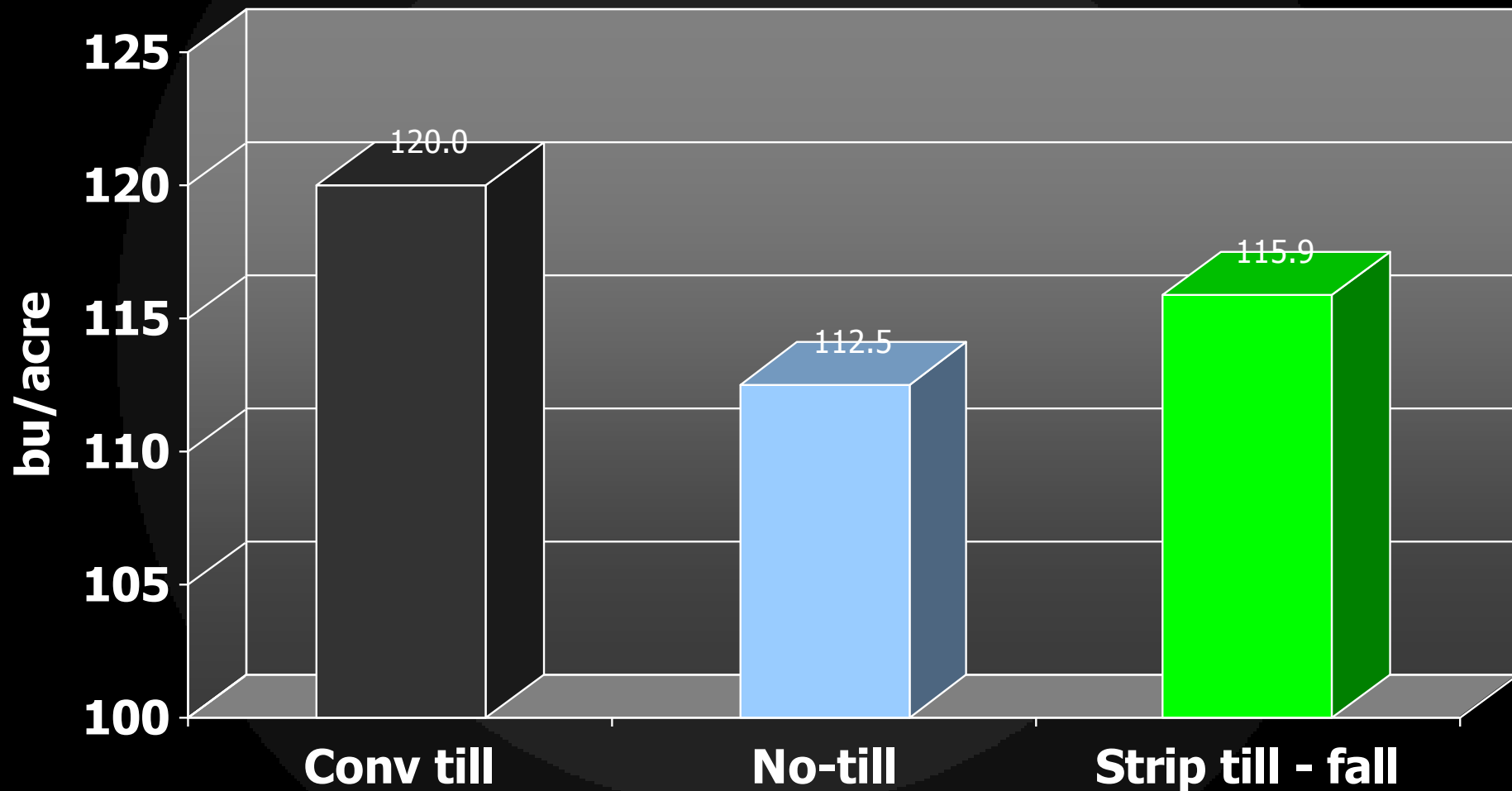
*LSD (0.05) = NS each year

Corn yield among tillage systems, Carrington, 2009*.



* Fall strip till on Oct 31, 2008; Planted May 19 with 2x2 band of 6 gal/A 10-34-0

Corn yield among tillage systems, Carrington, 2007-09*.



*LSD (0.05) = NS each year

CREC Research Summary:

Corn yield with strip-till compared to other tillage systems

- 3 site-yr average:
 - trend of conv > strip > no-till



Carrington, 2009

Spring P soil analysis: **9 ppm**

Fertilizer placement treatments :

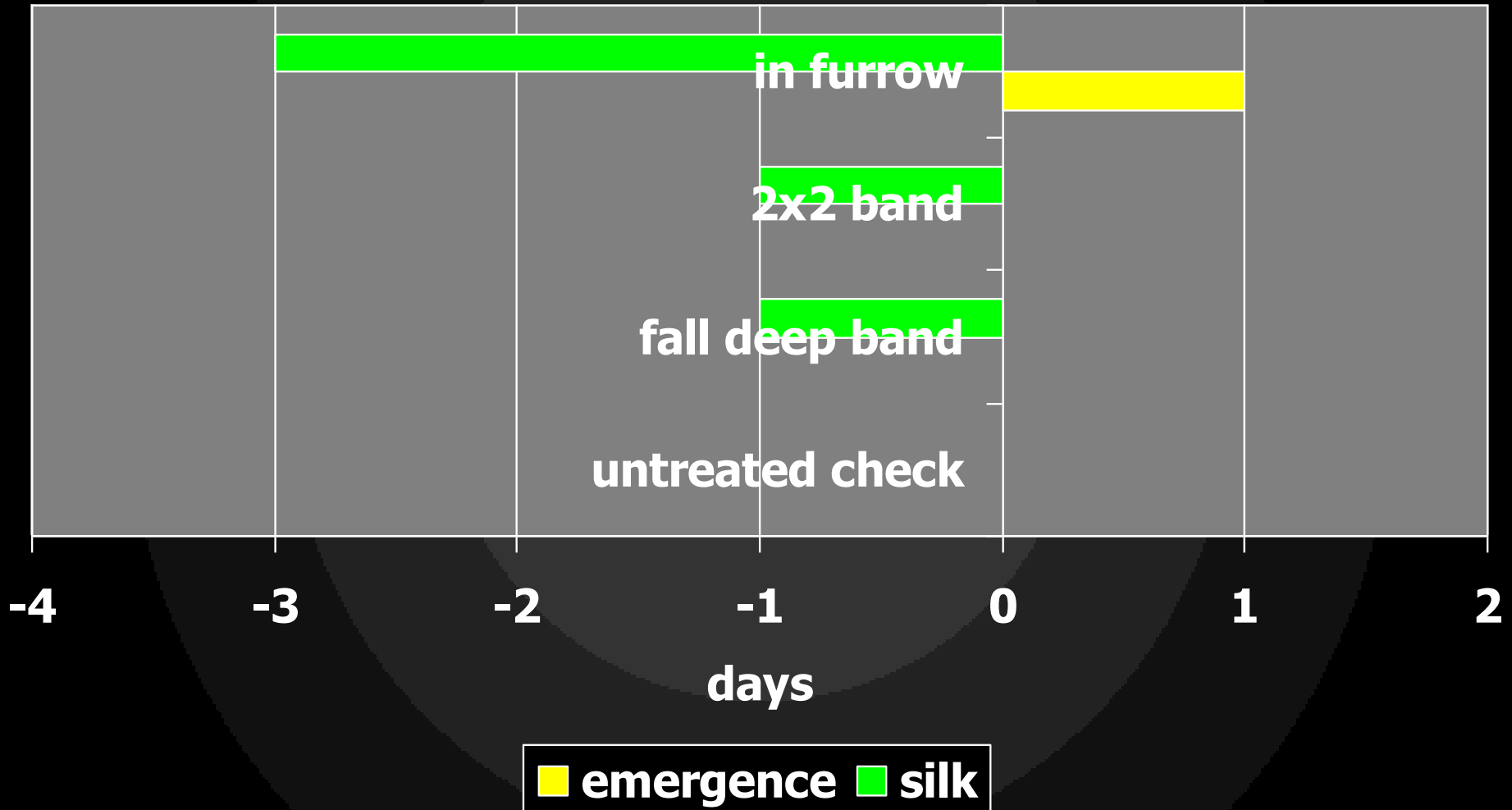
1. **untreated check (ST)**
2. **fall deep band (ST)**
3. **spring in-furrow (ST)**
4. **spring 2x2 band (ST, conv till, NT)**

2x2 10-34-0 placement in **no-till** during planting

6 gpa 10-34-0

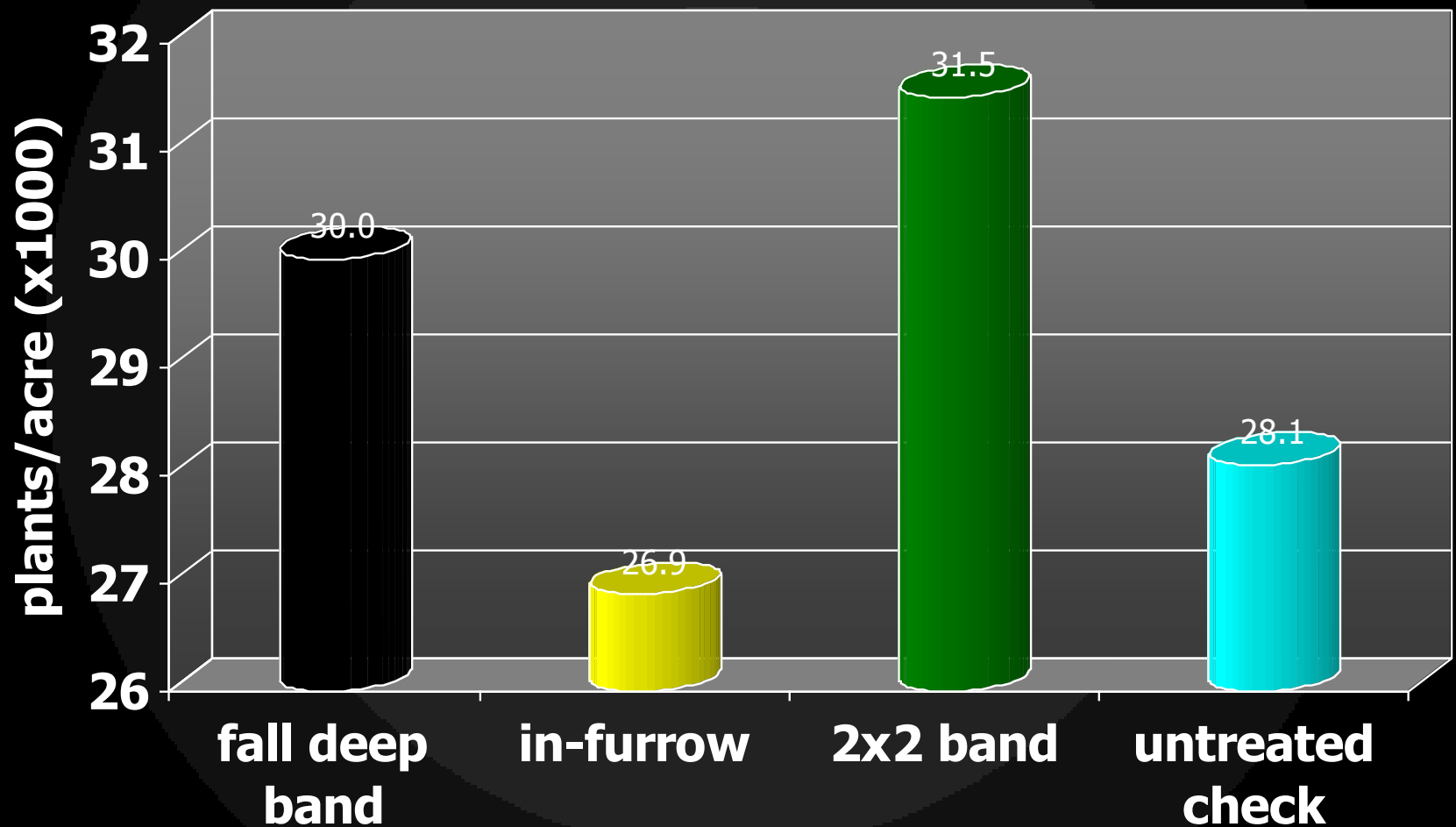
in-furrow 10-34-0 placement in **strip till** during planting

Strip till corn plant development differences among fertilizer placement, Carrington, 2008-09*.



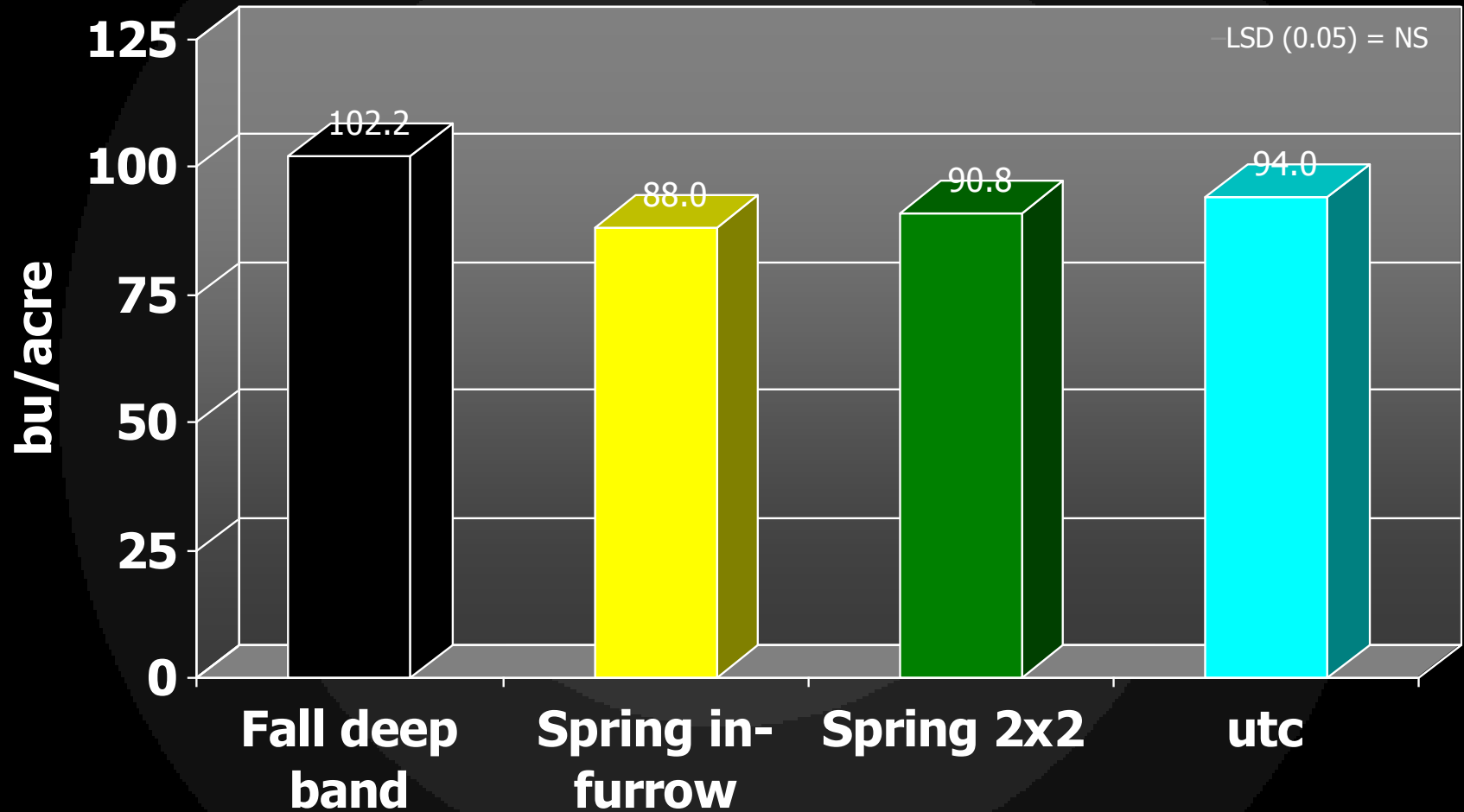
*Statistically significant (LSD=0.05): emergence=2009; silk=2008 and 2009.

Strip till corn stand among fertilizer placement, Carrington, 2008-09*.



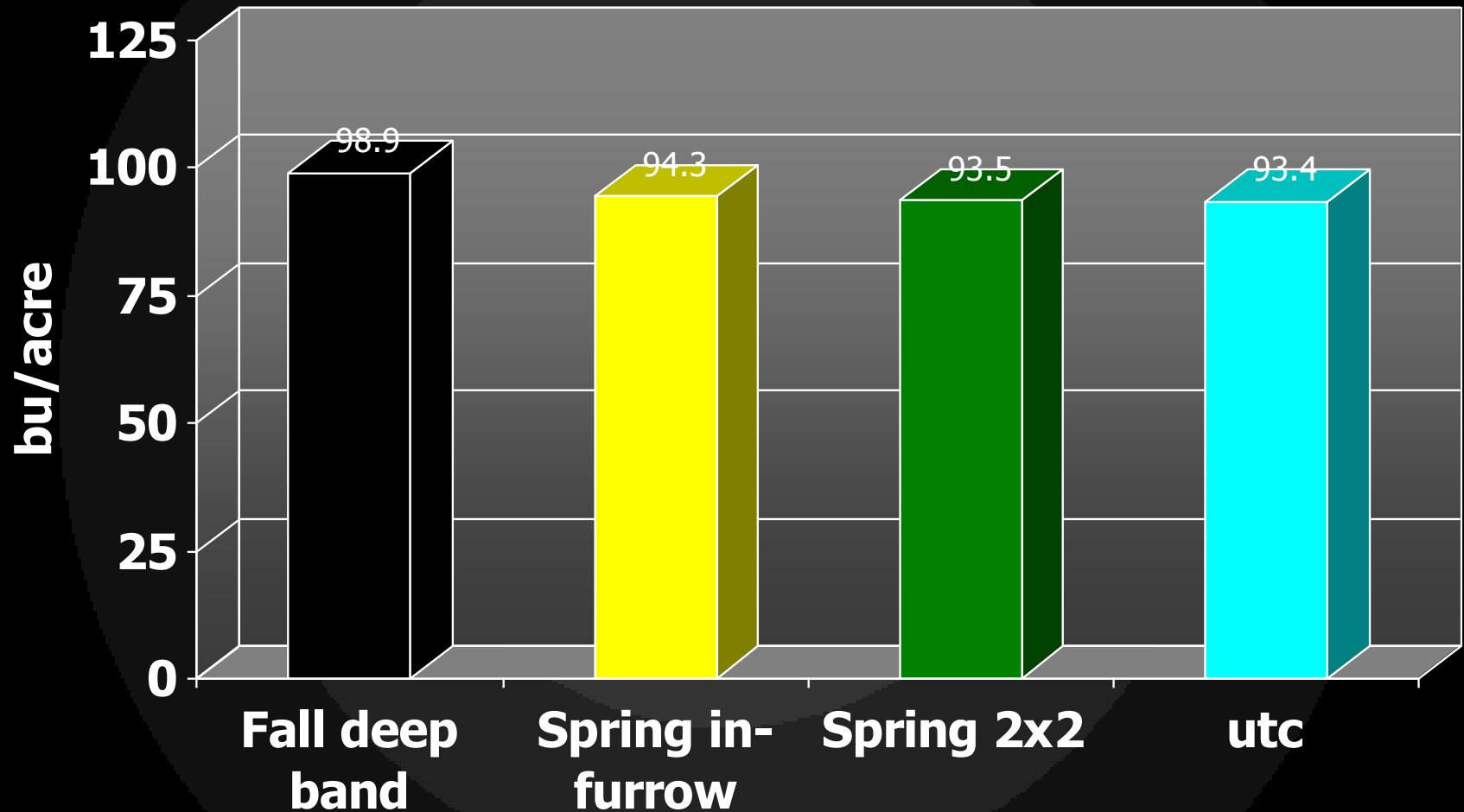
*LSD (0.05) = NS each year

Strip till corn yield among fertilizer placement, Carrington, 2009*.



* P=9 ppm; Planted May 19; 6 gal/A 10-34-0

Strip till corn yield among fertilizer placement, Carrington, 2008-09*.



*P: 2008=20 ppm, 2009=9 ppm; Planted May 13 and 19; 5-6 gal/A 10-34-0; LSD (0.05) = NS each year.

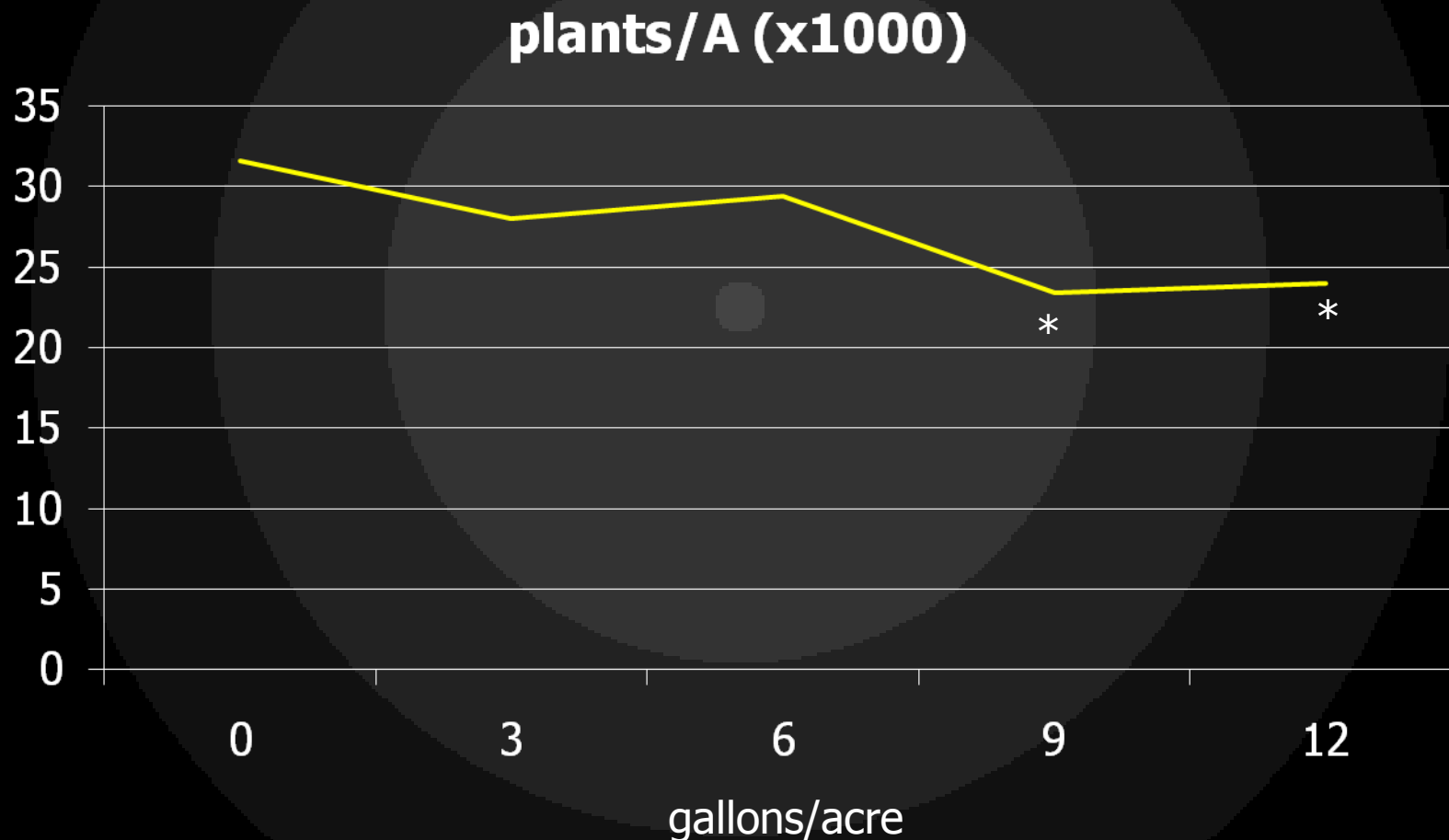
Corn yield with in-furrow 10-34-0, Carrington, 2007-08.

Rate	Yield (bu/A)	
gal/A	2007	2008
0	101	86
2	121	90
4	135	92
6	150	96
8	156	102
10	153	93
LSD (0.05)	22	NS

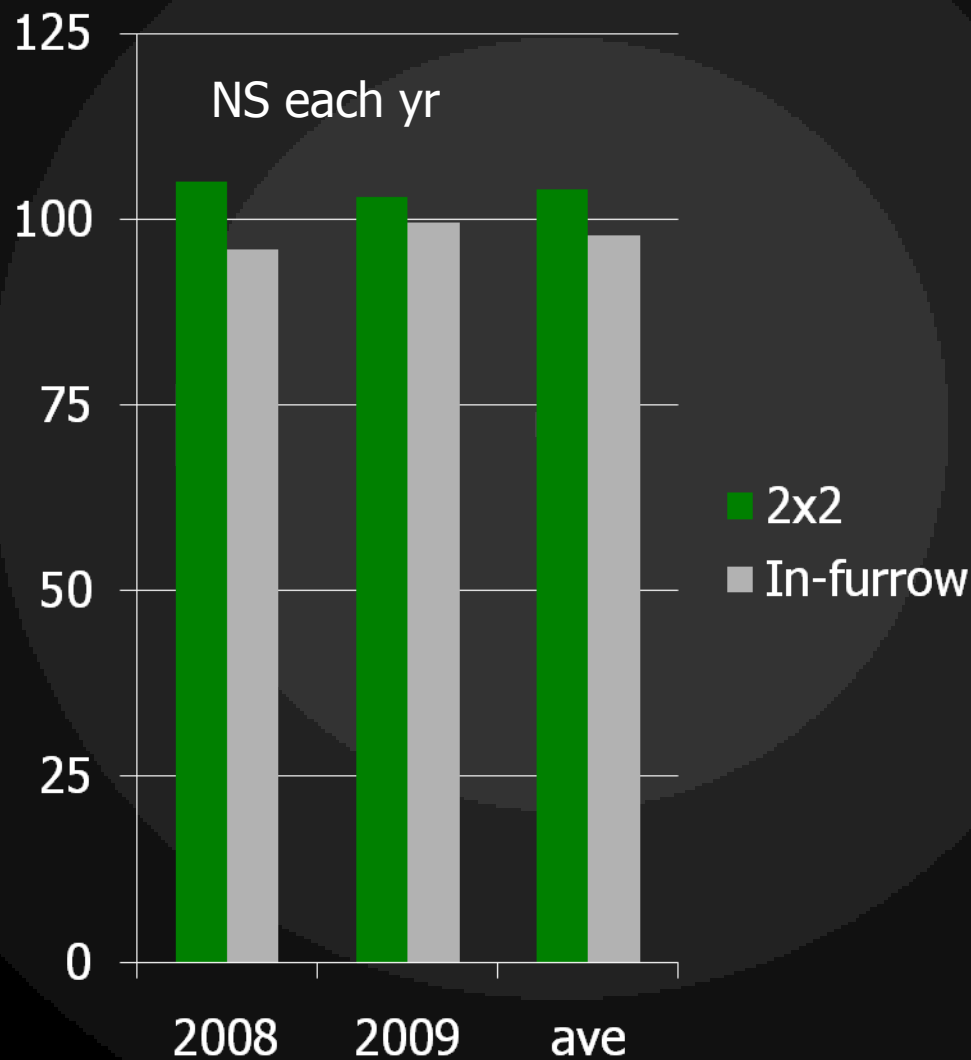
- Conventional tillage
- Soil P: 5 ppm (low) in 2007; 10 ppm (med) in 2008

No difference in plant stand among fertilizer rates each year.

Corn stand with in-furrow 10-34-0, Carrington, 2009.



Corn yield with placement of 6 gal/A 10-34-0, Carrington, 2008-09.



Special corn inputs, CREC, 2005-09

- QuickRoots (*TJ Technologies*)
 - 2005
- APSA-80
 - 2005-07: yield increase in 1 of 6 site-yr
- Bio Forge, Bio Power, Xtra Power (*StollerUSA*)
 - 2006
- Avail (*SFP*)
 - 2007 and 2009
- Torque (*EMD Crop BioScience*)
 - 2008-09
- AgBlend and SoilBuilder (*Advanced Microbial Solutions*)
 - 2008
- Nutrisphere (*SFP*)
 - 2008-09

Direct-seeded corn response to N rate and timing of weed control, Carrington, 2009.

- **N (lb nitrate-N/acre)**

- Spring soil = 24
- PP (urea) = 0, 50, 100
 - 0.78" rain 13 DAA
- POST (UAN; 4-leaf) = 25
 - 0.94" rain 1 DAA

- **Weed control**

1. weed free (soil/POST)
 - soil = Surpass + RU PowerMax; POST = RU PowerMax
2. early POST/POST
 - target 2-4" weed
3. late POST/POST
 - target 8-12" weed



early POST

late POST



untreated check

weed free

early POST

late POST

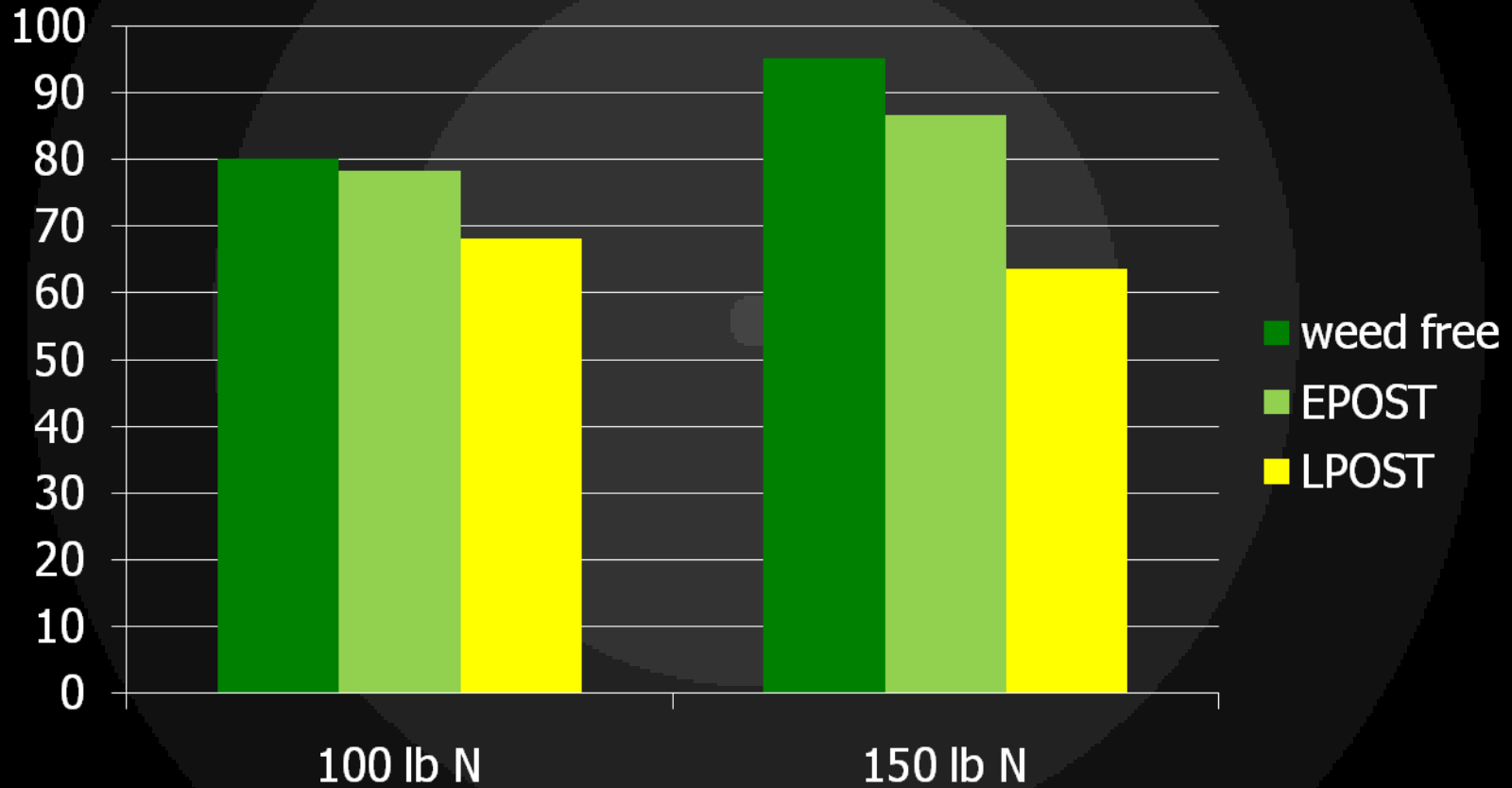
150 lb N/acre

Direct-seeded corn response to N rate and timing of weed control, Carrington, 2009.

Total N	Basal stalk N	Grain yield	TW	Grain M
lb/A	ppm	bu/A	lb/bu	%
50	x	46.7	49.7	24.0
100	92	65.5	49.7	23.1
150	198	69.5	49.0	25.9
LSD (0.05)	87	10.0	NS	1.6

Weed timing	Basal stalk N	Grain yield	TW	Grain M
	ppm	bu/A	lb/bu	%
UTC	x	27.1	48.3	26.6
weed free	229	80.2	50.2	22.3
EPOST	100	74.5	50.0	23.4
LPOST	107	60.1	49.3	24.9
LSD (0.05)	NS	11.5	0.9	1.9

Direct-seeded corn yield with N rate X timing of weed control, Carrington, 2009.





Questions or
Comments?