

Impact of Raised Beds and Deep Tillage on the Profitability of Irrigated Soybeans Grown on Heavy Clay Soils in Mississippi



Daniel H. Poston

Associate Research/Extension Professor

Delta Research and Extension Center

Stoneville, MS

dposton@drec.msstate.edu

(662) 820-0893

MS soybean production

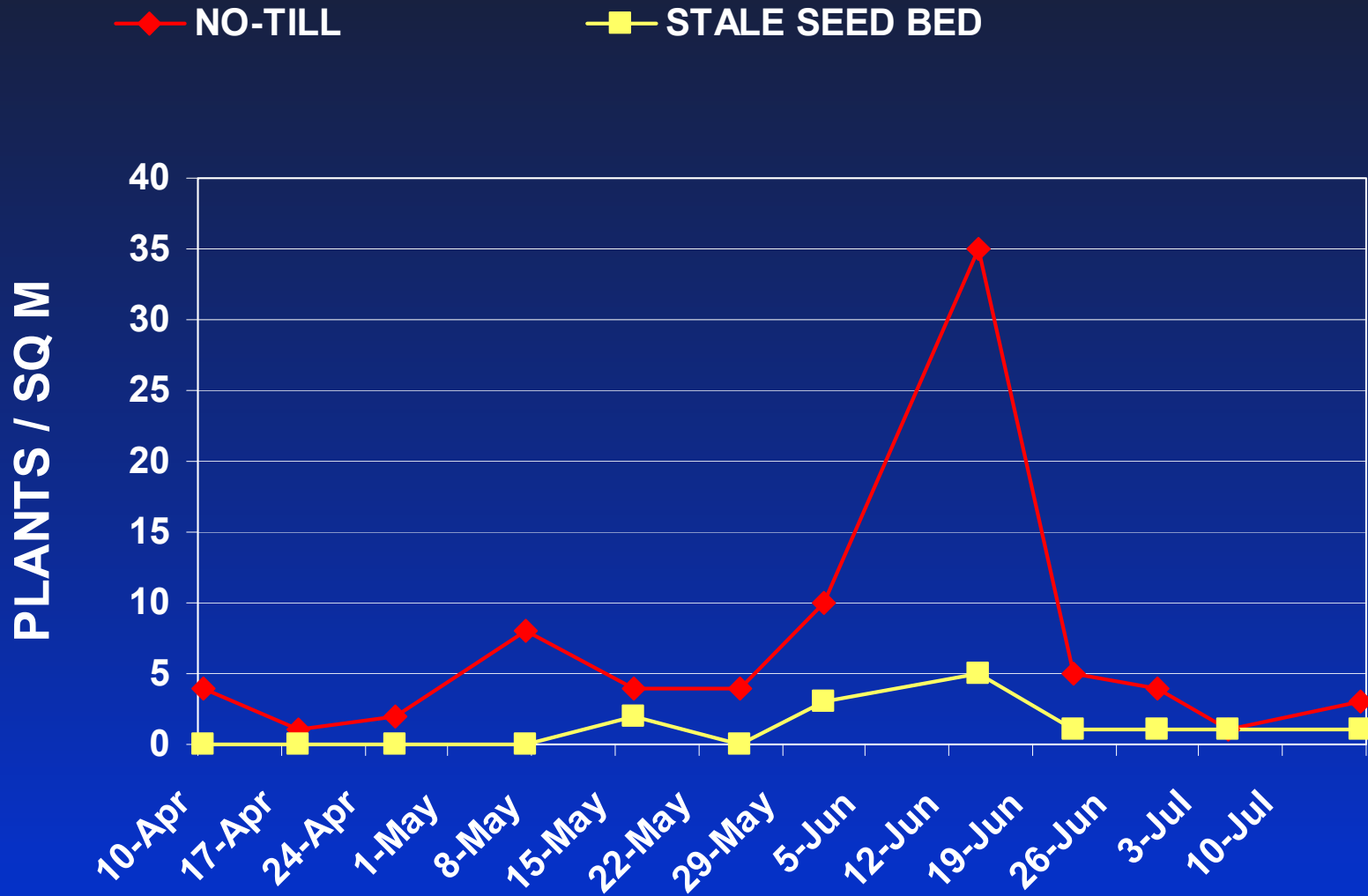
- Mostly on mixed and clay soils – Drainage problems
- ESPS widely adopted
 - Cool and wet growing conditions
 - Short plants with poor canopy closure
 - Late-season weed problems
- Common to plant flat and flood irrigate especially in rice rotations; resistance to using bedding systems
- No-till or Reduced Tillage adopted because of reduced inputs and time savings

No-Till vs. Conventional Tillage

- The national average difference in soybean yield between no-tillage and conventional tillage was found to be negligible with a 0.7% advantage to no-till.
- No-till tended to have greater yields than conventional tillage in the south and west regions.
- No-till had greater soybean yields than conventional tillage on moderate- to well-drained soils, but slightly lower yields than conventional tillage on poorly drained soils.

**Influence of Tillage on Soybean Yield in the United States and Canada.
by Michael DeFelice, Paul Carter and Steven Mitchell; Pioneer Crop Insights,
Vol. 16, No. 11, Page 1.**

ANNUAL GRASS EMERGENCE 2001



Tillage and Raised Bed Research



Tillage and Raised Bed Studies - 2006

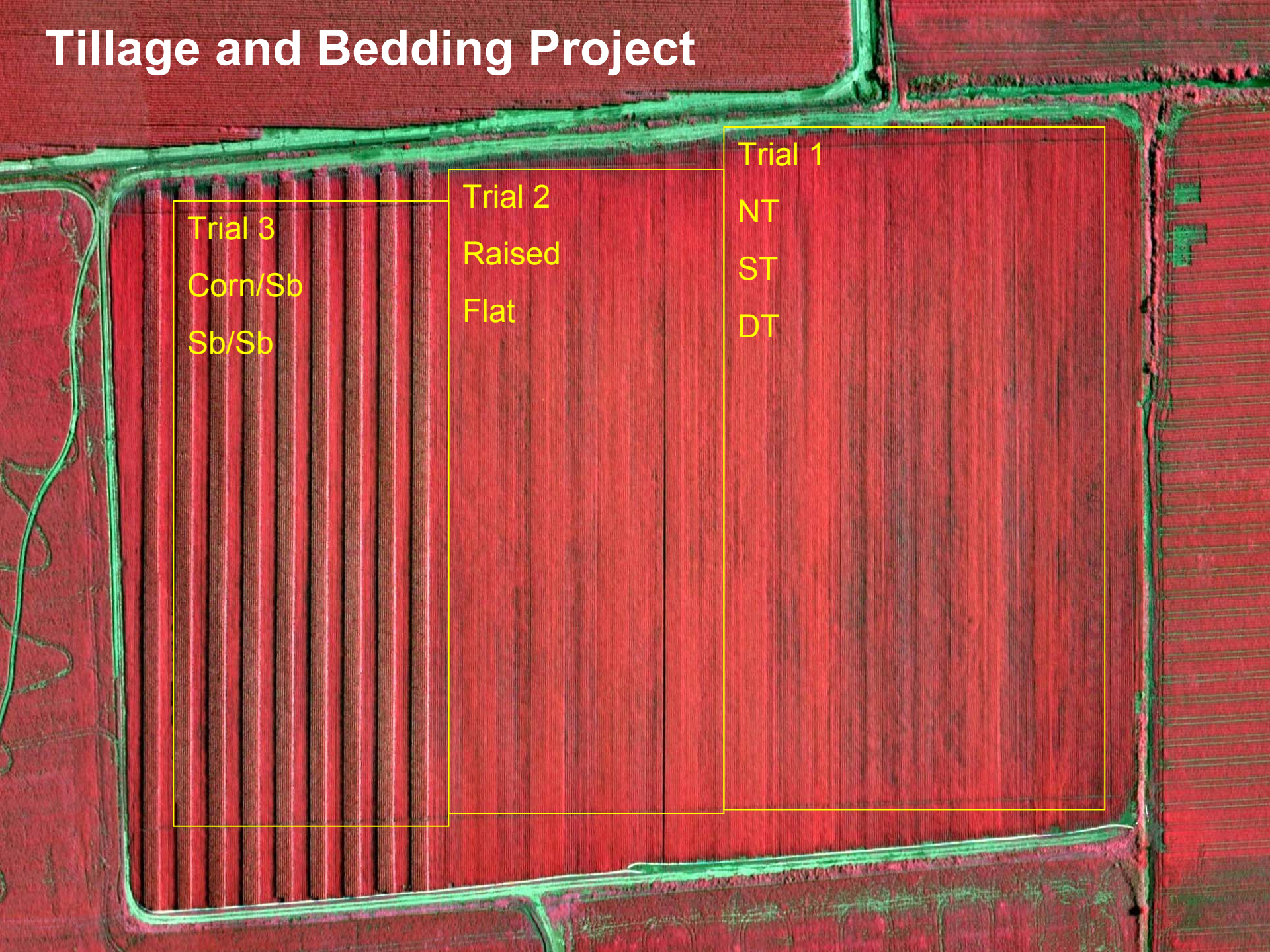
- 32 acre grower field
- Difficult to irrigate, drainage issues
- No-till soybean for 4+ years (possibly 8 years)
- Heavy mixed to clay soil
- Flood irrigated with poly pipe from top of field, NO LEVEES, 0.2% Slope
- Good fertility
- Annual grasses, groundcherry, dayflower, and redvine infestations

Tillage and Bedding Project

Trial 3
Corn/Sb
Sb/Sb

Trial 2
Raised
Flat

Trial 1
NT
ST
DT



Tillage and Bedding Project

Trial 3

Corn/Sb

Sb/Sb

- Interaction of Rotation and Response to Fungicides
- Soybean Yield and Economic Returns

Trial 2

Raised

Flat

- Weed Population Response to Tillage
- Interaction of Bedding and Response to Fungicides
- Varietal Response to Raised Beds
- Soybean Growth and Development
- Soybean Yield and Economic Returns

Trial 1

NT

ST

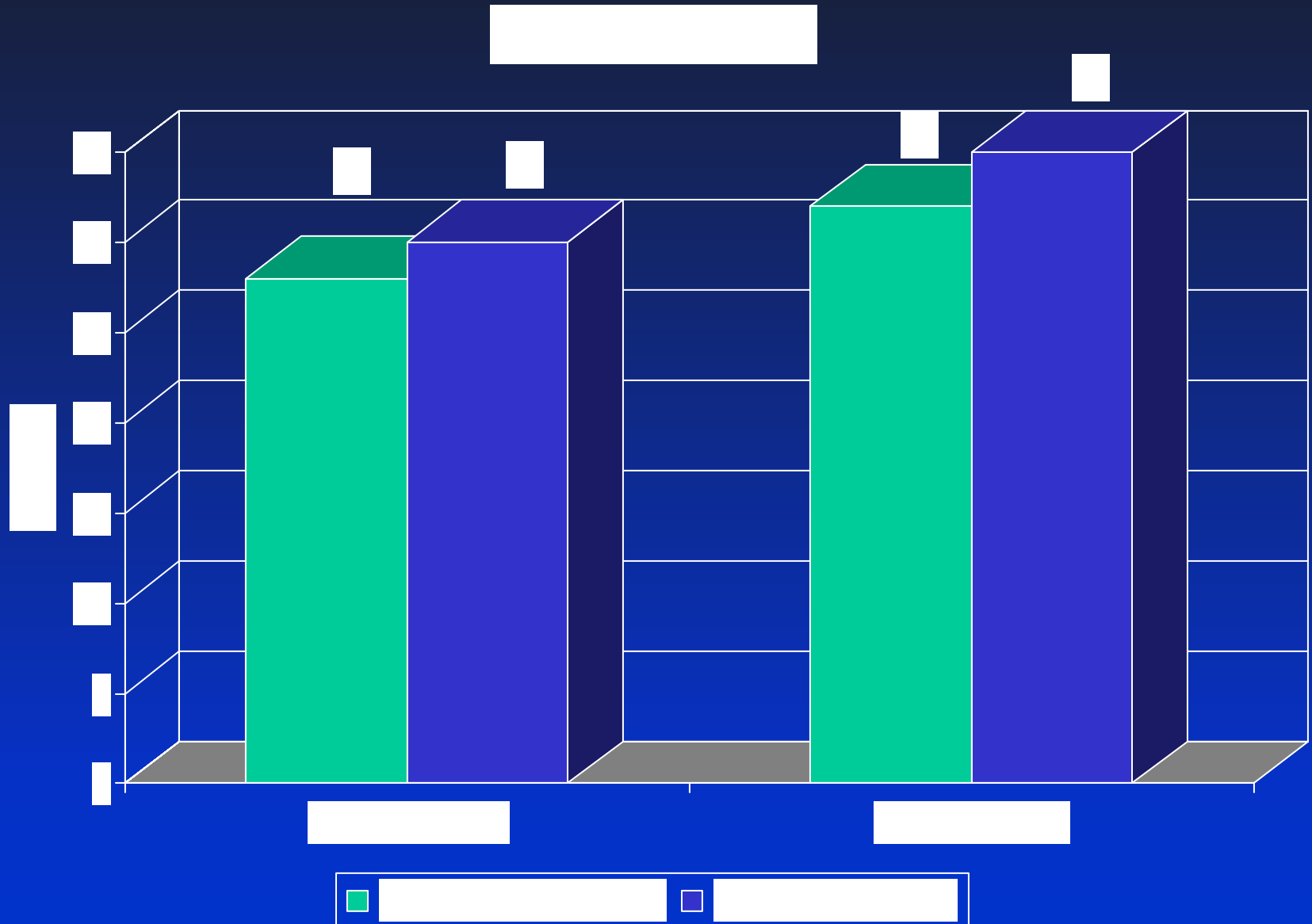
DT

- Weed Population Response to Tillage
- Interaction of Tillage and Response to Fungicides
- Varietal Response to Tillage
- Soybean Growth and Development
- Soybean Yield and Economic Returns

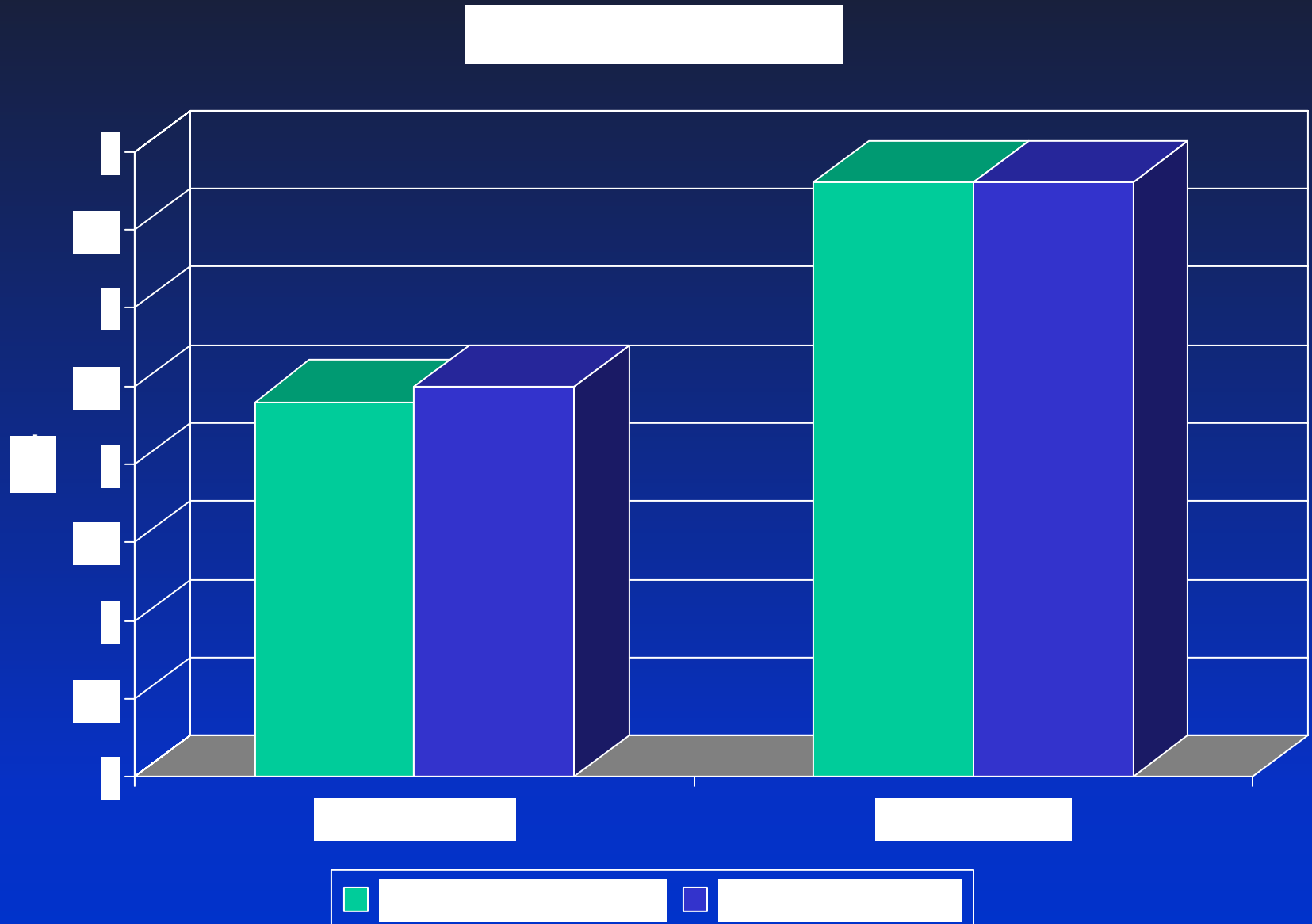
Raised vs. Flat Plantings Study

- Large Strip Plots
 - 0.25 acre/plot and 1 acre/treatment
- Tillage Operations
 - Raised- hipped 1X in fall, do-all in spring
 - Flat- disked 1x in fall
- Varieties
 - Asgrow 4403 – somewhat flood-susceptible
 - Pioneer 94B73 – relatively flood-tolerant
- Fungicide – Headline 6 oz/A
- RCB design with Split-Split Treatment Arrangement
 - Bedding system (2) x Variety (2) x Fungicide w or w/out Headline (2)
 - 8 treatments, 4 reps

Bedding Effect on Plant Height



Bedding Effect on LAI





Flat Planted

Raised Beds



Flat Planted

A photograph of a lush green field, possibly a crop field, with a yellow text box overlaid at the bottom center. The plants are dense and appear to be a mix of leafy greens and grasses. The text "Flat Planted" is written in a yellow, serif font within the box.

Flat Planted



Raised Beds

A photograph showing a vast field of green, leafy plants, likely a crop like spinach or lettuce, growing in raised beds. The plants are densely packed and cover the entire visible area. The lighting is bright, suggesting a sunny day. A yellow rectangular box is overlaid at the bottom center of the image, containing the text "Raised Beds" in white serif font.

Raised Beds

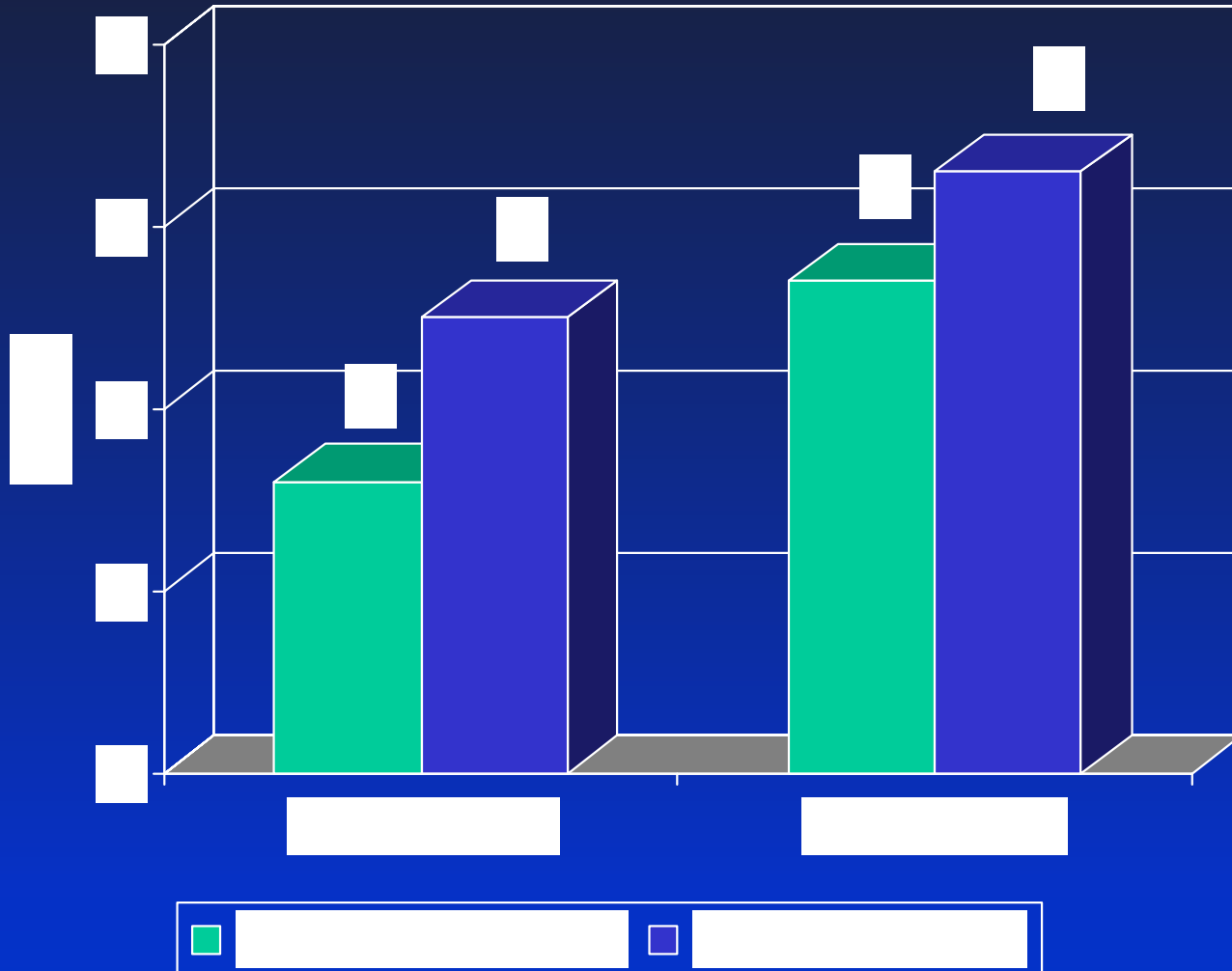
Raised Beds



Flat Planted



Effects of Variety and Bedding on Soybean Yield - 2006

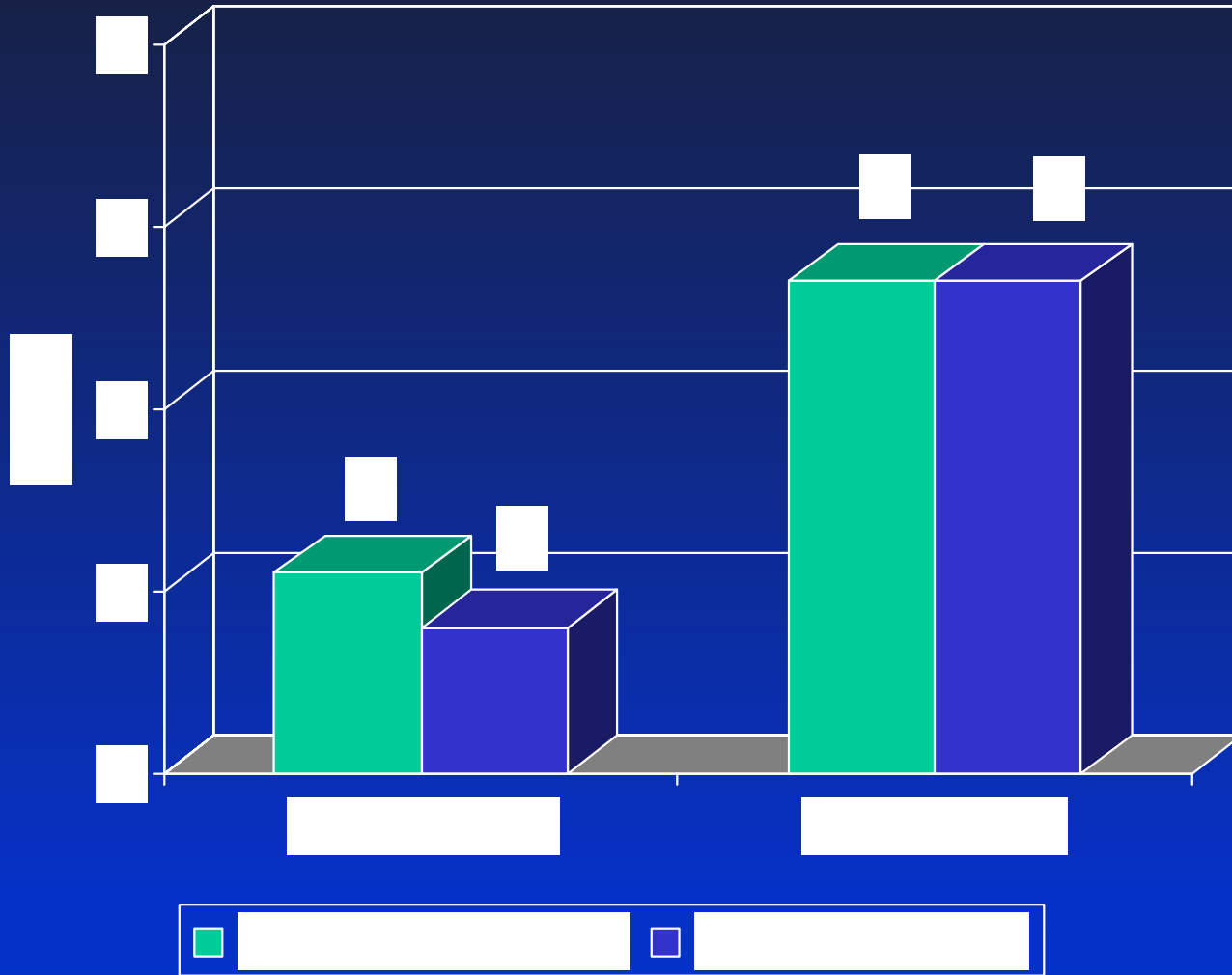


9 bushels for proper varietal placement

10 bushels from raising beds

Still gained 8 bushels by planting flood tolerant variety on a bed

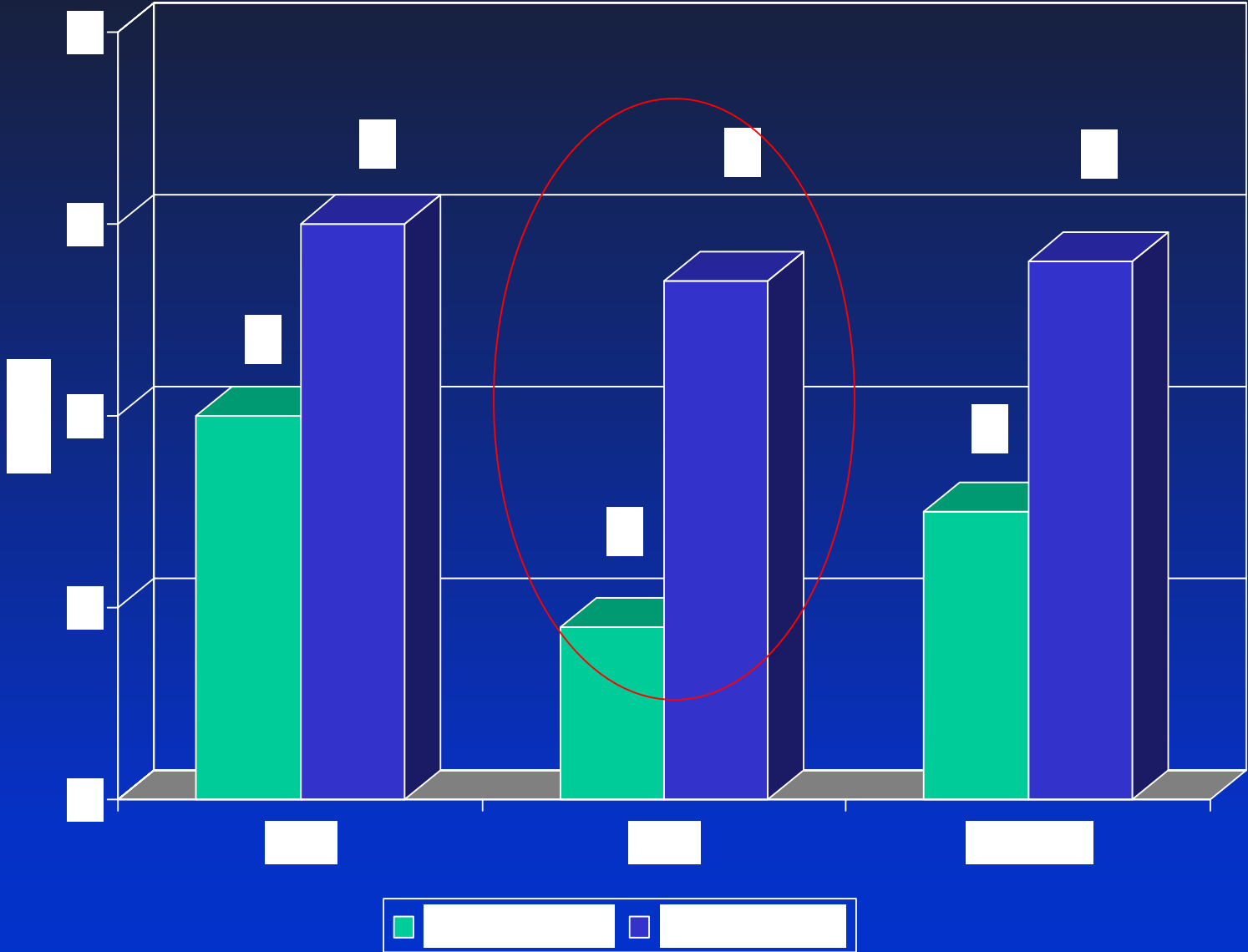
Effects of Variety and Bedding on Soybean Yield - 2007



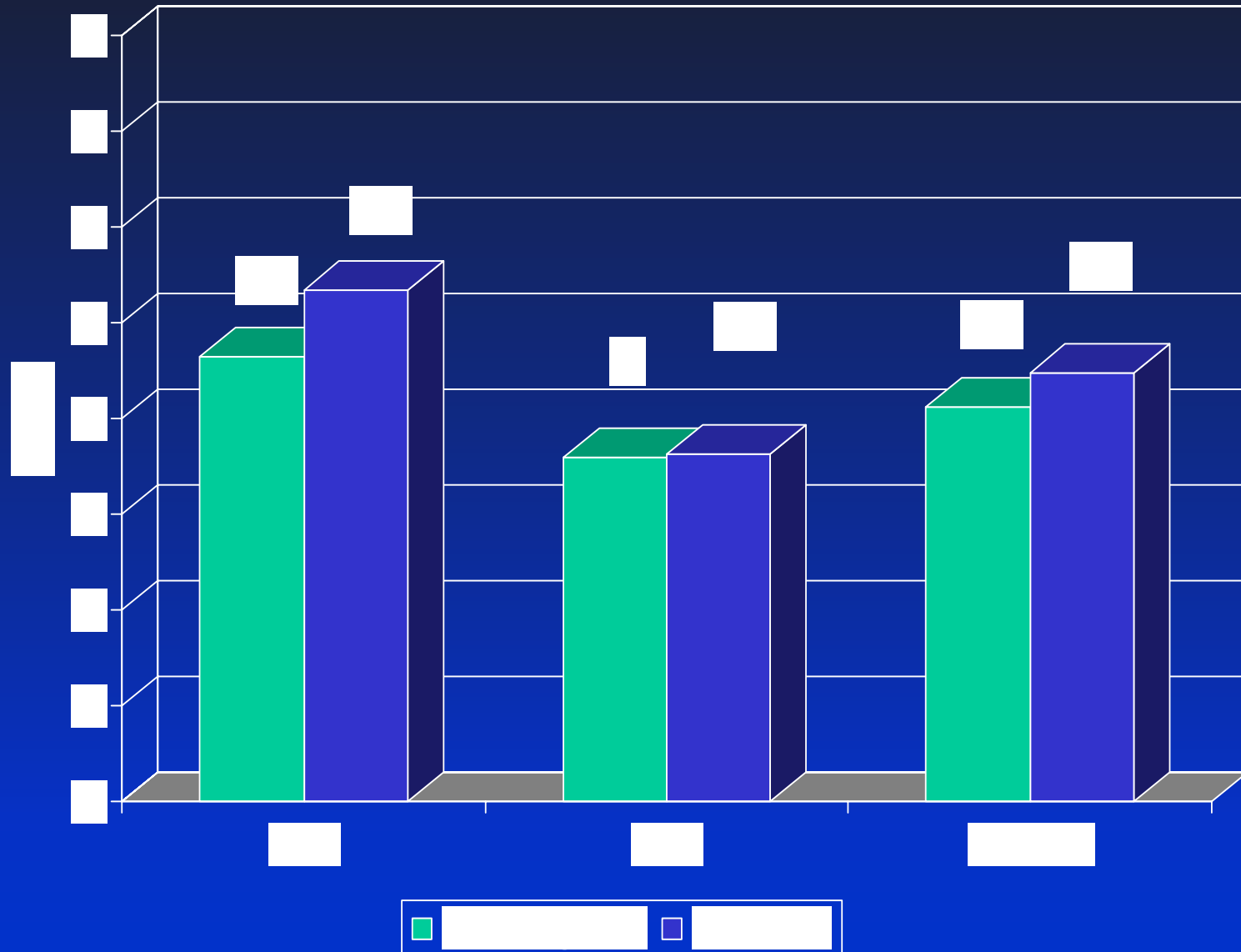
No significant difference between varieties – DOP 3/31/07

17.7 bushels from raising beds

Effect of Bedding on Soybean Yield 2006 and 2007



Effect of fungicide on Soybean Yield 2006 and 2007



Field Operations and Input Costs

Blanket Inputs		Cost per acre 2006/2007
Chemical		
	Glyphosate + 2,4-D PREPLANT	\$11.86/11.59
	Glyphosate AT PLANTING 2006 ONLY	\$12.53/6.07
	Sequence EPOST	\$20.07/20.73
	Roundup + Python MPOST	\$6.61/6.47
	Karate Z at R4 to R5	\$9.29/10.50
	Gramoxone Inteon + Defol 5 + NIS PREHARVEST	\$4.30/12.16
Planting		
	Great Plains Twin Row Drill	\$11.62/8.71
Irrigation		
	217 hr/ 96 hr	\$54.39/21.76
Harvest		
	Custom Cutting	\$25.00/28.00

Total

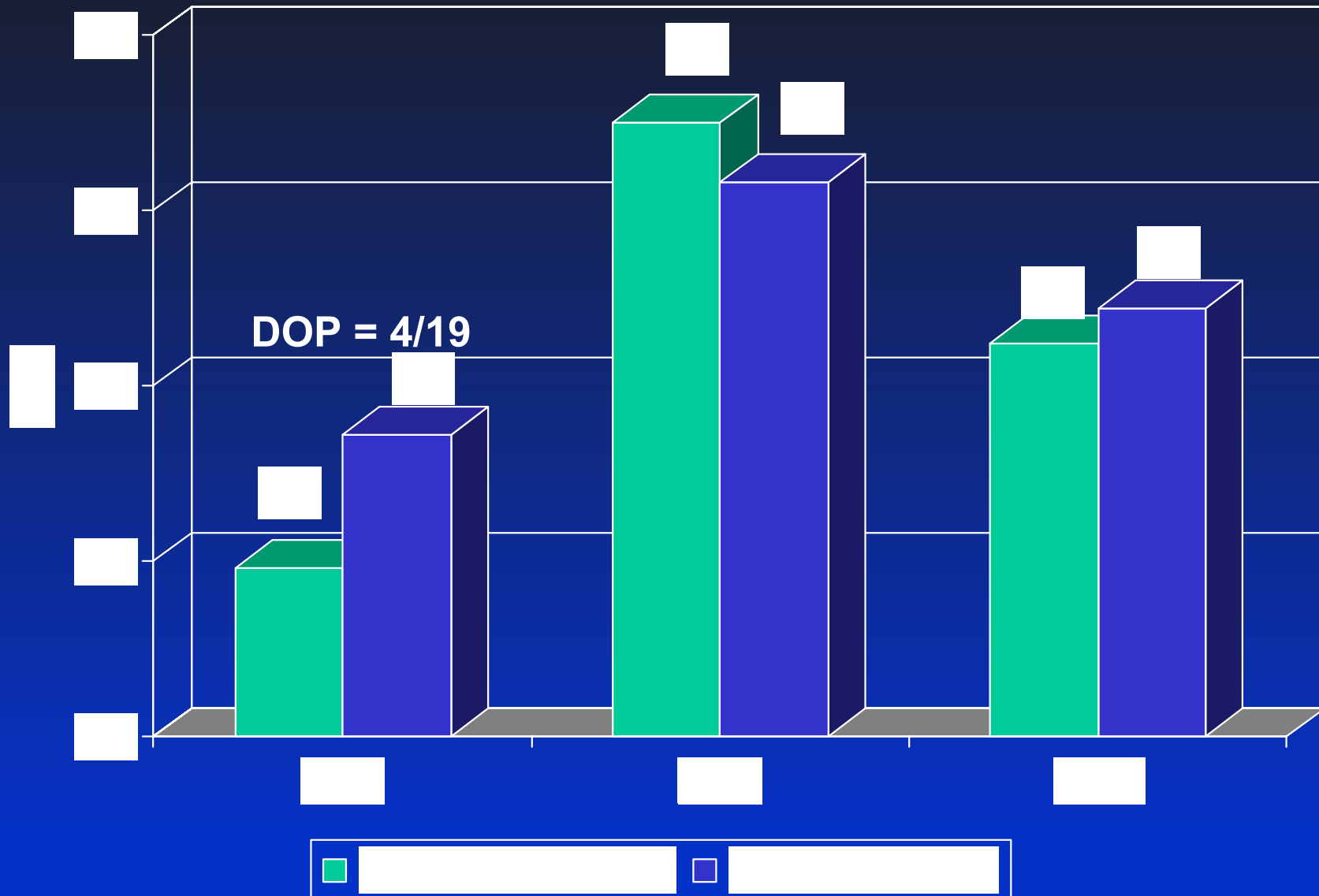
\$155.67/125.99

Cost
-\$/acre-

Operation	2006	2007
Hipper	5.61	5.88
Do-All	4.22	4.58
Disk Harrow	7.15	7.41

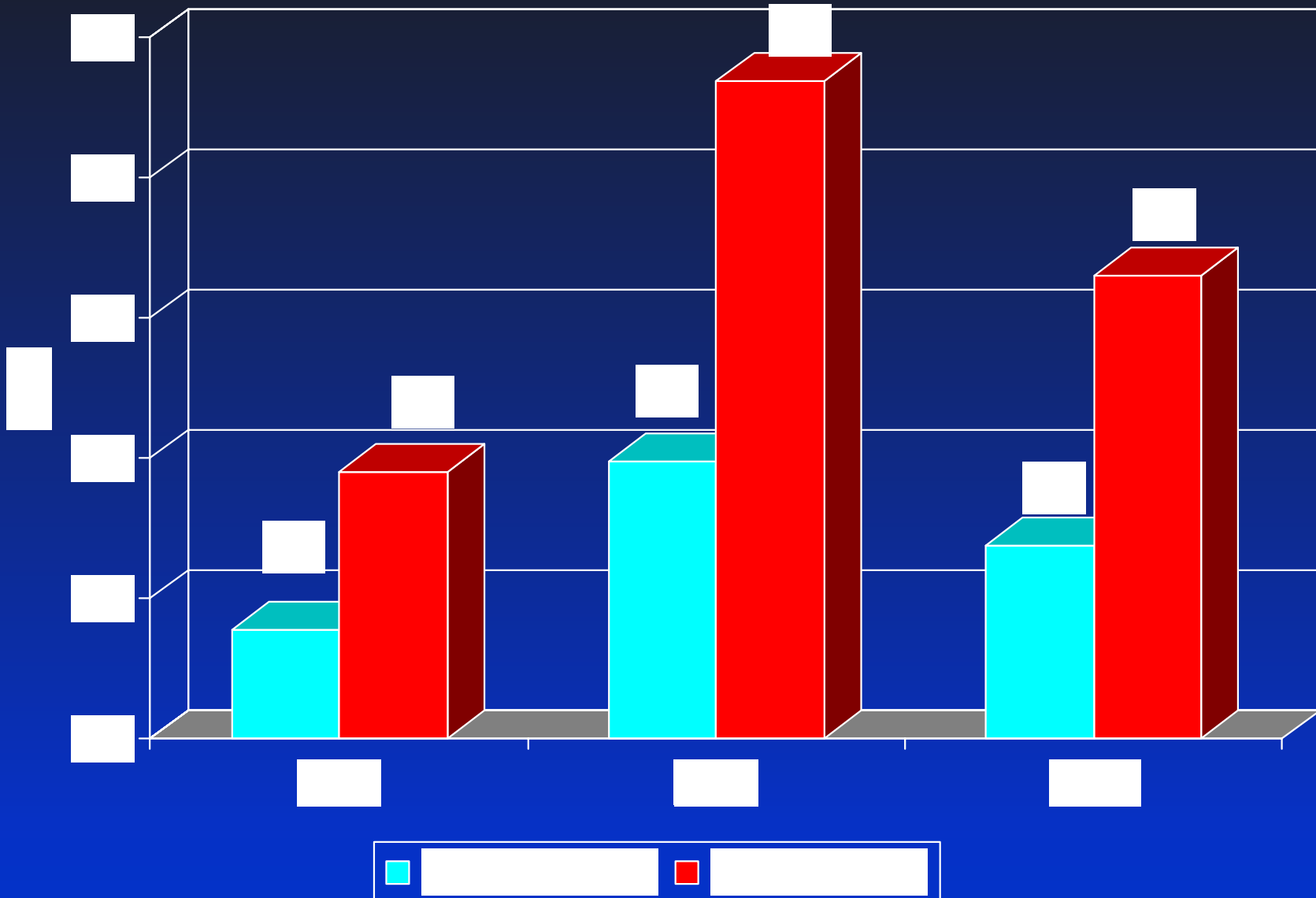
Effect of Variety Selection on Net Returns

DOP = 3/31



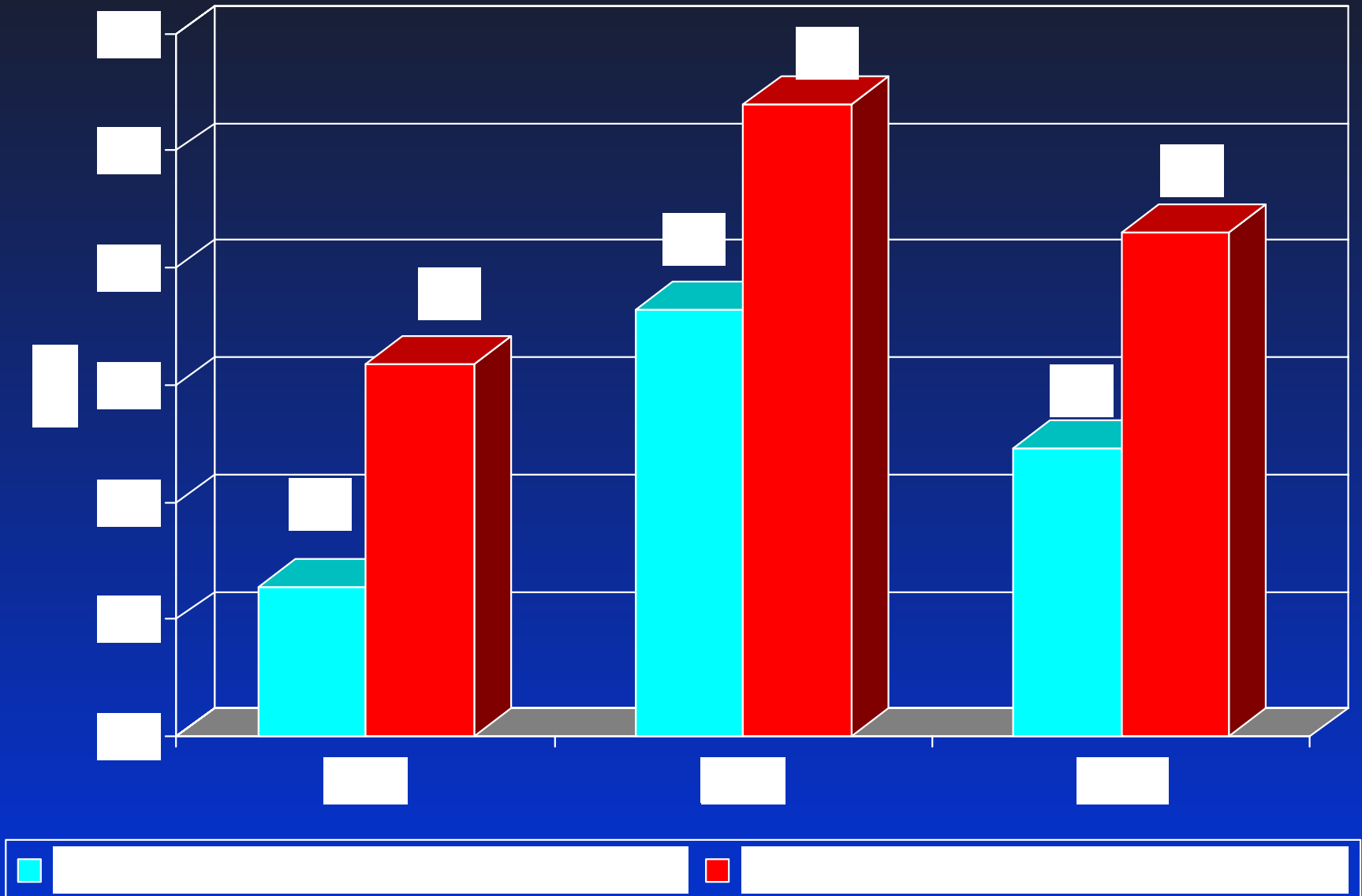
Net Returns based on Yearly Average Selling Price, \$6.43/bu in 2006 and \$7.99/bu projected for 2007.

Effect of Bedding on Net Returns



Net Returns based on Yearly Average Selling Price, \$6.43/bu in 2006 and \$7.99/bu projected for 2007.

System Effects on Net Returns

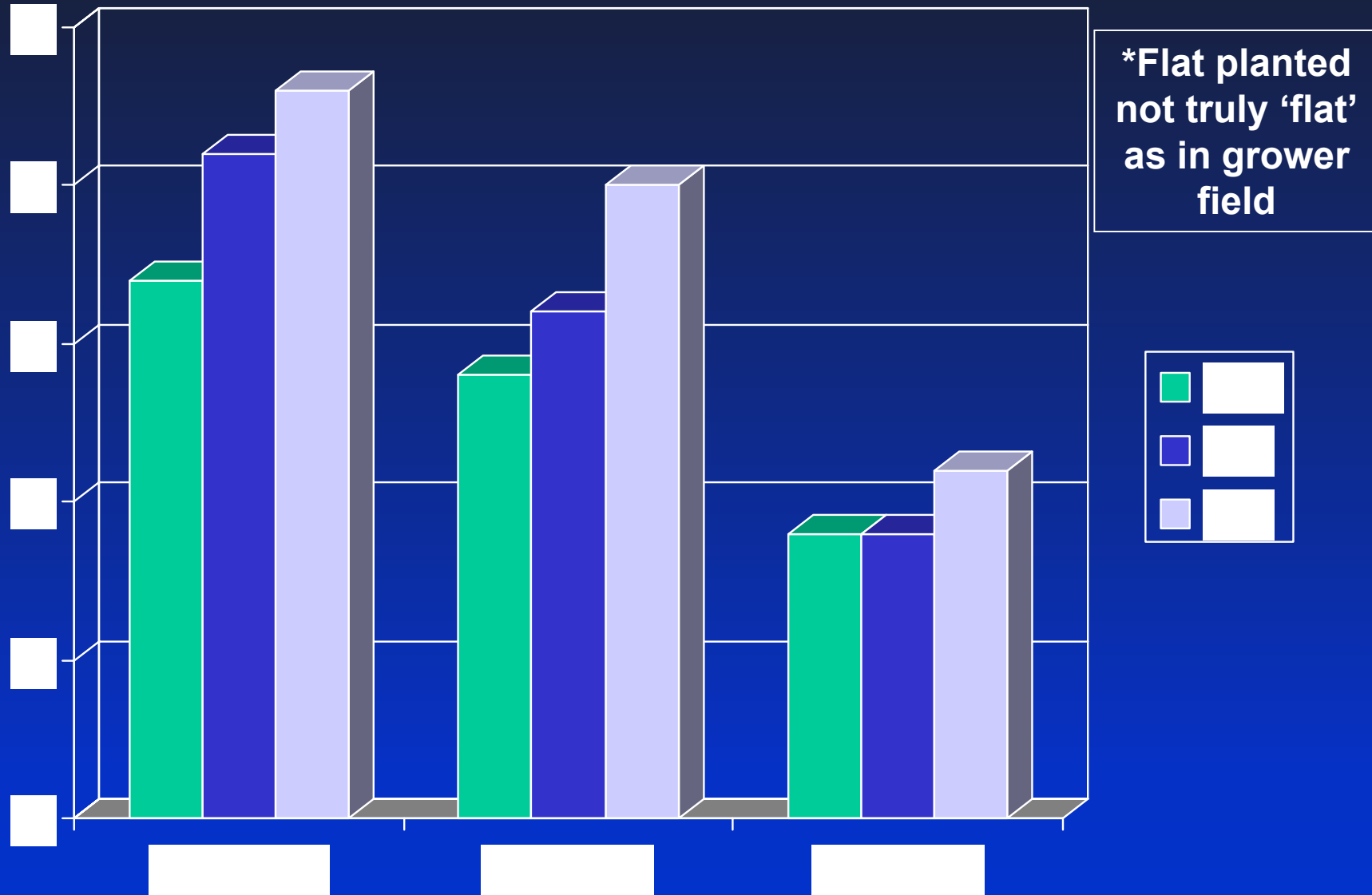


Net Returns based on Yearly Average Selling Price, \$6.43/bu in 2006 and \$7.99/bu projected for 2007.

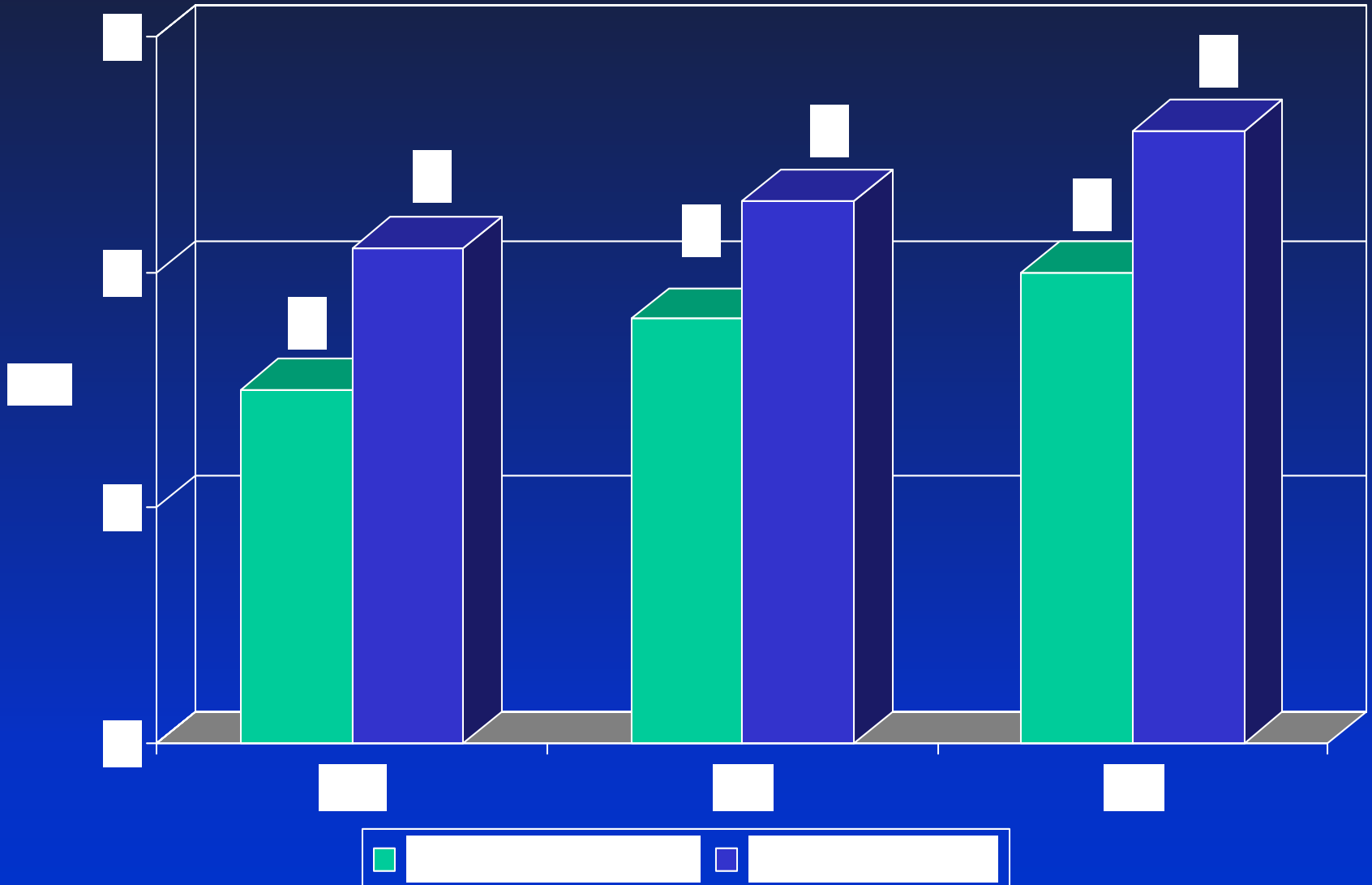
Study: Flooding and Beds



Effect of Bedding System and Flooding on Soybean Yield



Effect of Variety and Bedding System on Soybean Yield



Conclusions from this study

- Increasing duration of flood reduces yield
 - Even as little as 2d, reduced yield of somewhat flood tolerant variety (6%)
 - 4d flood reduced yield 12%
- Bedding system
 - Stair-step effect in response to bedding width in both varieties
 - 40'' > 80'' > Flat (wide rows)



Bedding Systems Behind Rice

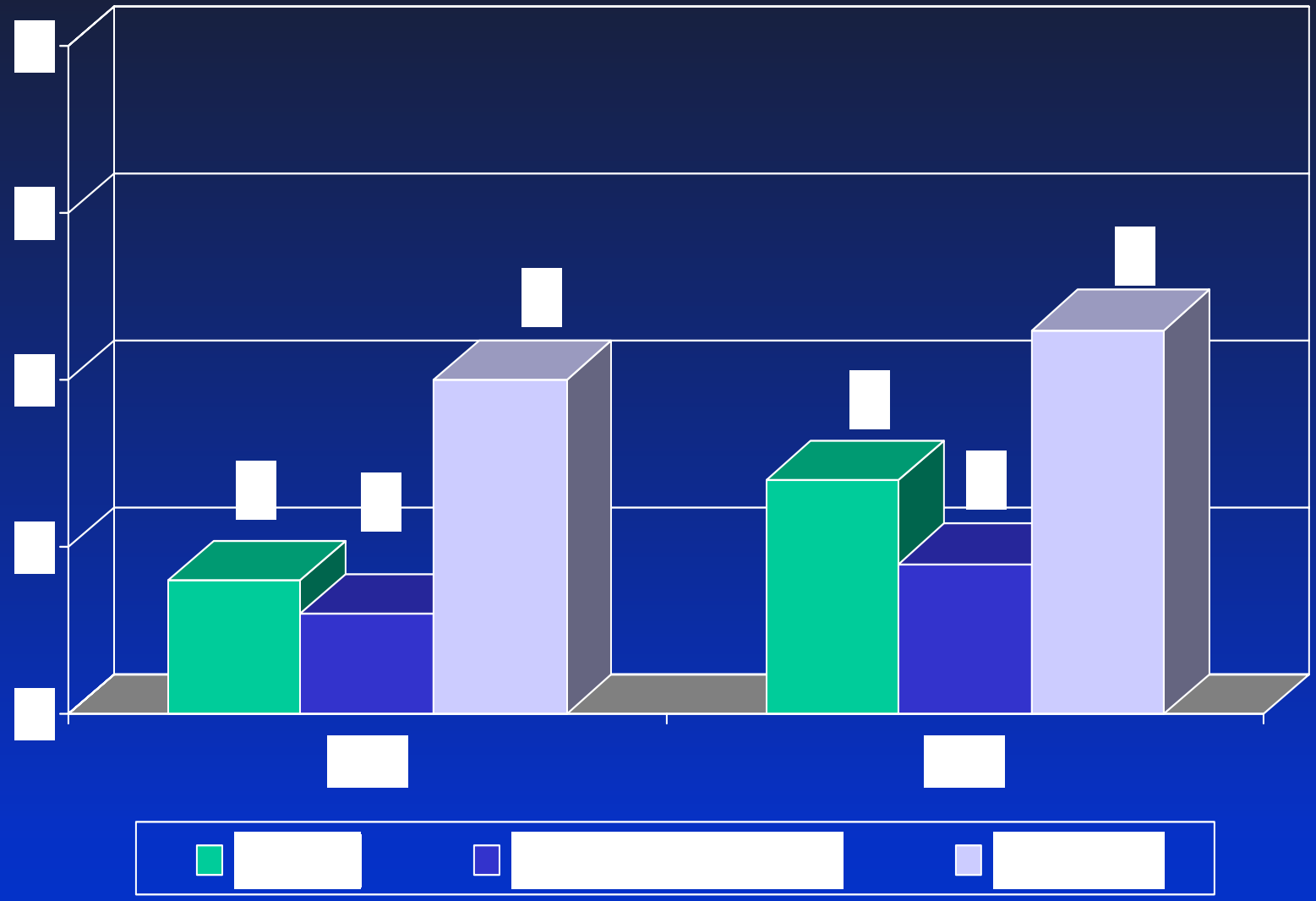








Tillage Effects on Soybean Yield



Tillage Effects on Weed Populations

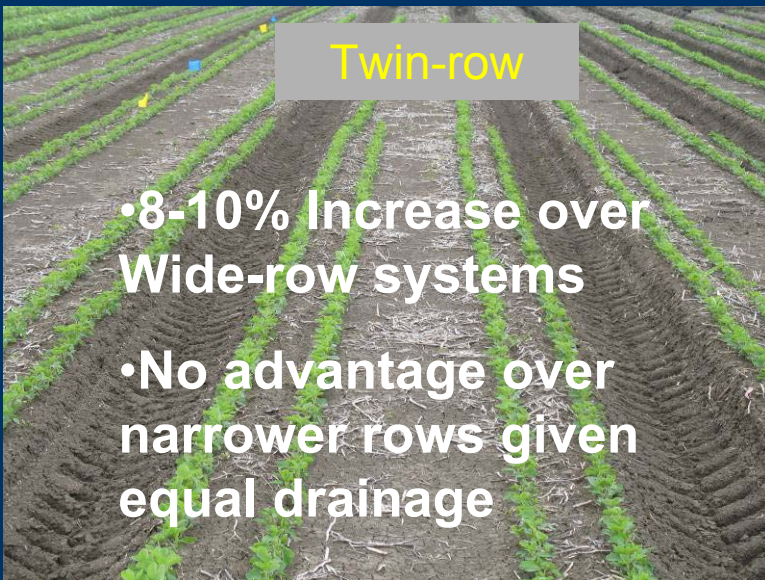




Drill



Narrow-row



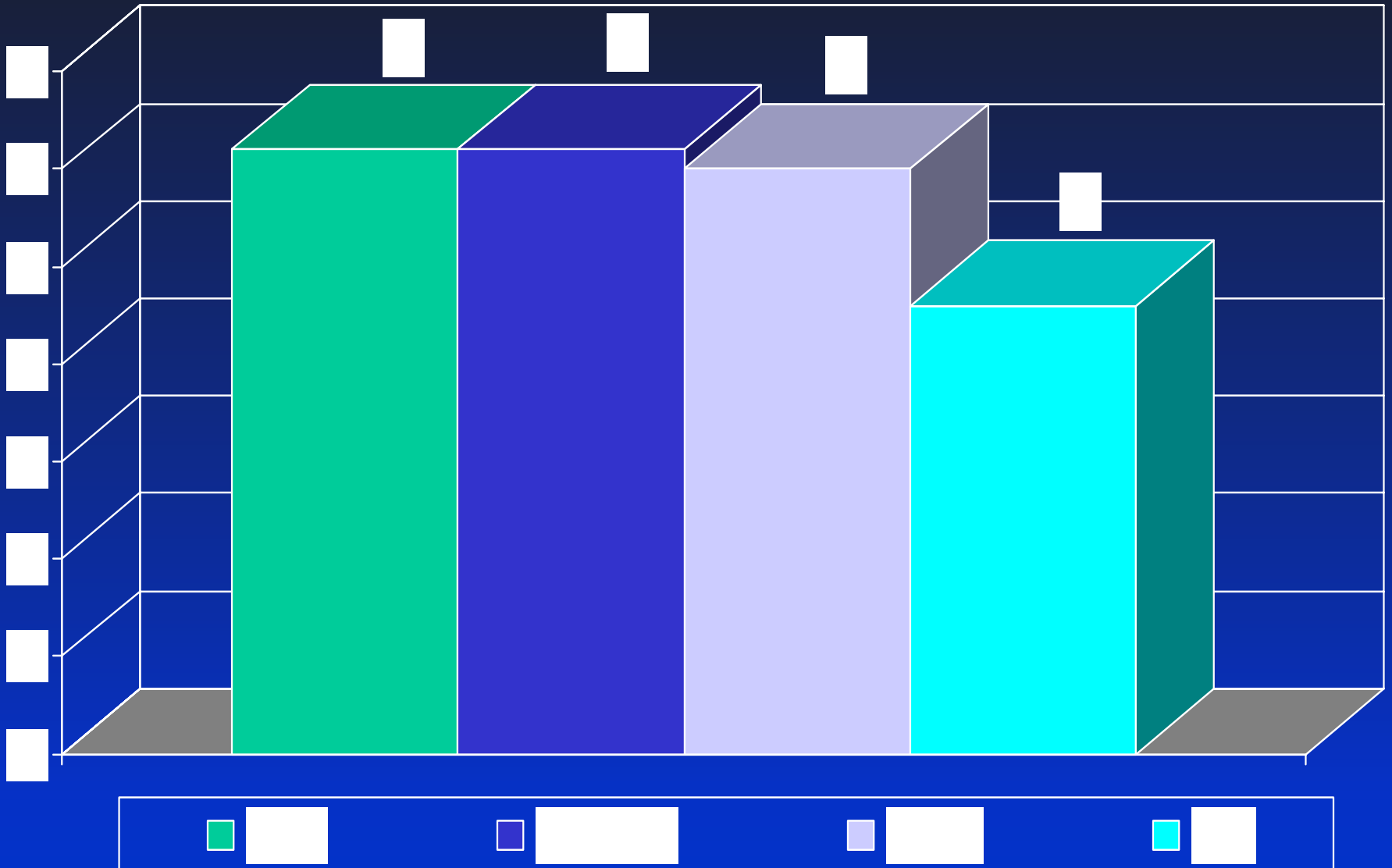
Twin-row

- 8-10% Increase over Wide-row systems
- No advantage over narrower rows given equal drainage



Wide-row

Spacings on 80" Beds



Funding Provided By:

Mississippi Soybean Promotion Board



*Making Your
Checkoff Pay Off*

Funding Provided By:
Mississippi Soybean Promotion Board



*Making Your
Checkoff Pay Off*

Dan Poston

Associate Research/Extension Professor

Delta Research and Extension Center

Stoneville, MS 38776

Cell: 662-820-0893

Email: dposton@drec.msstate.edu

