

Impact of Raised Beds & Deep Tillage on Soybean Yield and Net Returns

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A Little Background

- MS soybean production systems vary:
 - ESPS
 - Glyphosate is primary weed control
 - No-till/reduced tillage common
 - Flat plantings
 - Varietal selection not always best
 - Many acres of monoculture soybean

The Potential Problems

- ESPS
 - cooler, damper environment
- Coupling RR technology and No-till
 - increase in weed spectrum
- No-till
 - Disease inoculums, drainage issues, soil compaction
- Varietal Selection
 - Heavy clay soils with poor drainage = wet feet
- Monoculture
 - Continuous host for diseases
- Fungicide
 - Consistent yield bump from strobilurins at R3

Objectives

- Determine effect of tillage practices on weed and disease pressure, soybean yield, and net returns
- Determine the effect of raising beds on soybean yield and net returns

Materials and Methods

- Selected site:
 - 32 acre grower field near Elizabeth, MS
 - Surface/internal drainage issues suspected
 - no-till, monoculture soybean for 8+ years
 - Glyphosate primary form of weed control
 - Heavy to mixed clay, 0.2% landformed slope
 - Flood/furrow irrigated
 - Yield inconsistent with other similar fields
 - Average of 45-50 bu/a

Materials and Methods

- Field info:
 - 40” twin row, 2 drills spaced 10” apart, 145,000 s/a
 - Planted mid-April
 - Chemical weed control:
 - Glyphosate + 2,4-D burndown (March)
 - Glyphosate at planting (April)
 - Sequence early postemergence (May)
 - Glyphosate + Python in-season (June)
 - Irrigation:
 - 6X (217 hr total) starting in May, ending in late August
 - Insecticide:
 - Karate Z (July)
 - Desiccant:
 - Gramoxone + Defol 5 (September)

Materials and Methods

- Trial info:
 - Trial 1: Impact of Tillage, Variety, and Fungicide
 - Factor 1- no-till, shallow till, deep till
 - Factor 2- AG 4403, Pioneer 94B73
 - Factor 3- no fungicide, Headline applied at R3
 - Trial 2: Impact of Raised Beds, Variety, and Fungicide
 - Factor 1- flat planted, raised beds
 - Factor 2- AG 4403, Pioneer 94B73
 - Factor 3- no fungicide, Headline applied at R3

Materials and Methods

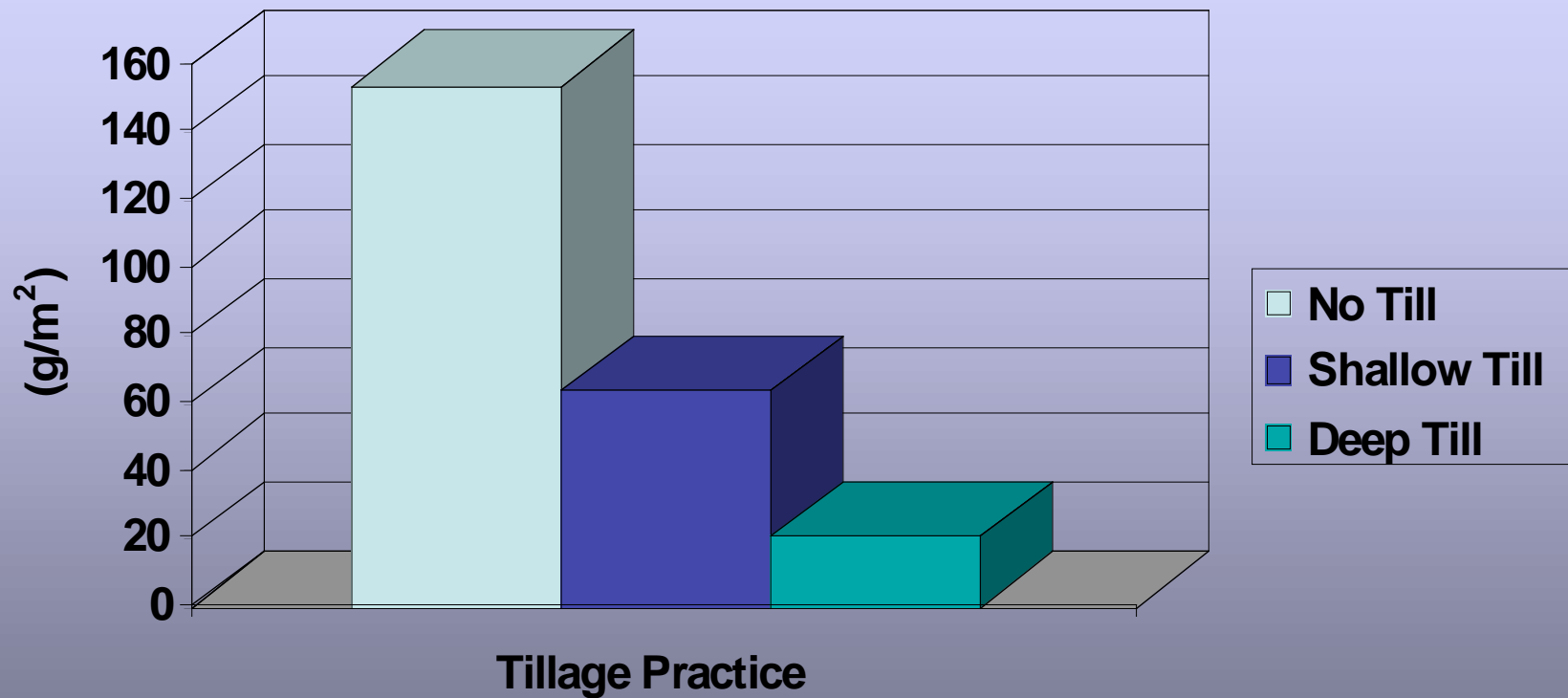
- RCB, 4 replications
- Split-split plot treatment arrangement
- Plot size:
 - 4-40" rows for 13.3 ft width
 - 765 ft length
 - roughly 0.25 ac/plot, for ~ 1 acre/treatment
- Data analyzed using ANOVA and means separated using Fisher's protected LSD test at $P=0.05$

Trial 1: Impact of Tillage, Variety, and Fungicide

- Tillage:
 - No-till
 - Shallow till- disk in fall
 - Deep till- parabolic subsoiler followed by disk in fall
- Variety:
 - Asgrow 4403-
 - flood susceptible
 - frog-eye leafspot susceptible
 - 3750 s/lb
 - Pioneer 94B73-
 - flood tolerant
 - moderately susceptible to late season cercospora
 - 2950 s/lb
- Fungicide:
 - No fungicide
 - 6 oz/a Headline applied at R3 growth stage

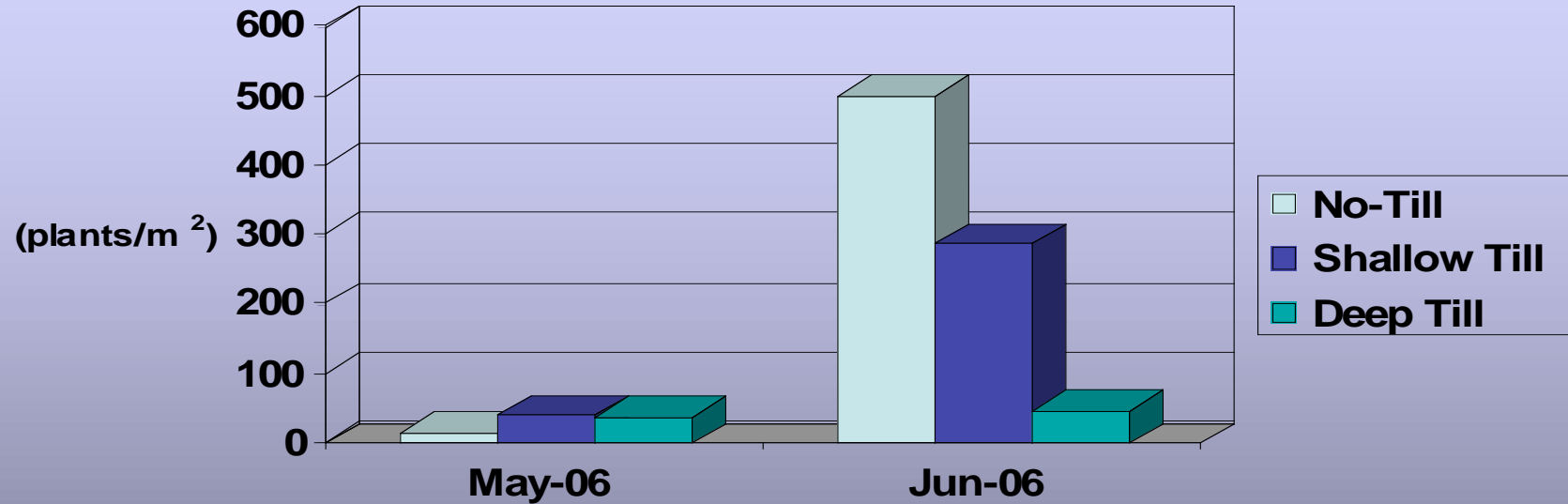
Trial 1: Impact of Tillage, Variety, and Fungicide

Redvine Freshweight



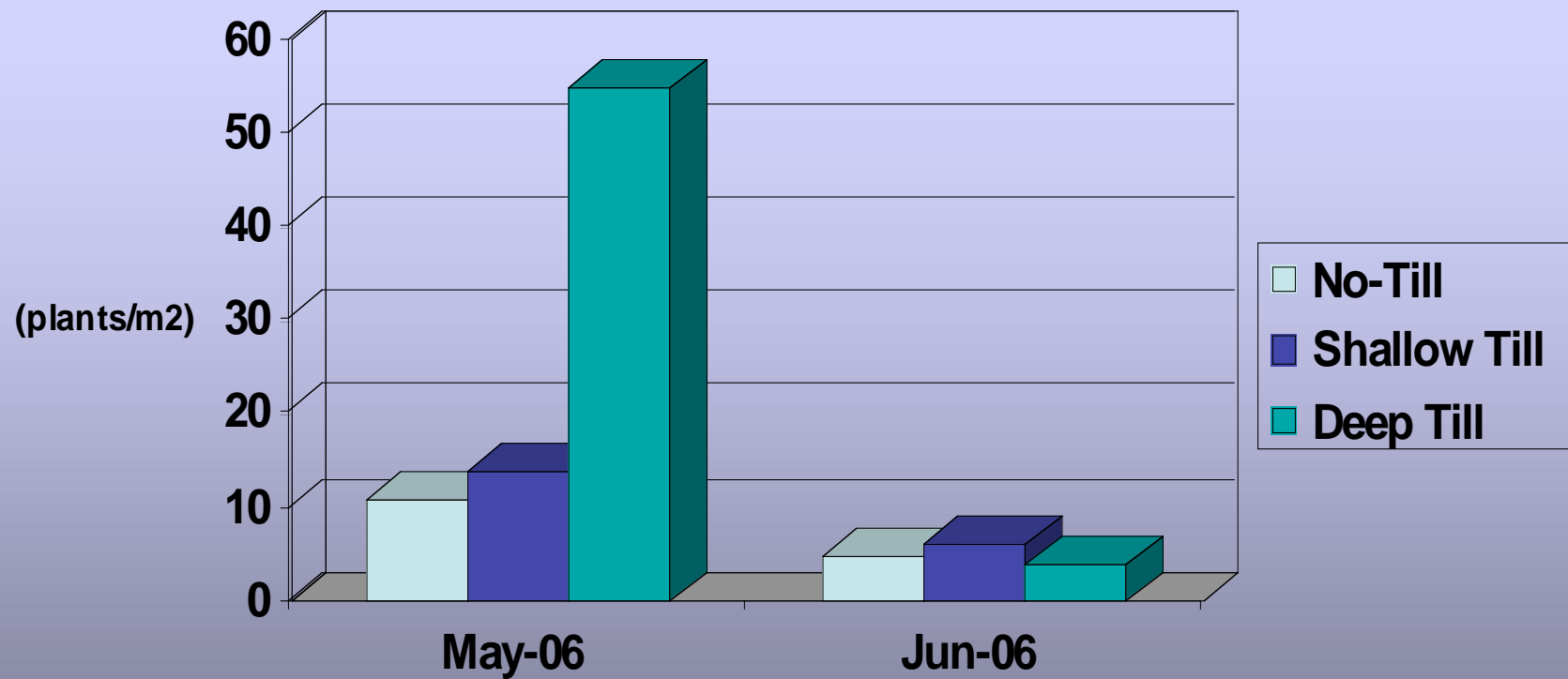
Trial 1: Impact of Tillage, Variety, and Fungicide

Groundcherry



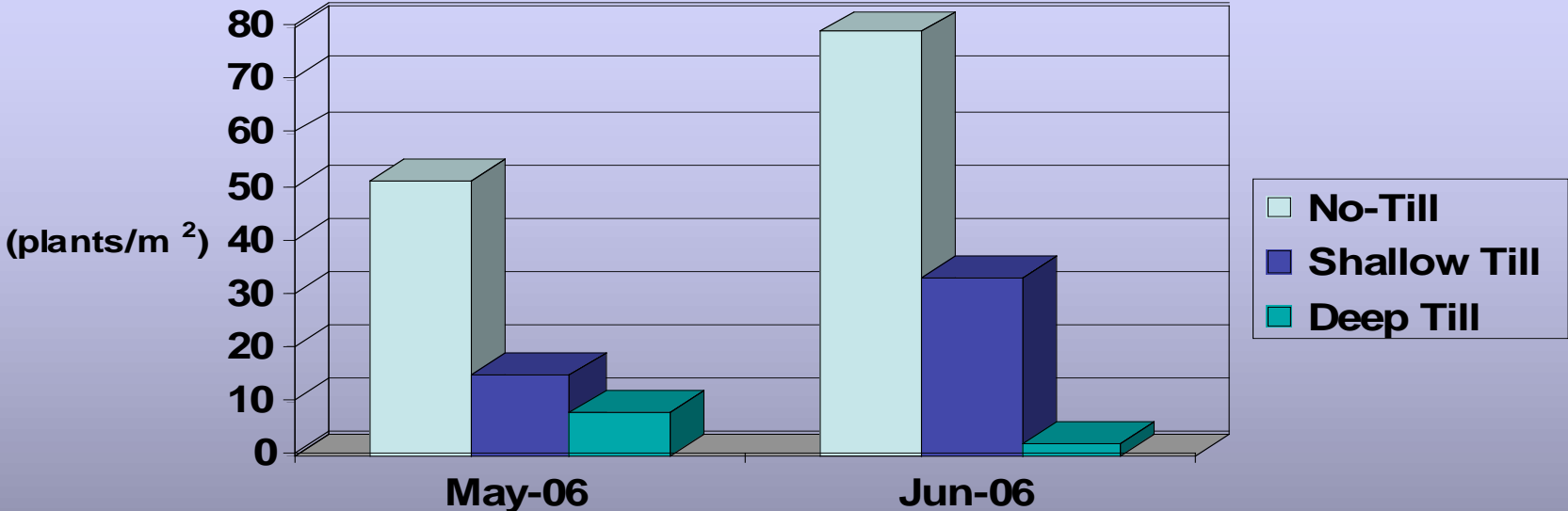
Trial 1: Impact of Tillage, Variety, and Fungicide

Dayflower



Trial 1: Impact of Tillage, Variety, and Fungicide

Prickly Sida

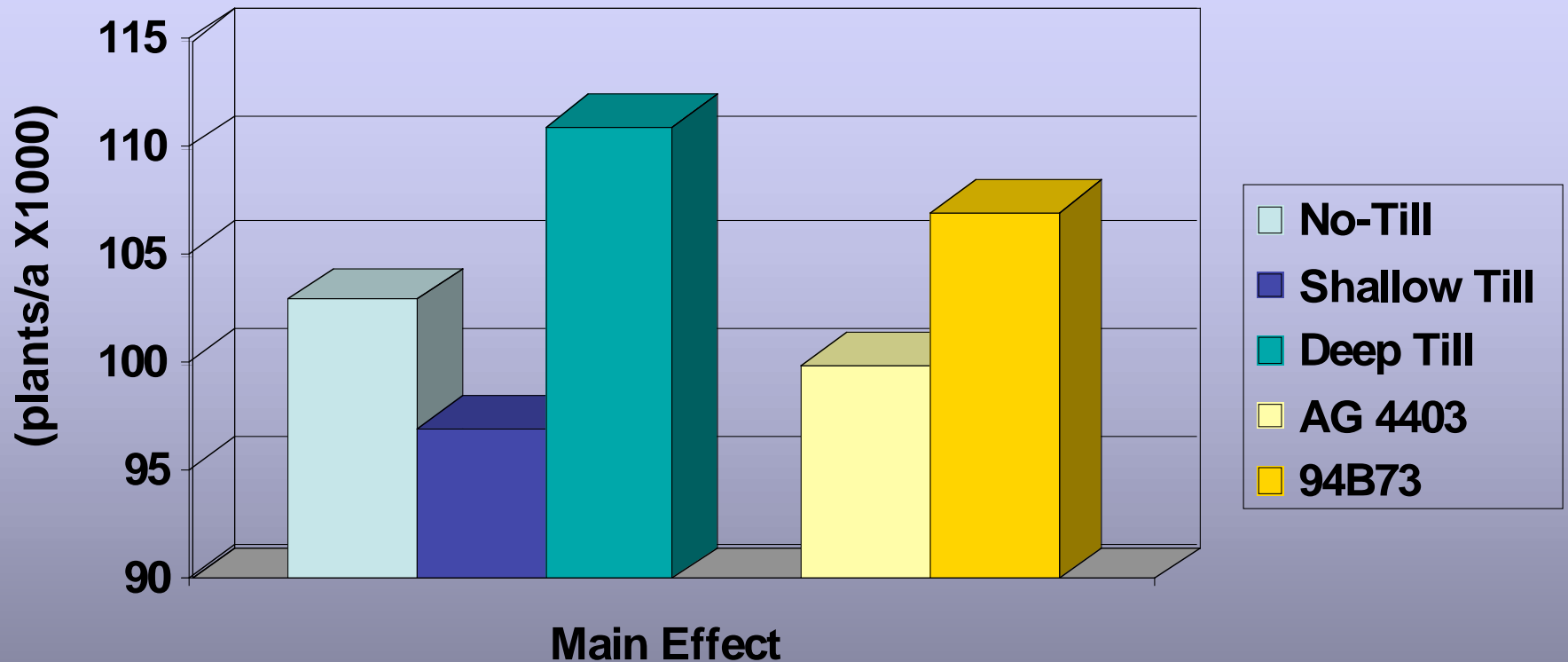


Trial 1: Impact of Tillage, Variety, and Fungicide

- Disease Incidence:
 - Frog-eye leafspot- incidence only lowered by application of Headline
 - Late season cercospora- incidence unaffected by treatments
 - Downy mildew- incidence lowered by application of Headline
 - also lower in shallow till plots, possibly due to less foliage and/or moisture in canopy

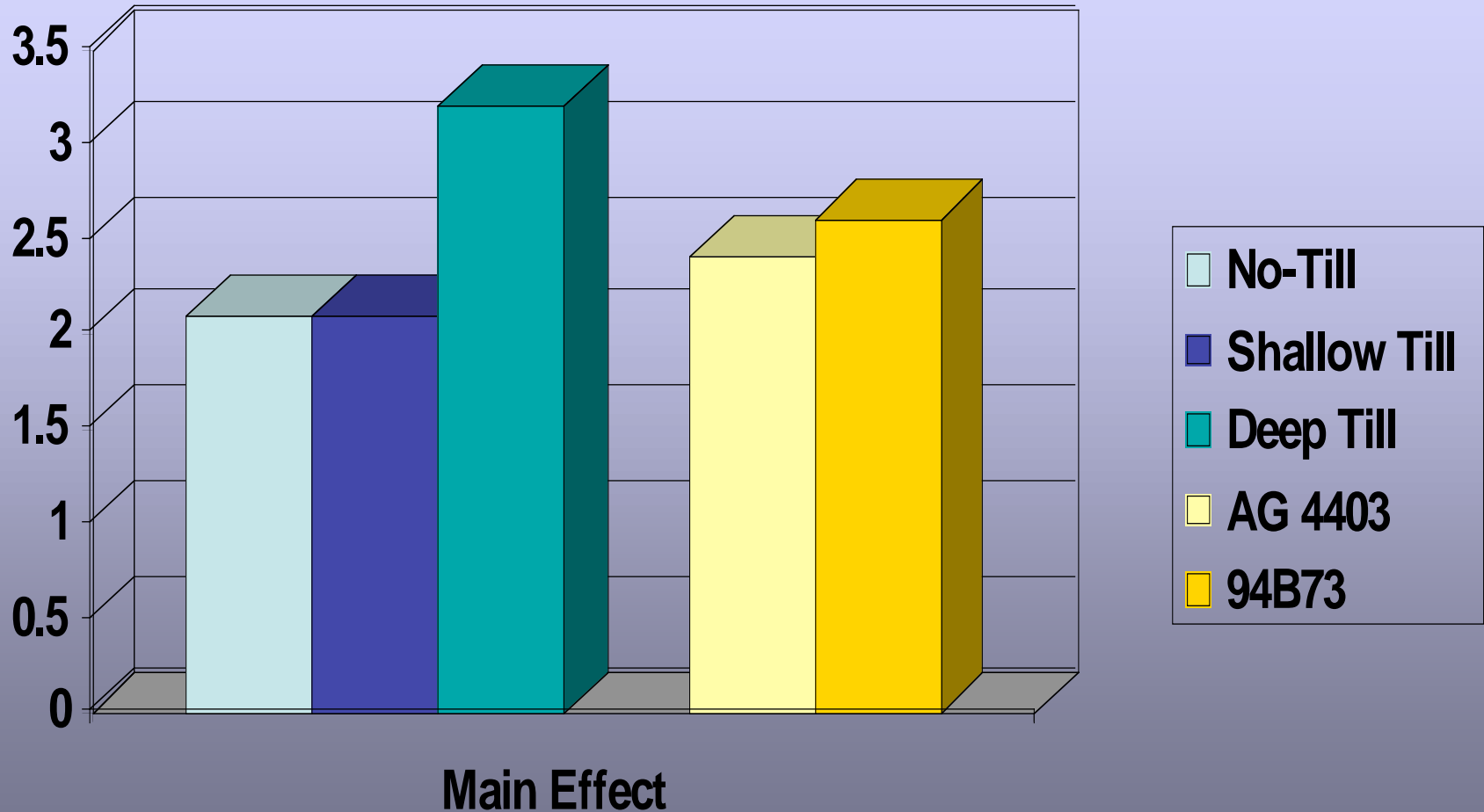
Trial 1: Impact of Tillage, Variety, and Fungicide

Plant Populations



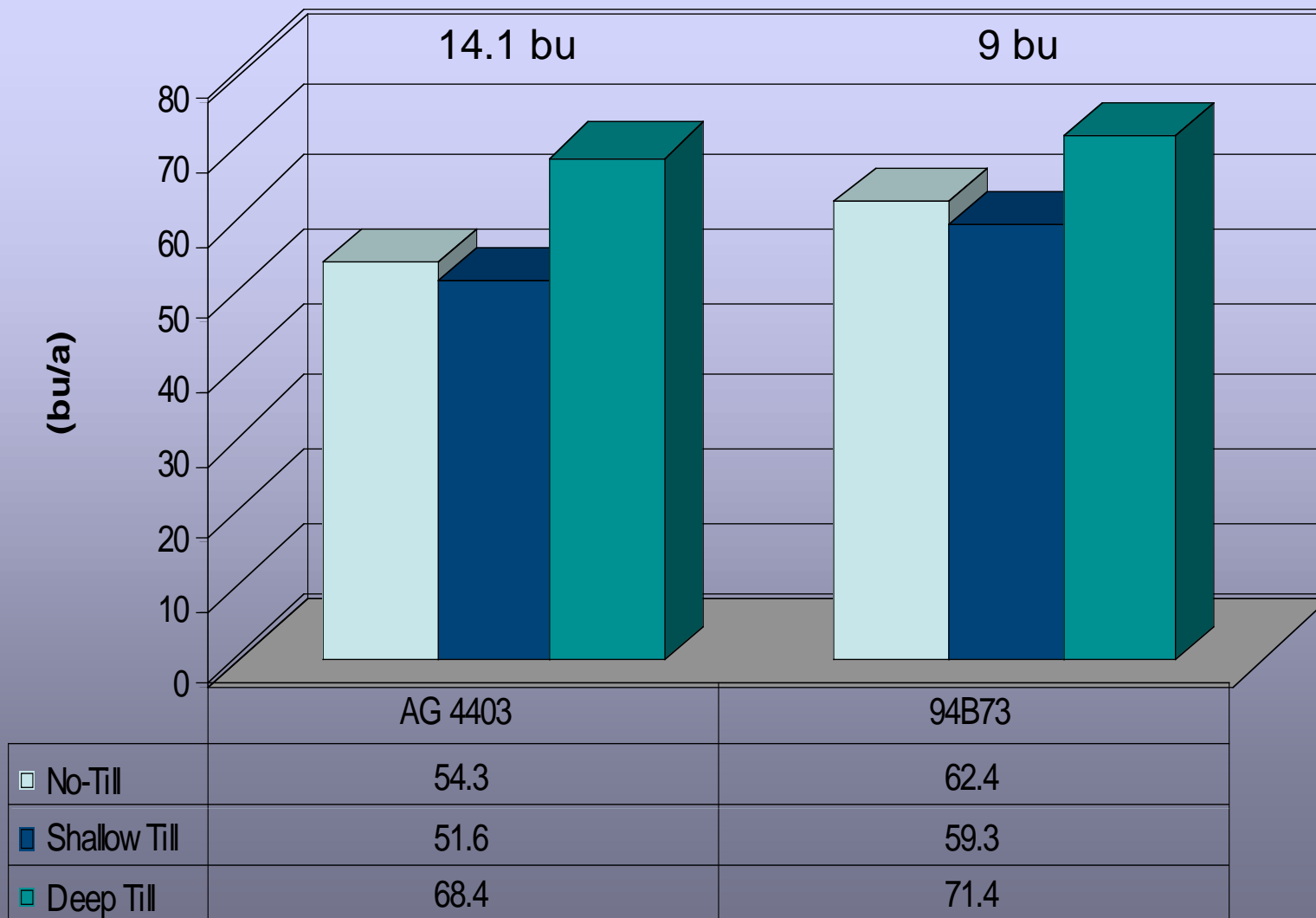
Trial 1: Impact of Tillage, Variety, and Fungicide

Leaf Area Indices

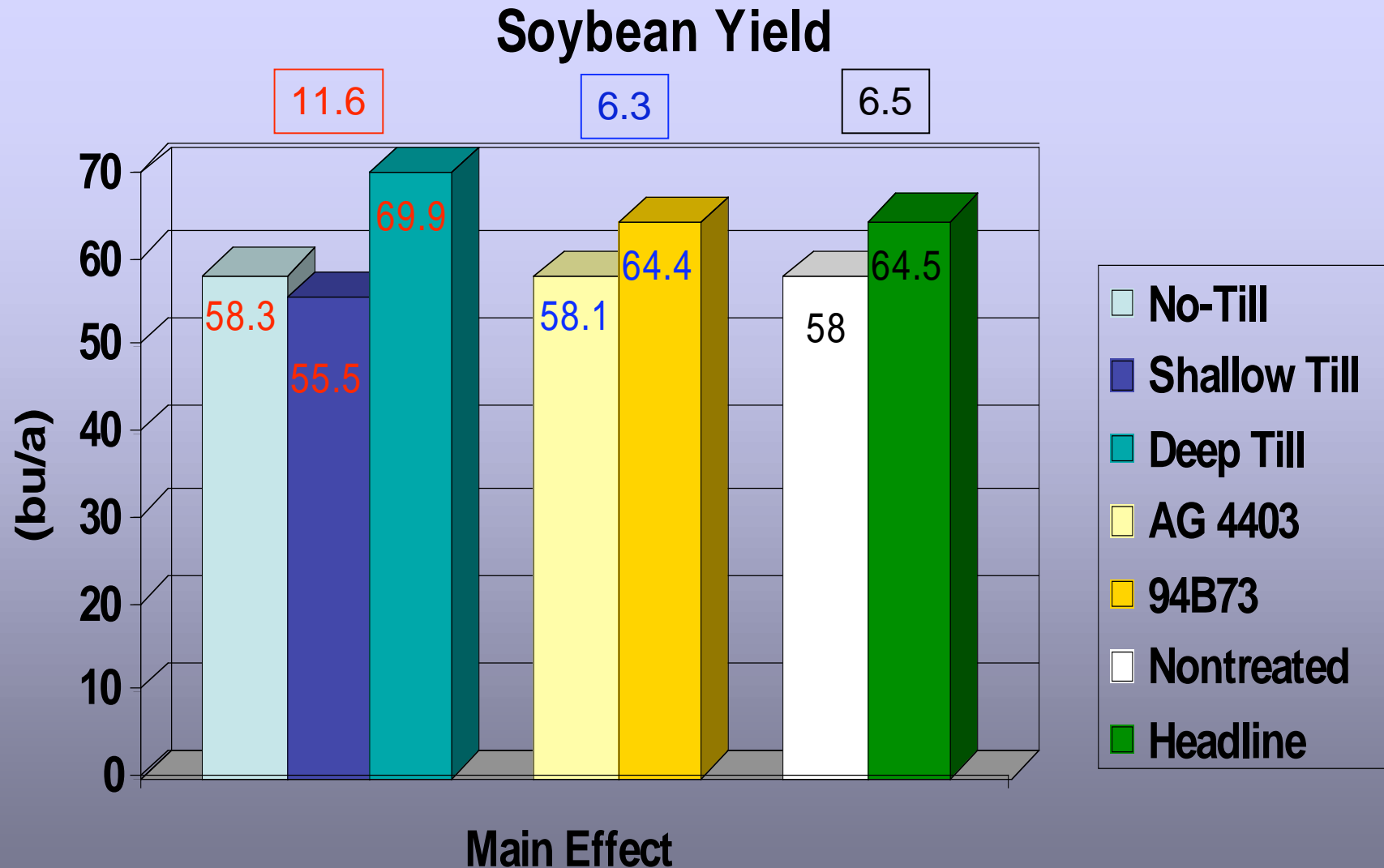


Trial 1: Impact of Tillage, Variety, and Fungicide,

Soybean Yield



Trial 1: Impact of Tillage, Variety, and Fungicide



Input Costs

Blanket Inputs		Cost per acre
Chemical		
\$64.66	Glyphosate + 2,4-D	\$11.86
	Roundup Weathermax	\$12.53
	Sequence	\$20.07
	Roundup Weathermax + Python	\$6.61
	Karate Z	\$9.29
	Gramoxone Inteon + Defol 5 + NIS	\$4.30
Planting		
	Great Plains Twin Row Drill	\$11.62
Irrigation		
	217 hr	\$54.39
Harvest		
	Custom Cutting	\$25.00

Total (Blanket)

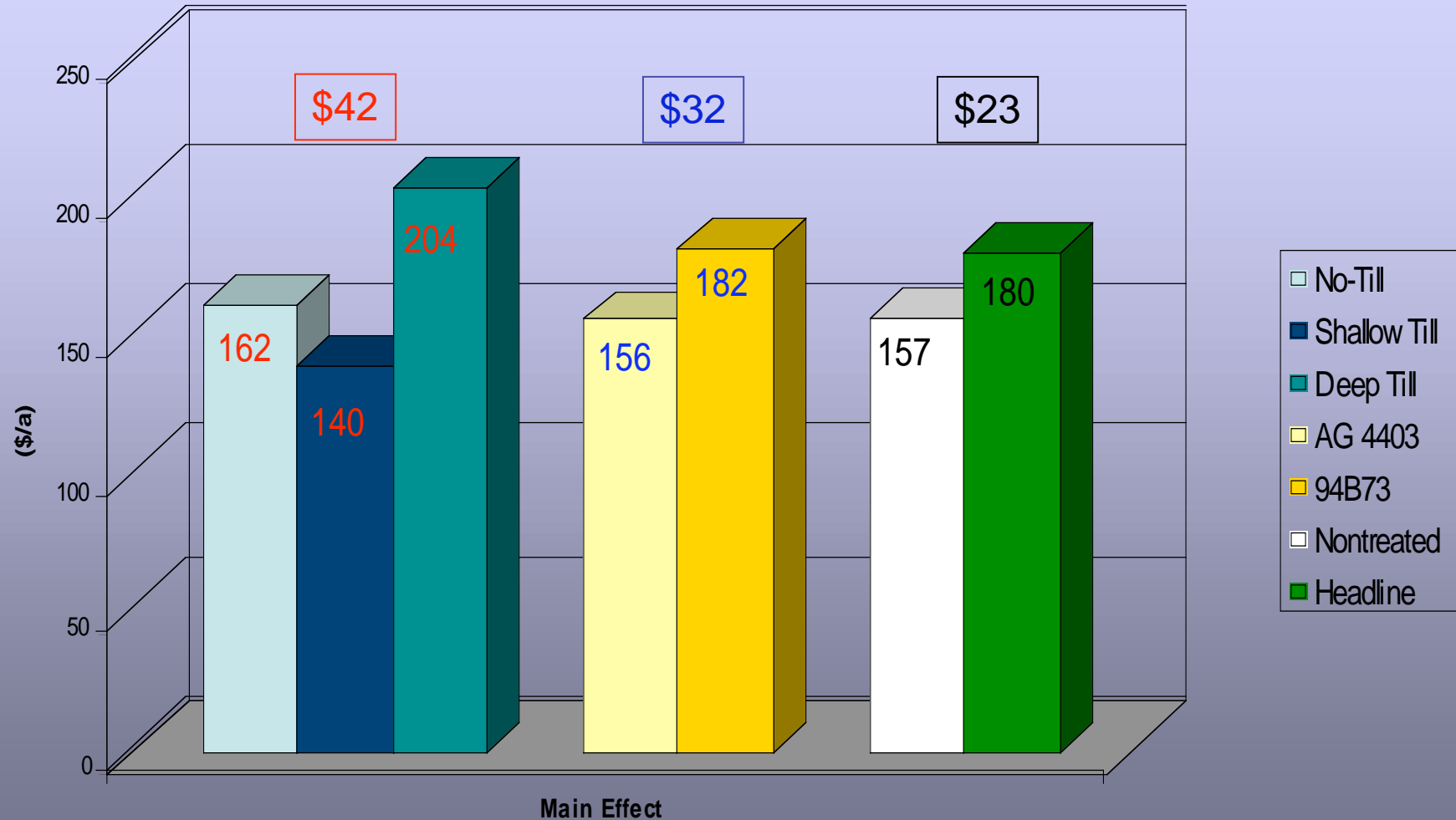
\$155.67

Input Costs

Treatment	Blanket	Tillage		Variety		Headline	Total (before \$0.15/bu hauling fee)
1	\$ 155.67	None	-	4403	\$ 24.70	-	\$ 180.37
2	\$ 155.67	None	-	4403	\$ 24.70	\$ 11.61	\$ 191.98
3	\$ 155.67	None	-	94B73	\$ 31.49	-	\$ 187.16
4	\$ 155.67	None	-	94B73	\$ 31.49	\$ 11.61	\$ 198.77
5	\$ 155.67	Shallow	\$ 7.15	4403	\$ 24.70	-	\$ 187.52
6	\$ 155.67	Shallow	\$ 7.15	4403	\$ 24.70	\$ 11.61	\$ 199.13
7	\$ 155.67	Shallow	\$ 7.15	94B73	\$ 31.49	-	\$ 194.31
8	\$ 155.67	Shallow	\$ 7.15	94B73	\$ 31.49	\$ 11.61	\$ 205.92
9	\$ 155.67	Deep	\$ 19.14	4403	\$ 24.70	-	\$ 199.51
10	\$ 155.67	Deep	\$ 19.14	4403	\$ 24.70	\$ 11.61	\$ 211.12
11	\$ 155.67	Deep	\$ 19.14	94B73	\$ 31.49	-	\$ 206.30
12	\$ 155.67	Deep	\$ 19.14	94B73	\$ 31.49	\$ 11.61	\$ 217.91

Trial 1: Impact of Tillage, Variety, and Fungicide

Net Returns Above Input Costs at \$5.40/bu Selling Price



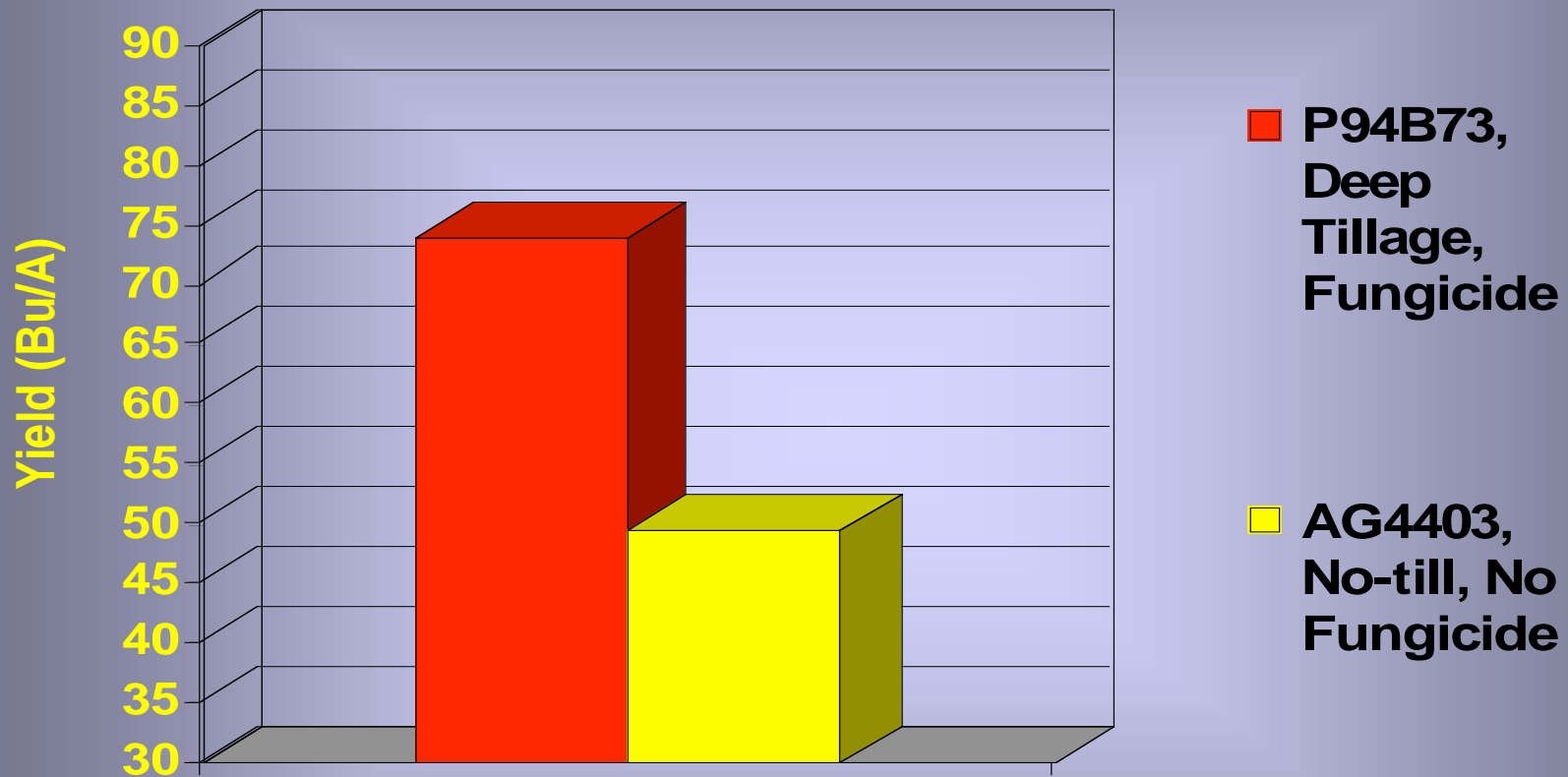
Results from Trial 1

- Deep tillage had the most positive effects on troublesome weed populations
- Disease incidence was lowered only by application of a fungicide
- Positive yield responses were seen in deep tilled plots, 94B73 plantings, and plots sprayed with Headline
- Net returns spoke for themselves, and the difference between the **right choices** and the **wrong choices** were worth **\$91/acre**

Good Choice vs. Poor Choice – 2006

Tillage Study

Soybean Yield

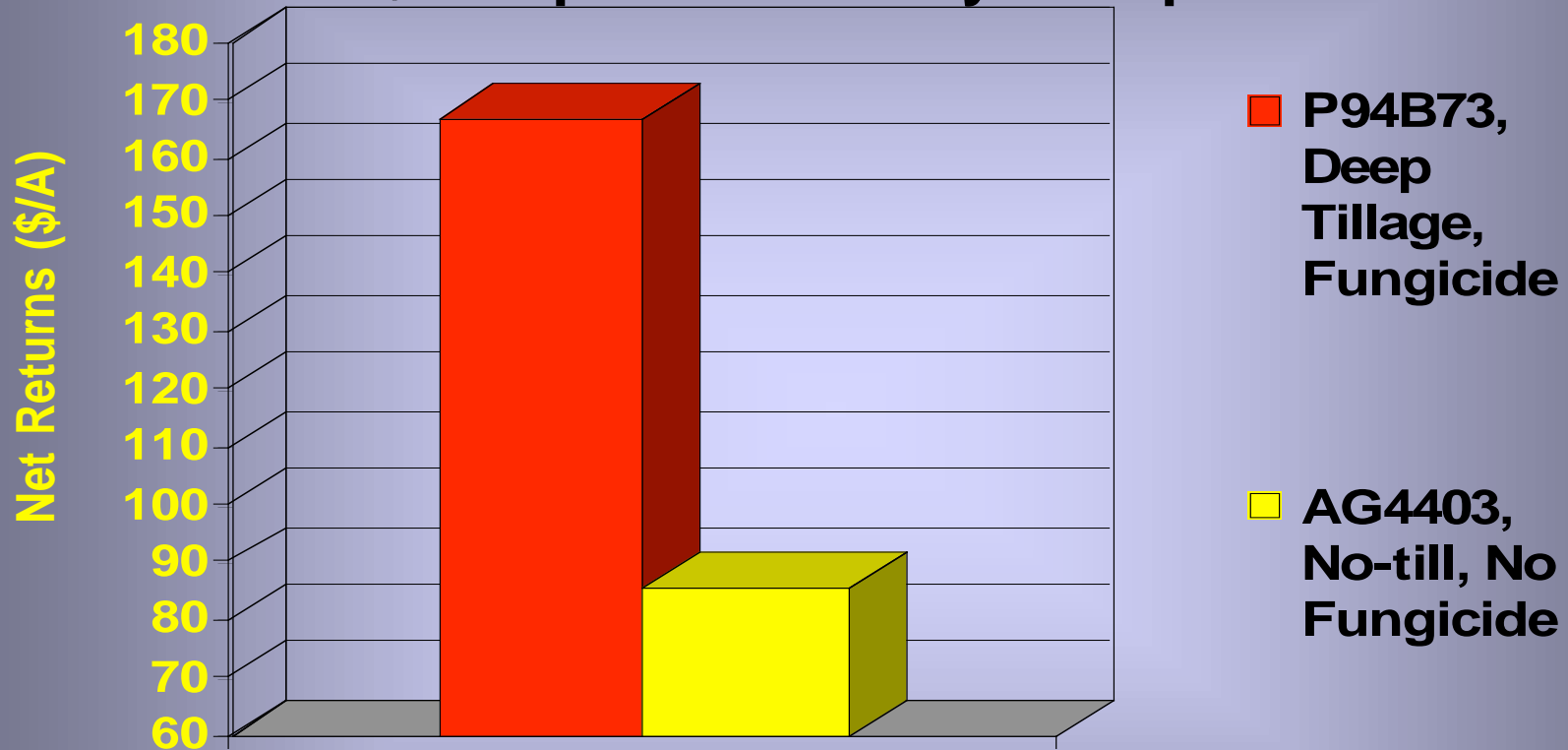


Good Choice vs. Poor Choice – 2006

Tillage Study

Net Returns

\$5.00 per bushel soybean price

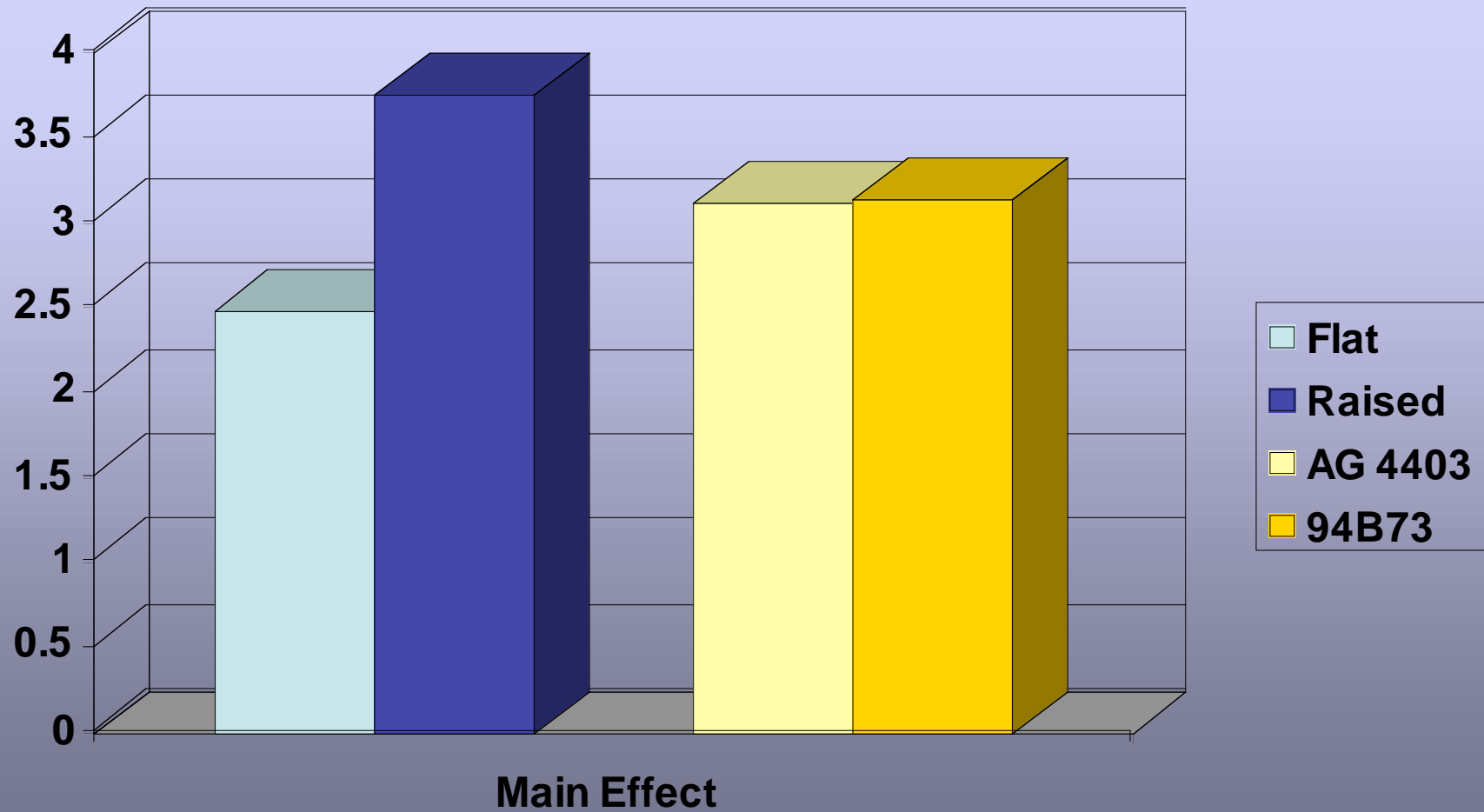


Trial 2: Impact of Raised Beds, Variety, and Fungicide

- Bedding System:
 - Flat planted (disked in fall)
 - Raised Beds (hipped in fall, do-alled in spring)
- Variety:
 - Asgrow 4403-
 - flood susceptible
 - frogeye leafspot susceptible
 - 3750 s/lb
 - Pioneer 94B73-
 - flood tolerant
 - moderately susceptible to late season cercospora
 - 2950 s/lb
- Fungicide:
 - No fungicide
 - 6 oz/a Headline applied at R3 growth stage

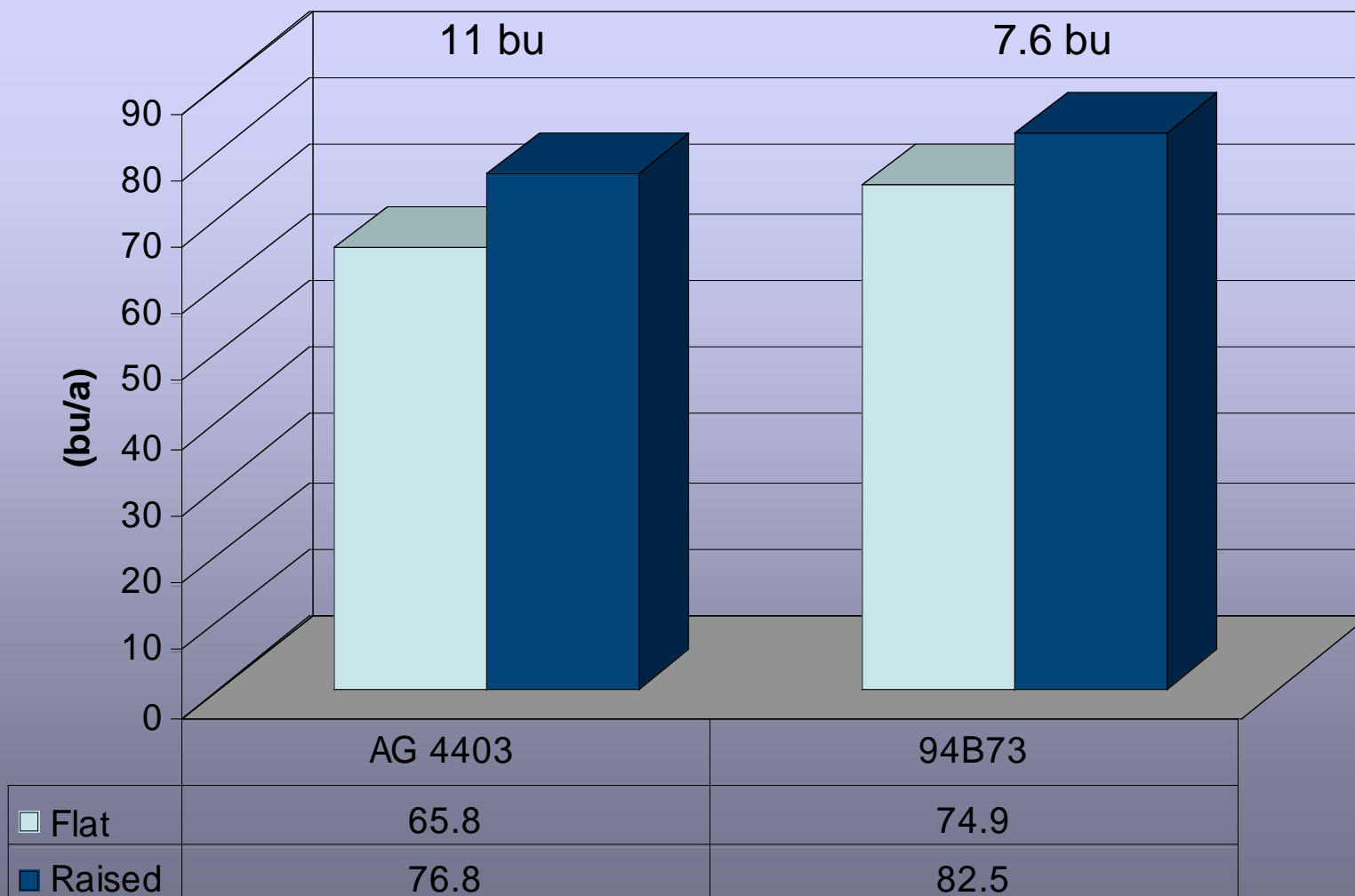
Trial 2: Impact of Raised Beds, Variety, and Fungicide

Leaf Area Indices

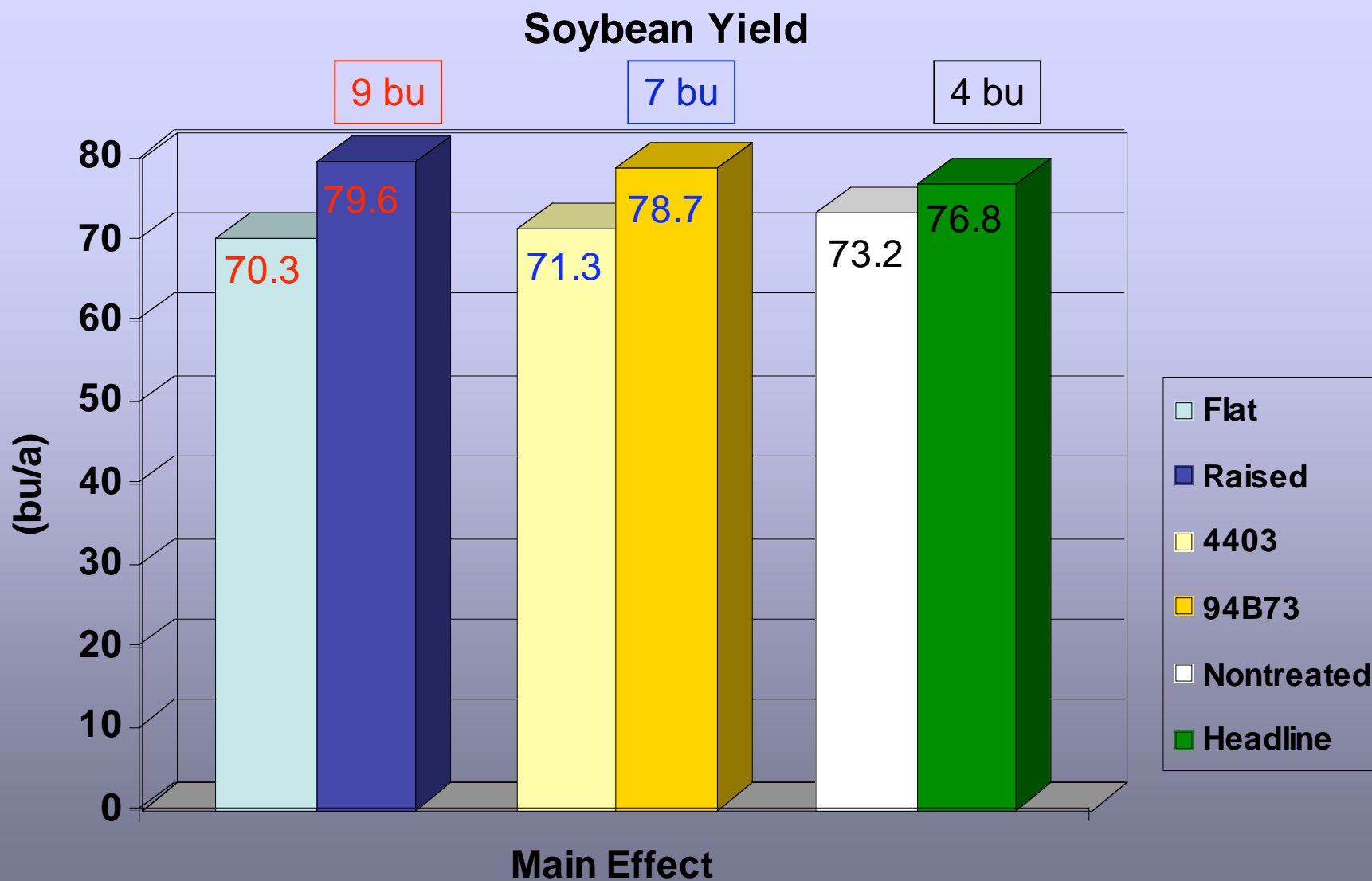


Trial 2: Impact of Raised Beds, Variety, and Fungicide

Soybean Yield



Trial 2: Impact of Raised Beds, Variety, and Fungicide

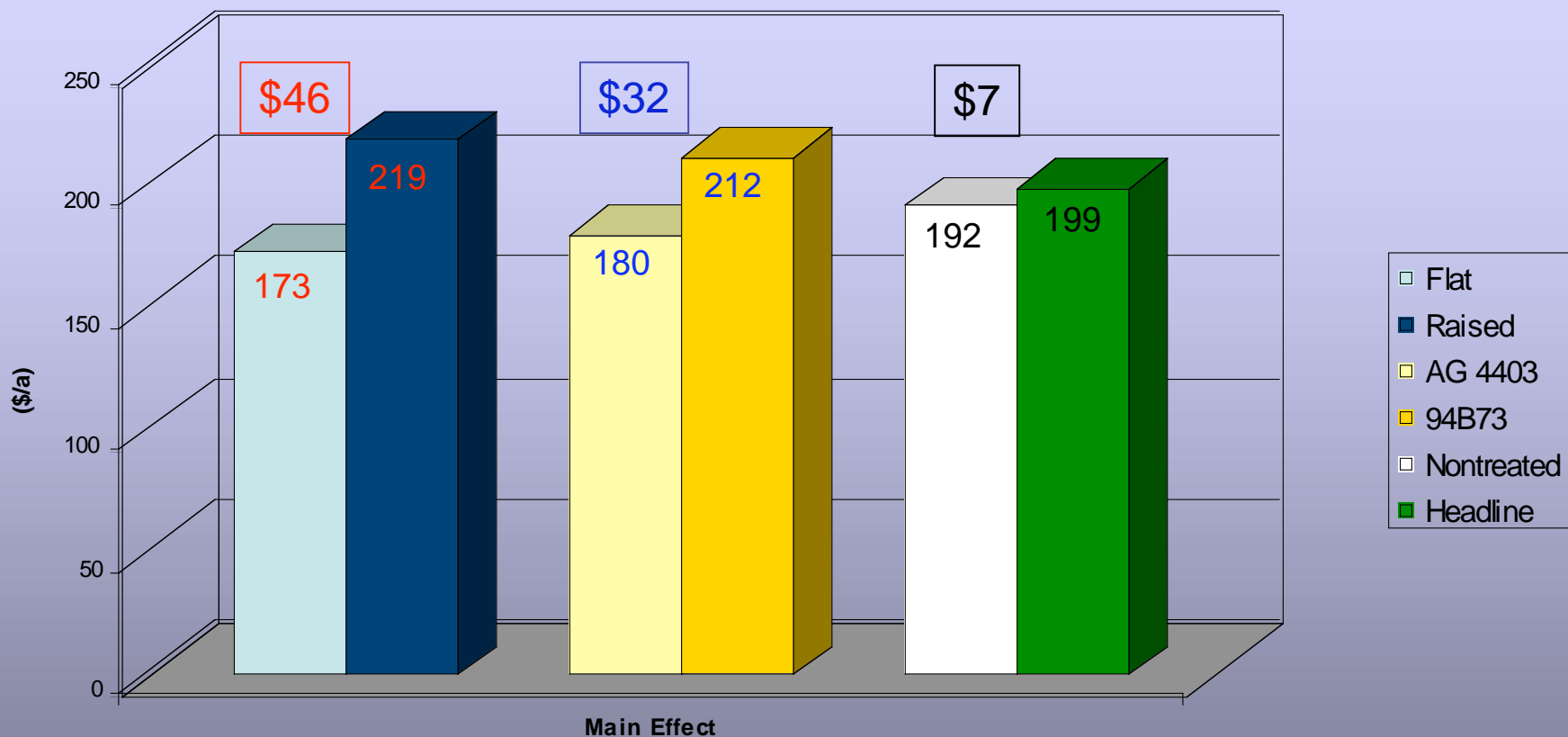


Input Costs

Treatment	Blanket	Bed		Variety		Headline	Total (before \$0.15/bu hauling fee)
1	\$ 155.67	Flat	\$ 7.15	4403	\$ 24.70	-	\$ 187.52
2	\$ 155.67	Flat	\$ 7.15	4403	\$ 24.70	\$ 11.61	\$ 199.13
3	\$ 155.67	Flat	\$ 7.15	94B73	\$ 31.49	-	\$ 194.31
4	\$ 155.67	Flat	\$ 7.15	94B73	\$ 31.49	\$ 11.61	\$ 205.92
5	\$ 155.67	Raised	\$ 5.61 \$4.22	4403	\$ 24.70	-	\$ 190.22
6	\$ 155.67	Raised	\$ 5.61 \$4.22	4403	\$ 24.70	\$ 11.61	\$ 201.81
7	\$ 155.67	Raised	\$ 5.61 \$4.22	94B73	\$ 31.49	-	\$ 196.99
8	\$ 155.67	Raised	\$ 5.61 \$4.22	94B73	\$ 31.49	\$ 11.61	\$ 208.60

Trial 1: Impact of Raised Beds, Variety, and Fungicide

Net Returns Above Input Costs at \$5.40/bu Selling Price



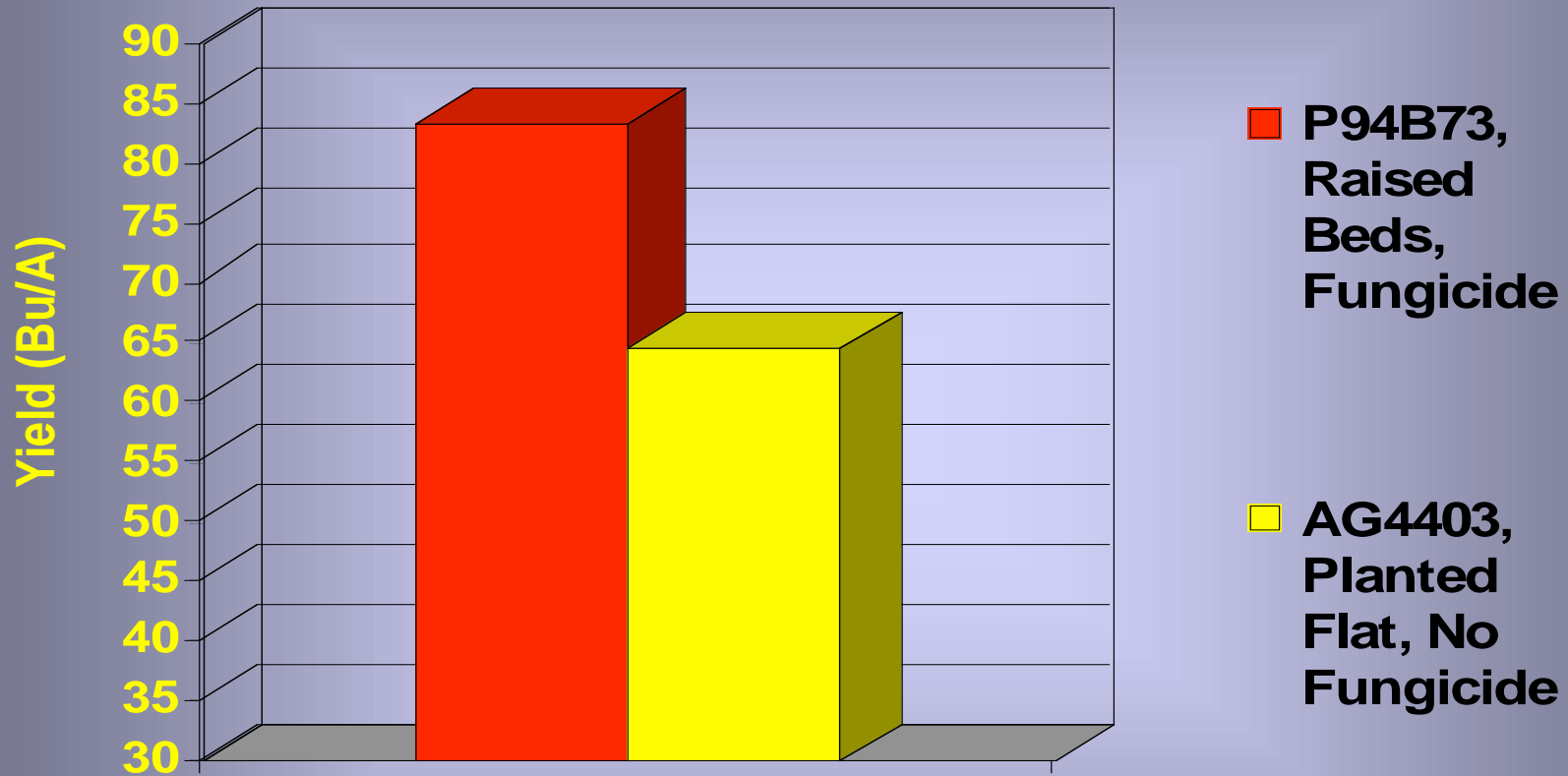
Results from Trial 2

- Positive yield responses were seen with raised beds, 94B73 plantings, and plots sprayed with Headline
- Net returns spoke for themselves, and the difference between the **right choices** and the **wrong choices** were worth **\$78/acre**

Good Choice vs. Poor Choice – 2006

Raised Bed Study

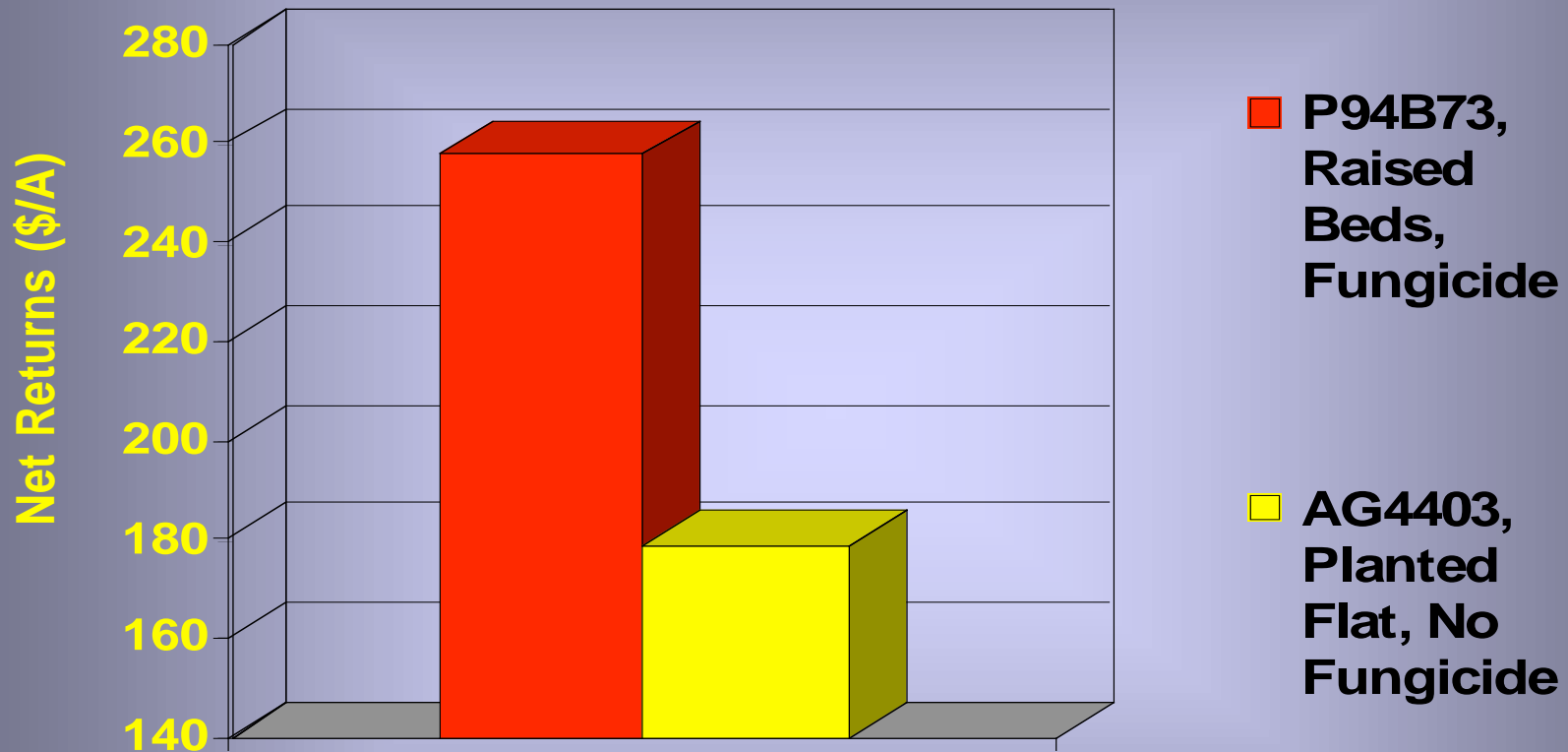
Soybean Yield



Good Choice vs. Poor Choice – 2006

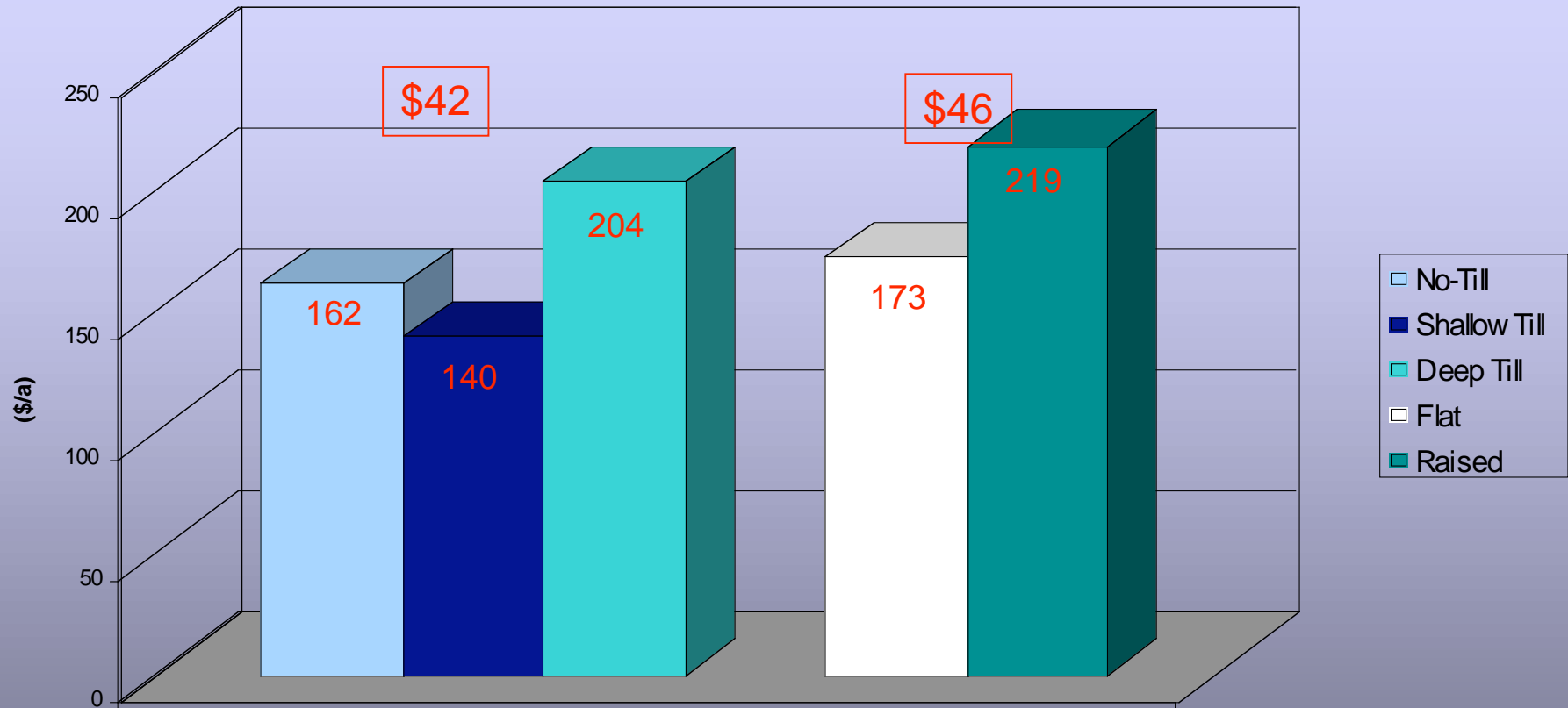
Raised Bed Study

Net Returns



Trials 1 and 2 Combined- Raised beds vs Tillage

Net Returns Above Input Costs at \$5.40/bu Selling Price



Conclusions

- Long-term, no-till continuous soybean production in the Yazoo-Mississippi Delta may not be economically sustainable
- Implementing methods to improve surface and/or internal drainage can prove profitable
- Extremely hard to convince a grower who is making money to change what he is doing!!!!
- More research is needed to determine those areas in which the probability of profitability is the highest

Next year.....

- Repeat these trials
- Adding a non-irrigated location on sandy soil
- Second year of a corn/soybean vs soybean/soybean rotation

Acknowledgements

- Dr. Dan Poston
- Dr. Steve Martin
- Mr. Russel Coleman
- Mr. Tom Eubank
- Mr. Hunter Doty
- Dr. Trey Koger
- Mississippi Soybean Promotion Board



Questions/Comments

