

# **Cropping Systems Rotations/Doublecropping Comparisons of monocropping with rotations and year-long systems**

**Louisiana Agricultural Technology & Management  
Conference**

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LSU AgCenter**

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**Continuous  
Soybean  
12<sup>th</sup> year**

**Soybean-  
Sorghum  
Rotation**

CONTINUOUS  
SOYBEAN  
12TH YEAR

SOYBEAN  
SORGHUM  
ROTATION

**Soybean needs to be rotated with cotton, corn or sorghum**

# **Benefits of Rotational Cropping Systems**

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- **Increase crop yield?**
  - **Increase profits?**
  - **Benefits to soil productivity**
  - **Weed control**
  - **Use of residual fertility**
  - **Disease and nematode control**
  - **Manage production risk**
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# **Rotation and Doublecropping Research in the LSU AgCenter**

**Northeast Research Station,  
St. Joseph  
and  
Macon Ridge Research Station,  
Winnsboro**

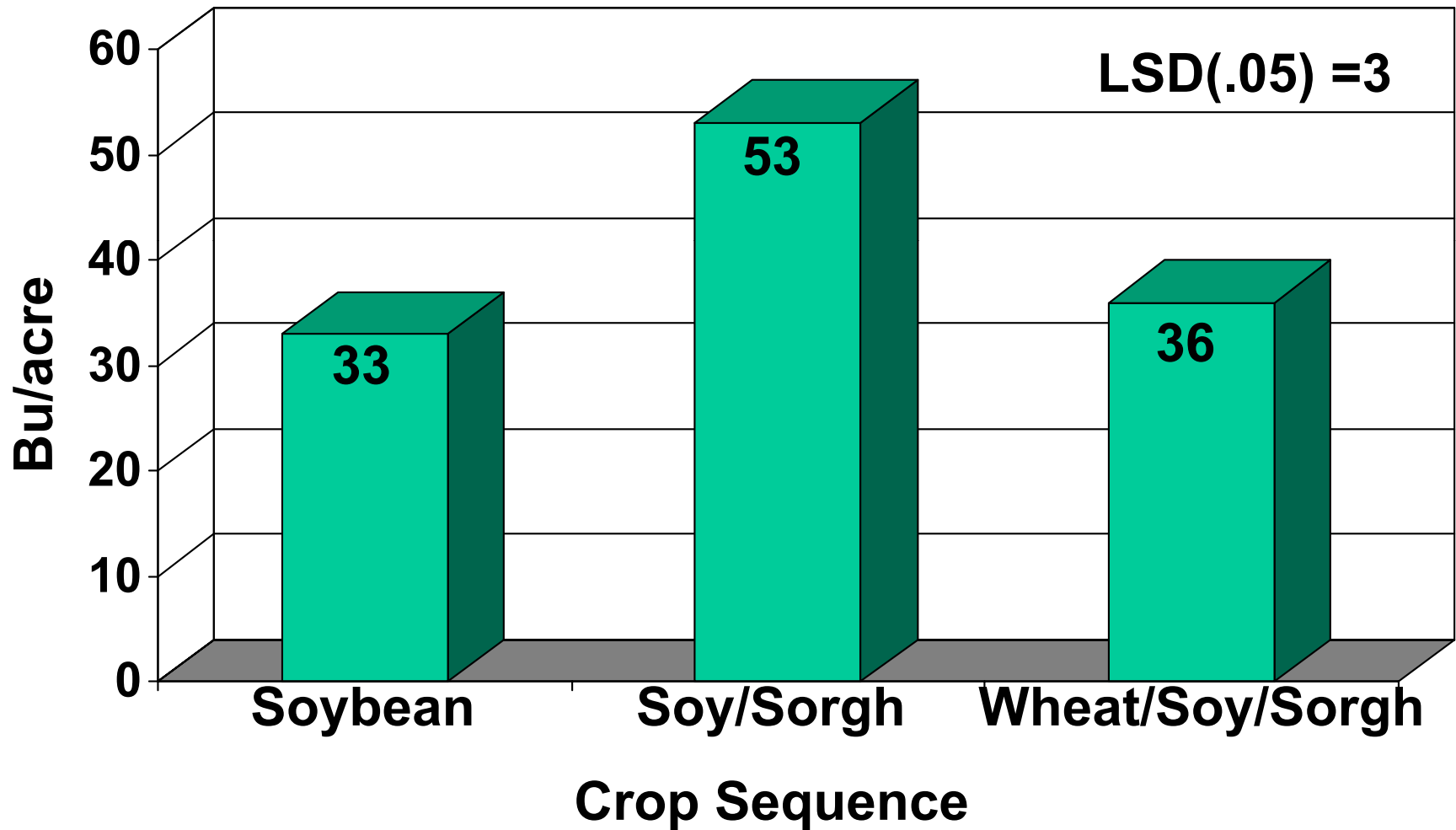
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# **Rotations and Doublecropping at the Northeast Research Station**

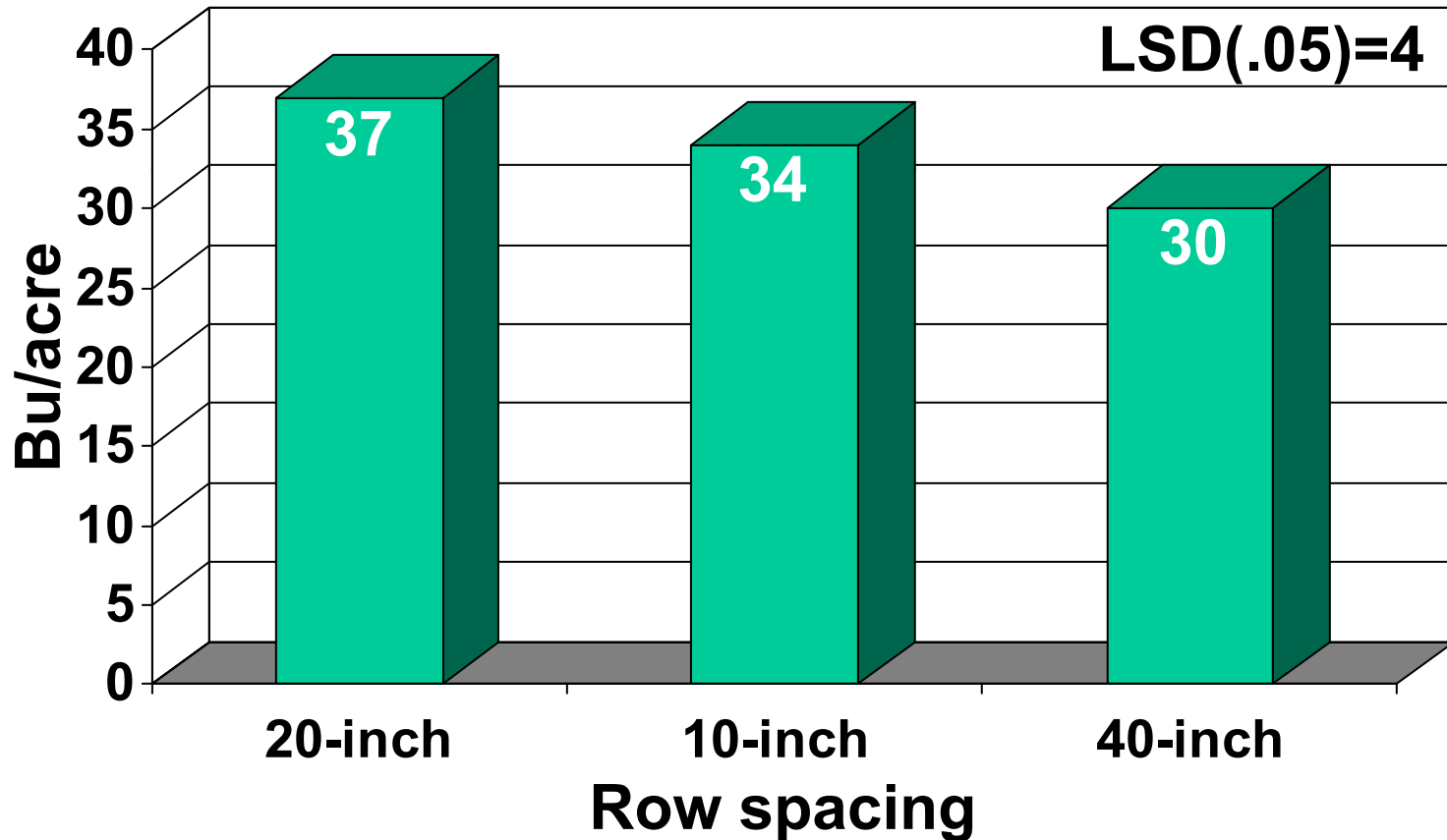
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- **Soybean following wheat – 1976 to 1995.**
- **Cotton and grain crops in rotations – 1982 to 2007.**

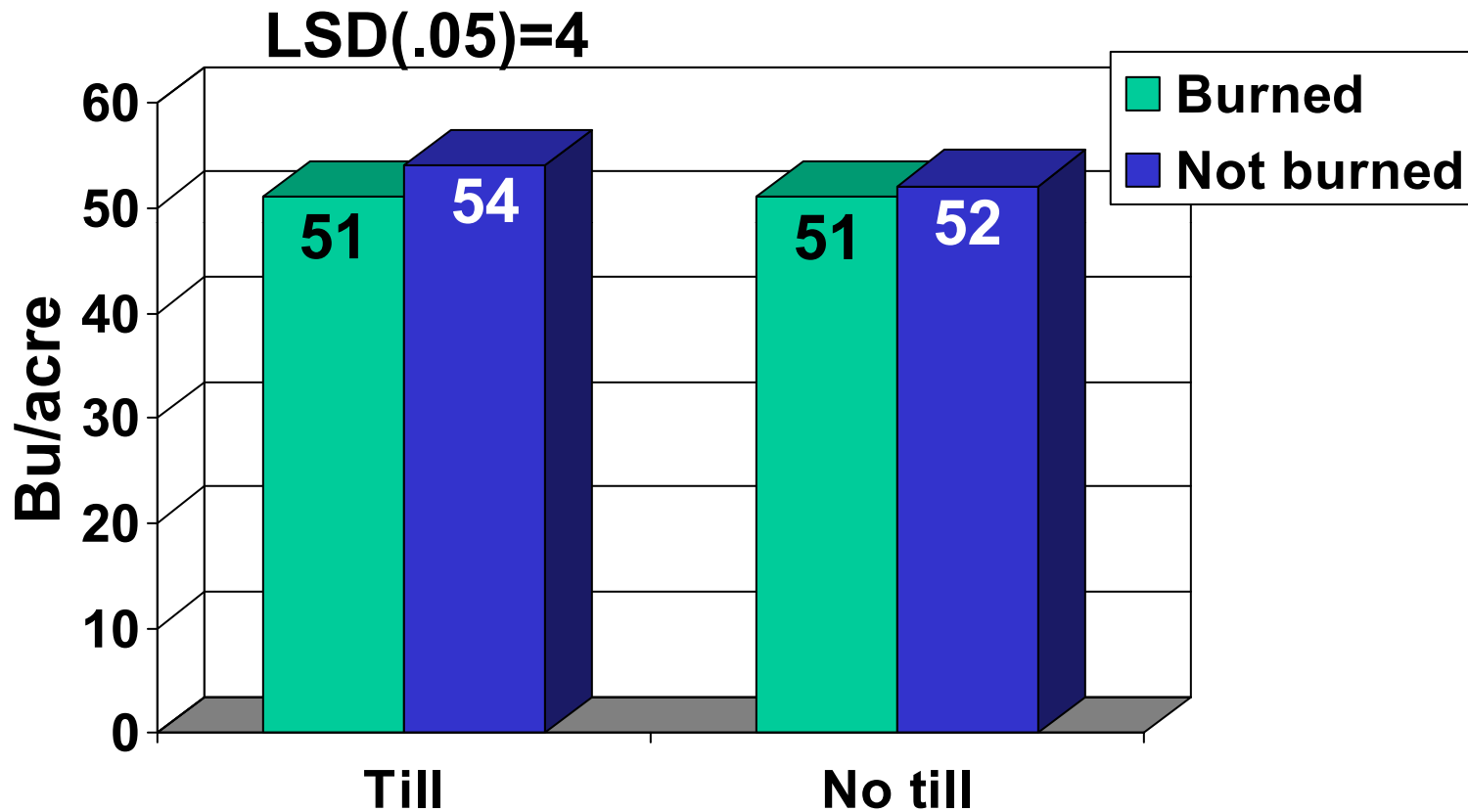
# Response of soybean to rotation and doublecropping systems, 1982-1995



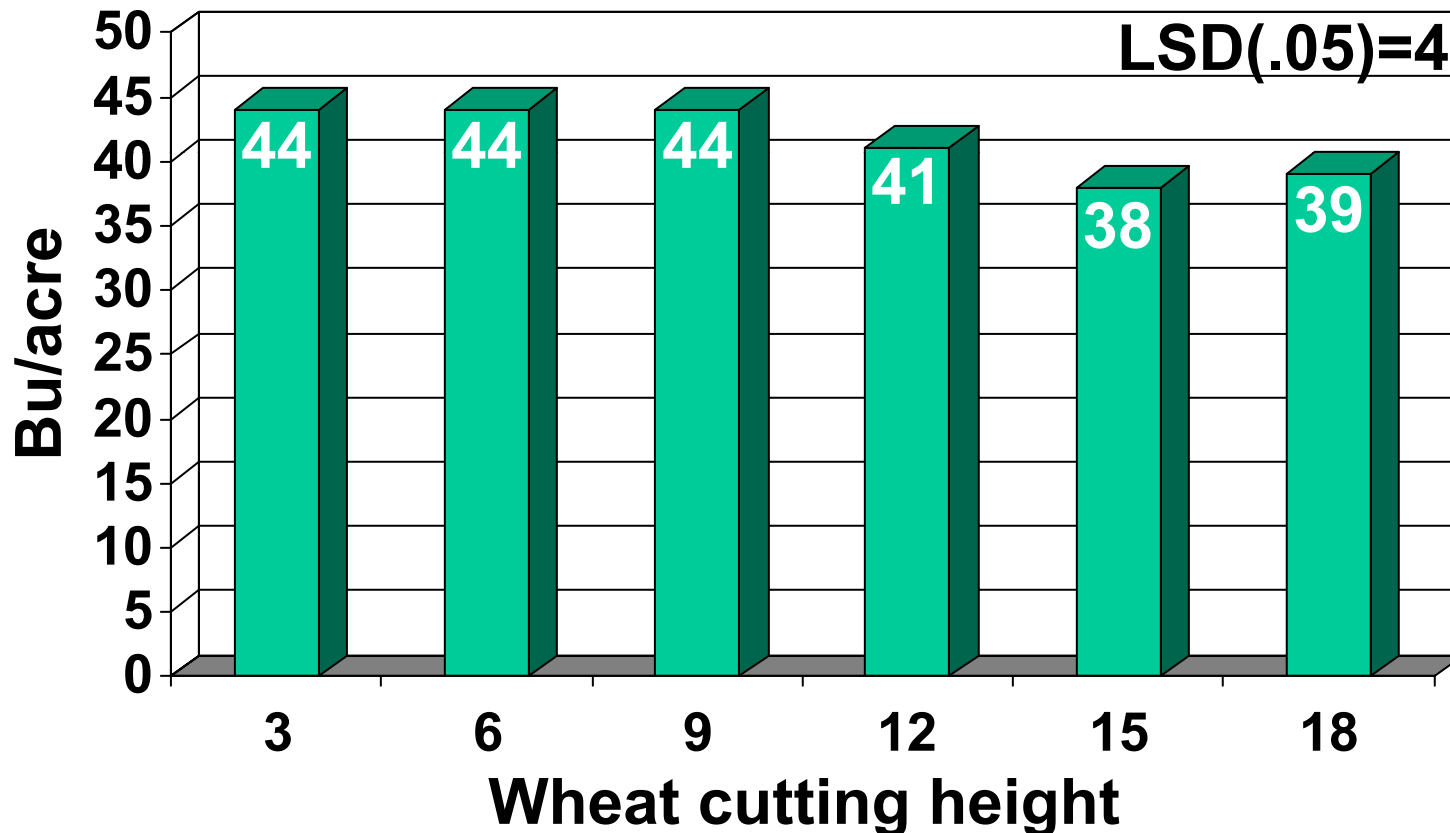
# Response of non-irrigated doublecrop soybean to row spacing, 6-year avg. 1976-1981.



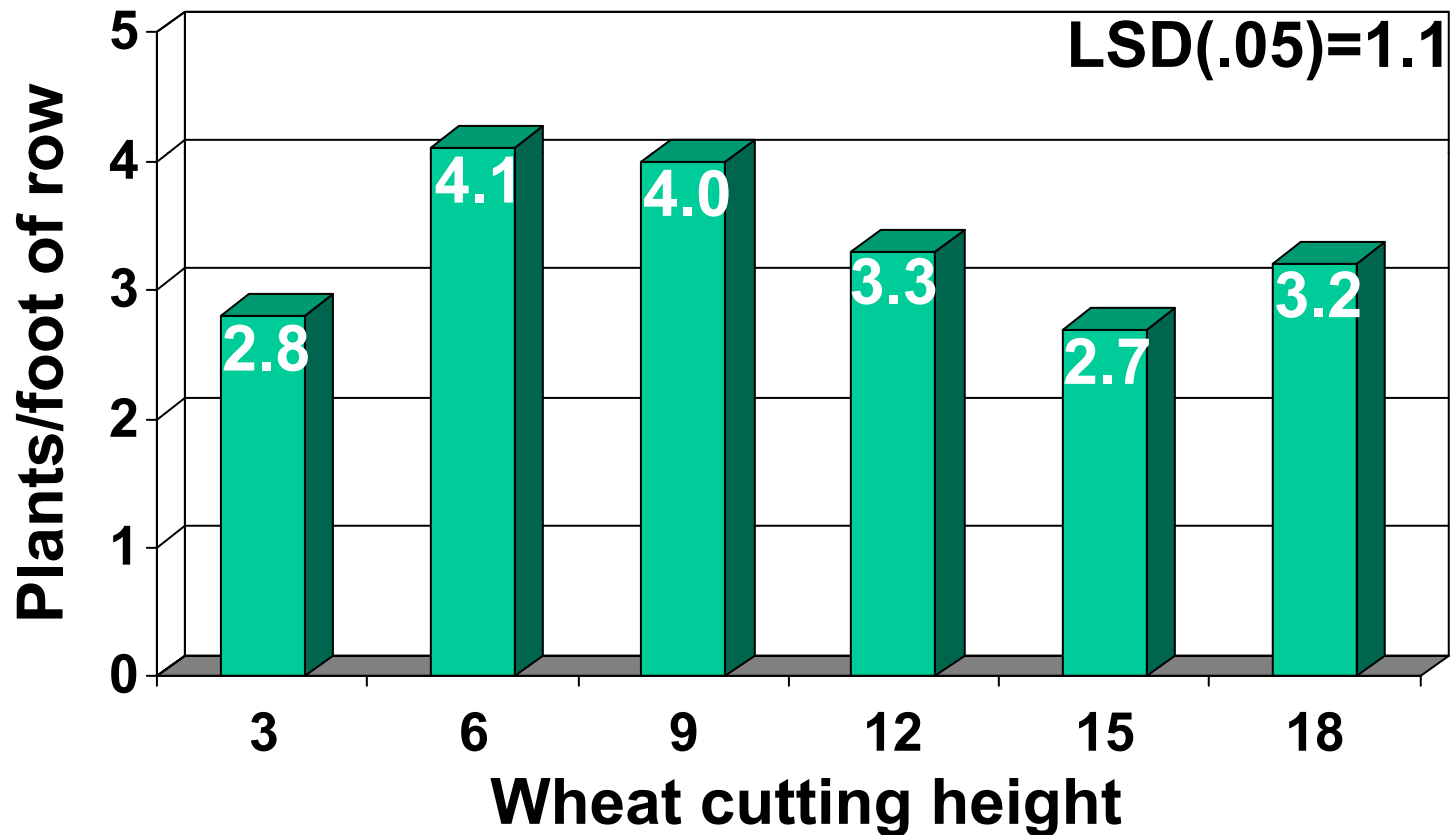
# Response of irrigated doublecrop soybean to wheat residue management, 1980-1982, 3-year avg.



# Response of non-irrigated doublecrop soybean yield to wheat cutting height, 2-year avg.1981-1982.



# Response of non-irrigated doublecrop soybean stand to wheat cutting height, 2-year avg. 1981-1982.



# **Crop Rotations**

## **26-year Study, 1982-2007**

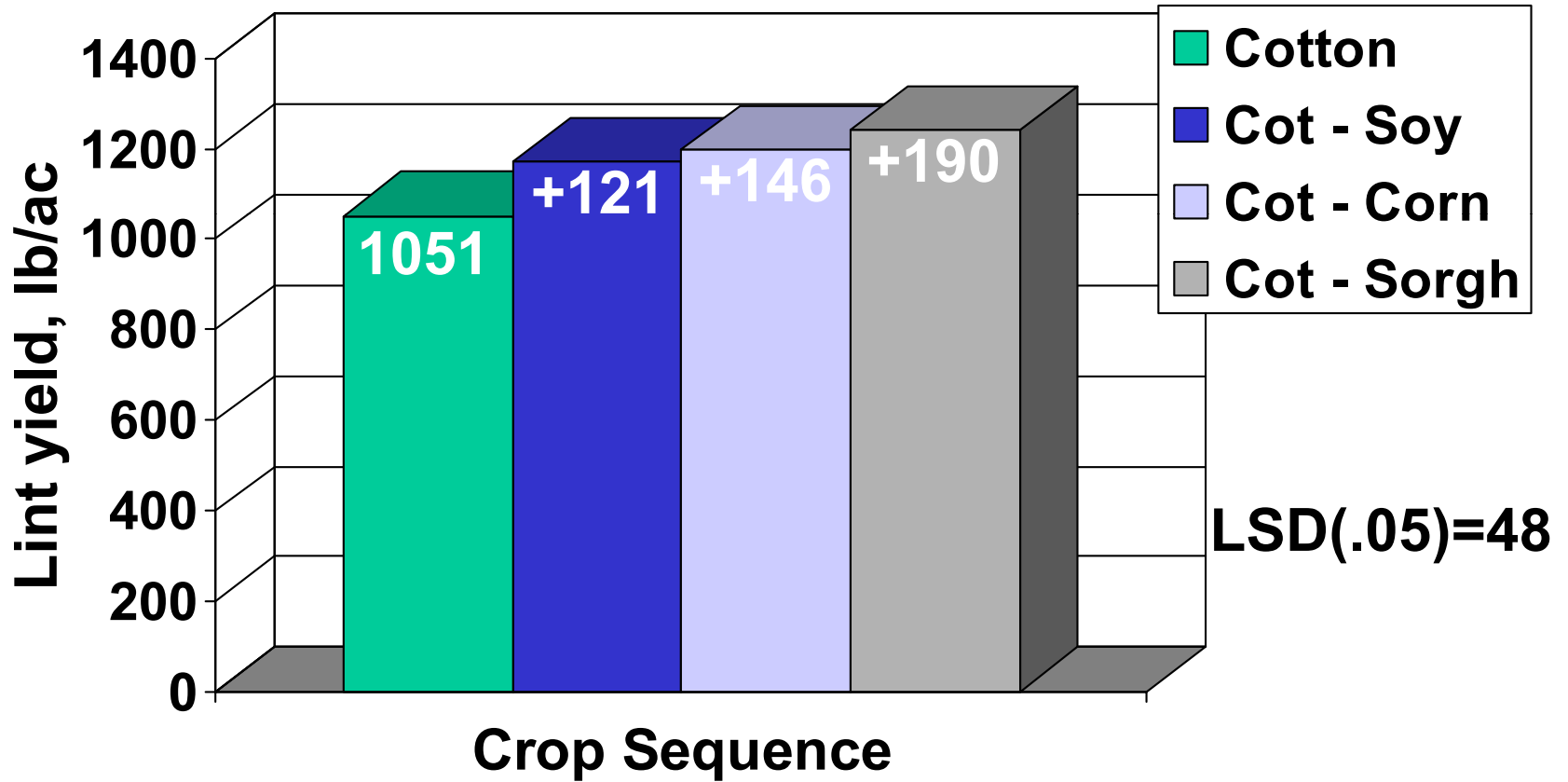
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### **Comparison of long-term rotation effects on Crop Yields (and Economics)**

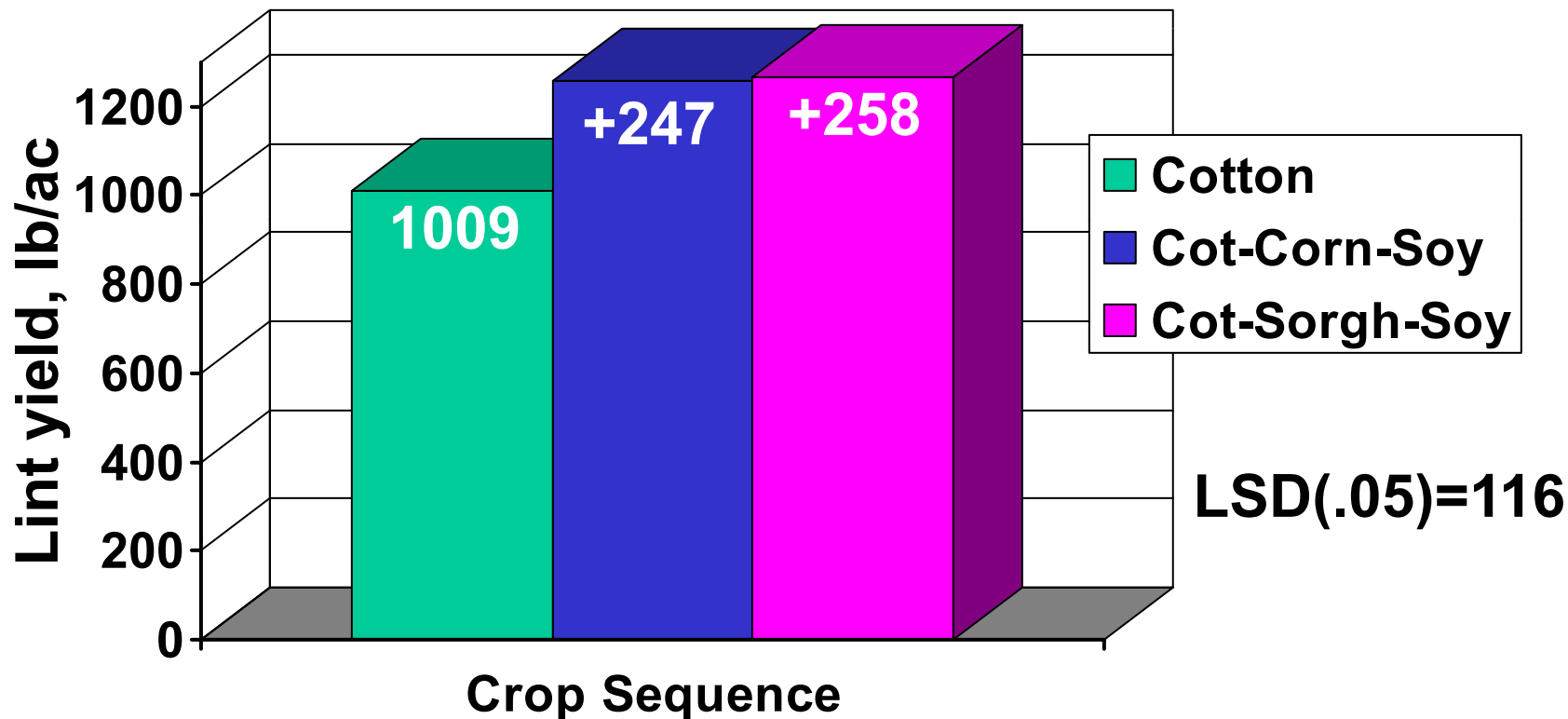
**Commerce silt loam, 15 different cropping systems with cotton, corn, soybean, grain sorghum, and wheat.**

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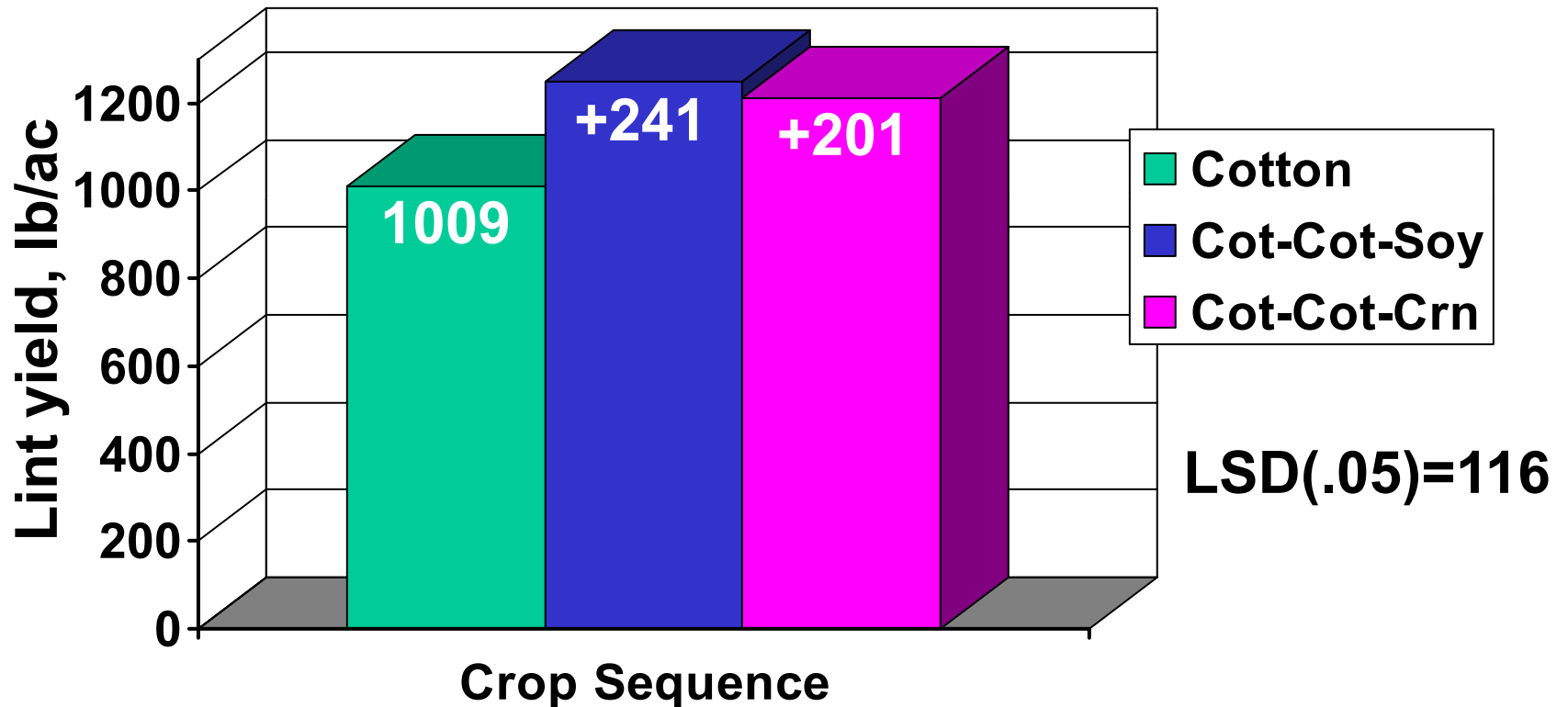
# Comparison of continuous cotton to 2-year rotations, lint yield, 1982-2007, St. Joseph



# Comparison of continuous cotton to 3-year rotations, lint yield, 4 cycles.

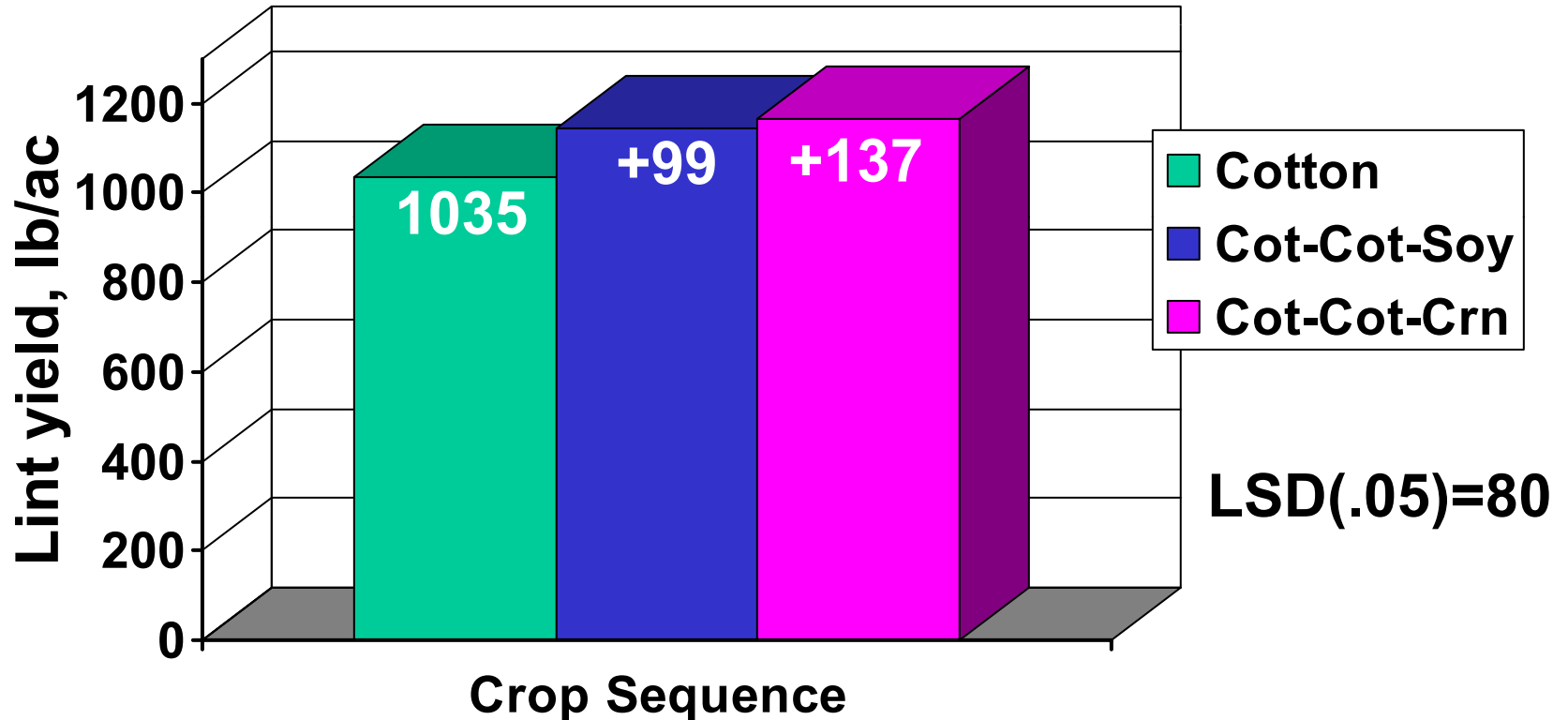


# Comparison of continuous cotton to 3-year rotations, lint yield\*, 4 cycles.



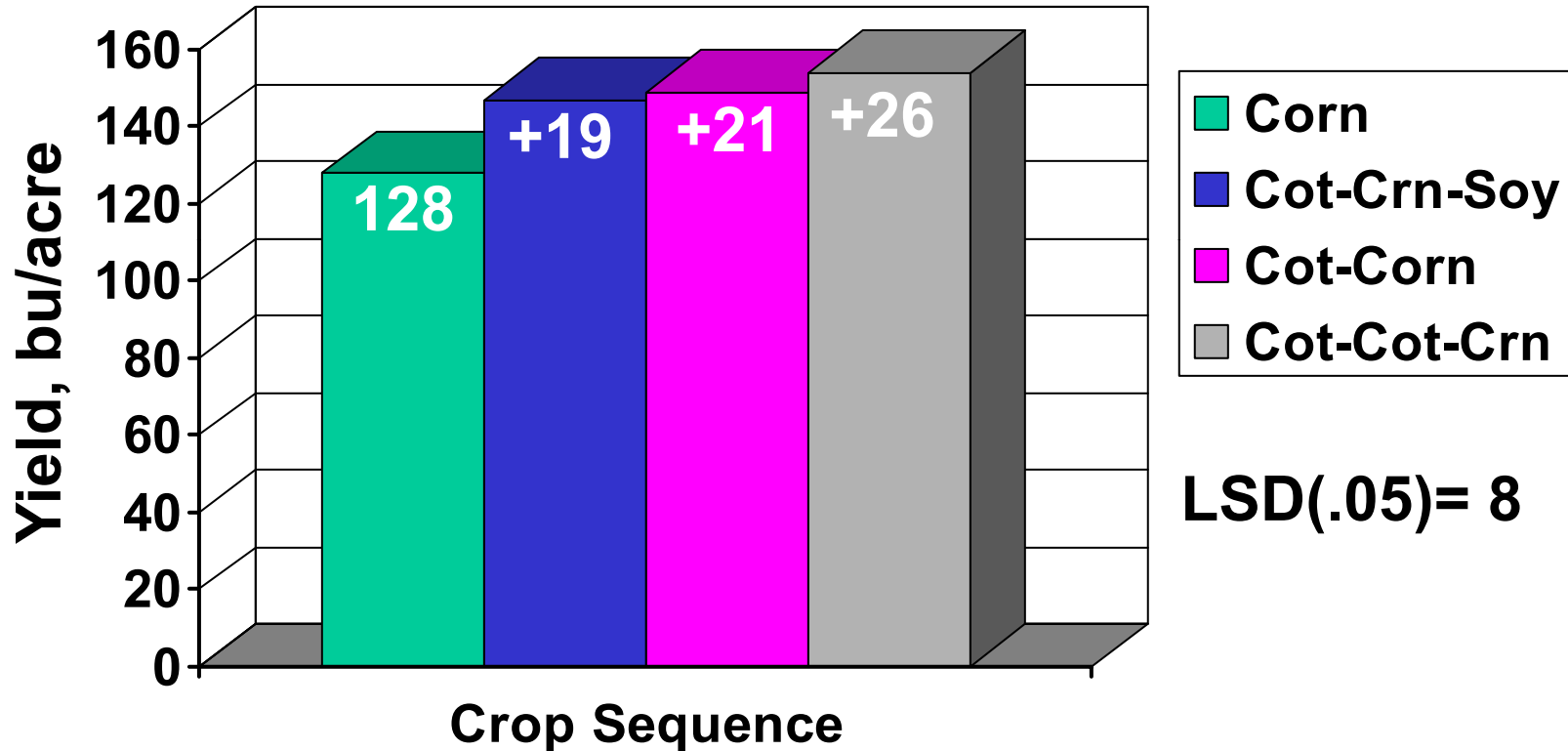
\*First year cotton after grain crop

# Comparison of continuous cotton to 3- year rotations, lint yield\*, 4 cycles

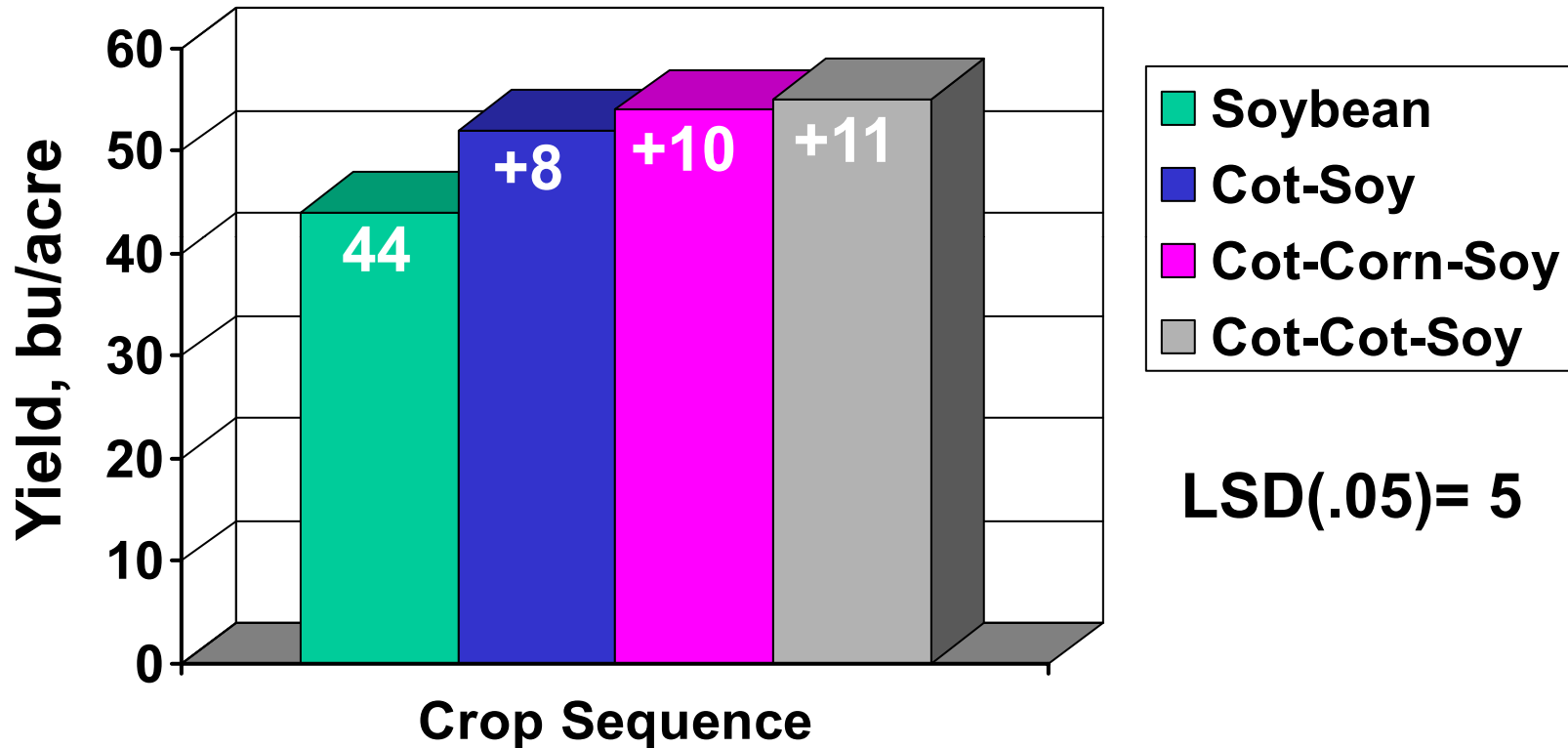


\*Second year cotton after grain crop

# Yield response of corn to 2 and 3-yr. rotations.



# Yield response of soybean to 2 and 3-yr. rotations.



# Summary of findings from St. Joe Studies

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- **Doublecrop soybean – Burning/not burning wheat residue and till/no till had no effect on soybean yield.**

- **Rotations of cotton and grain crops consistently increased yield of all crops.**


**Some crops benefit more from rotations than others but expect around 10 to 20% yield increase.**

# Summary of findings from St. Joe Studies

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**Maintaining flexibility is the key to using rotations successfully and profitably.  
Rotation is not always the best choice.**

- **Alternative crops may reduce income for a given year but this will be offset by the total benefits of the rotations.**



# **Cropping Systems**

## **8-year study, 2001-2008**

### **Winnsboro, LA**

**Comparison of year-long cropping systems with monocropping -“Yields and Economics in BMP systems”**

**Gigger silt loam; 15 crop sequences with cotton, corn, soybean, grain sorghum, wheat grain, and winter cover crops/green manures all with practical BMPs.**



**Objective: Evaluate BMPs (that protect water quality) for agronomic and economic productivity.**

**Runoff from tilled fields carries sediment, organic matter and nutrients, lowering the quality of soil and surface water bodies.**



**Year-long ground cover is the best way to preserve and improve soil and water quality.**

# PROCEDURES

## (Crops)

**Study was initiated in fall 2001.**

**Summer Crops: Cotton, Soybean,  
Corn, Grain Sorghum,  
(Sunflowers)**

**Winter crop: Wheat**

**Winter cover crops: Wheat, Rye,  
Oats, Hairy vetch, Winter fallow**

# Crop Sequences

## Winter

1. WG
2. WGM
3. WG
4. WG
5. WG
6. WG
7. WG
8. WF
9. WF
10. WF

## Summer

- Cotton
- Cotton
- Soybean
- Sorghum
- Soy/Cotton
- Sorgh/Cotton
- Sorgh/Soy
- Corn/WG/Cotton
- Sorgh/Cotton
- Cotton

## Winter

11. WF
12. WF
13. WF
14. WF
15. Rye
16. Oat
17. Vetch
18. WF

## Summer

- Soy/Cotton
- Corn
- Soy
- Sorgh
- Cotton
- Cotton
- Cotton
- Sunflw/Cotton

# **PROCEDURES**

## **Cultural practices**

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**Cultural practices and inputs are as close as possible to commercial farming. Cotton, corn and soybean are Roundup Ready.**

**Summer crops are furrow irrigated.**

**Soil type: Gigger silt loam (loess)**

**All crops planted no till.**

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# RESULTS

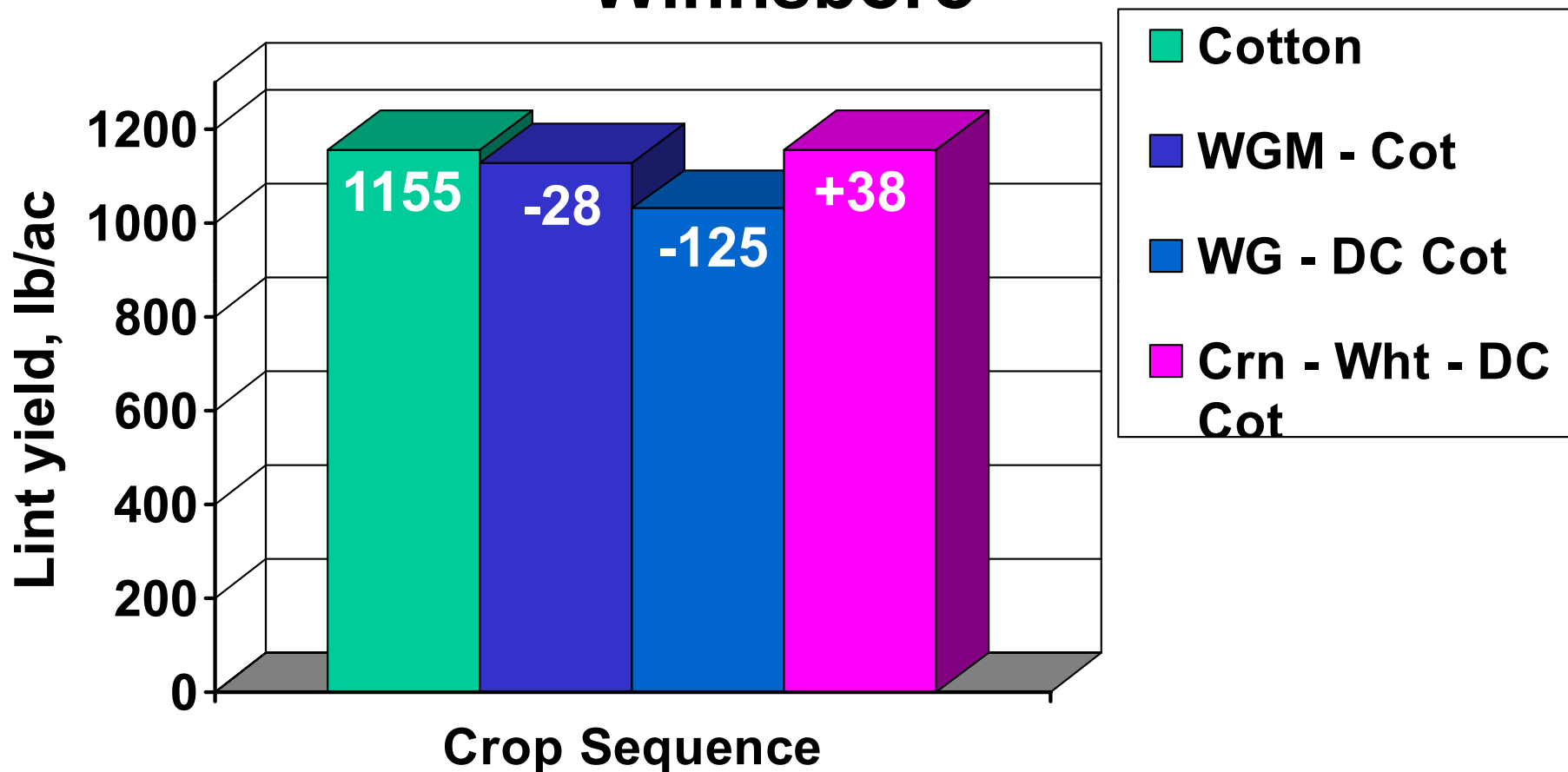
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**1. Yield data**

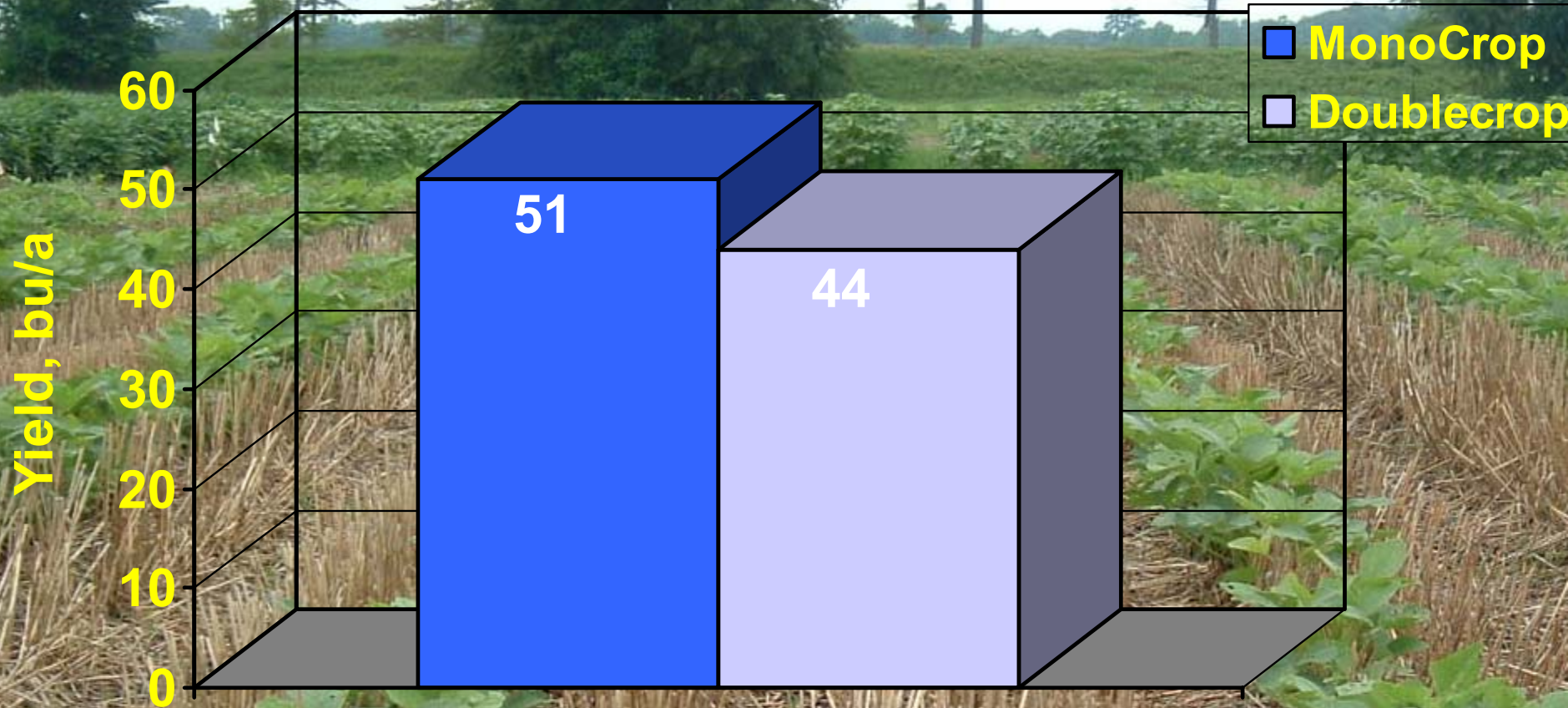
**2. Economic data -- Net returns above  
variable expenses**

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# Yield response of cotton in cropping systems, Gigger sl, 2001-2007, Winnsboro



Wheat averaged 63 bu/ac, Corn averaged 151 bu/ac



### Avg. Yield

Irrigated monocrop and doublecrop soybean yields on no till Gigger sl, 2002-2007. MC, monocrop with winter fallow. DC, doublecrop following winter wheat.

*7-year average wheat yield – 63 bu/acre*

# Average yields of grain crops in a 7-year cropping system study.

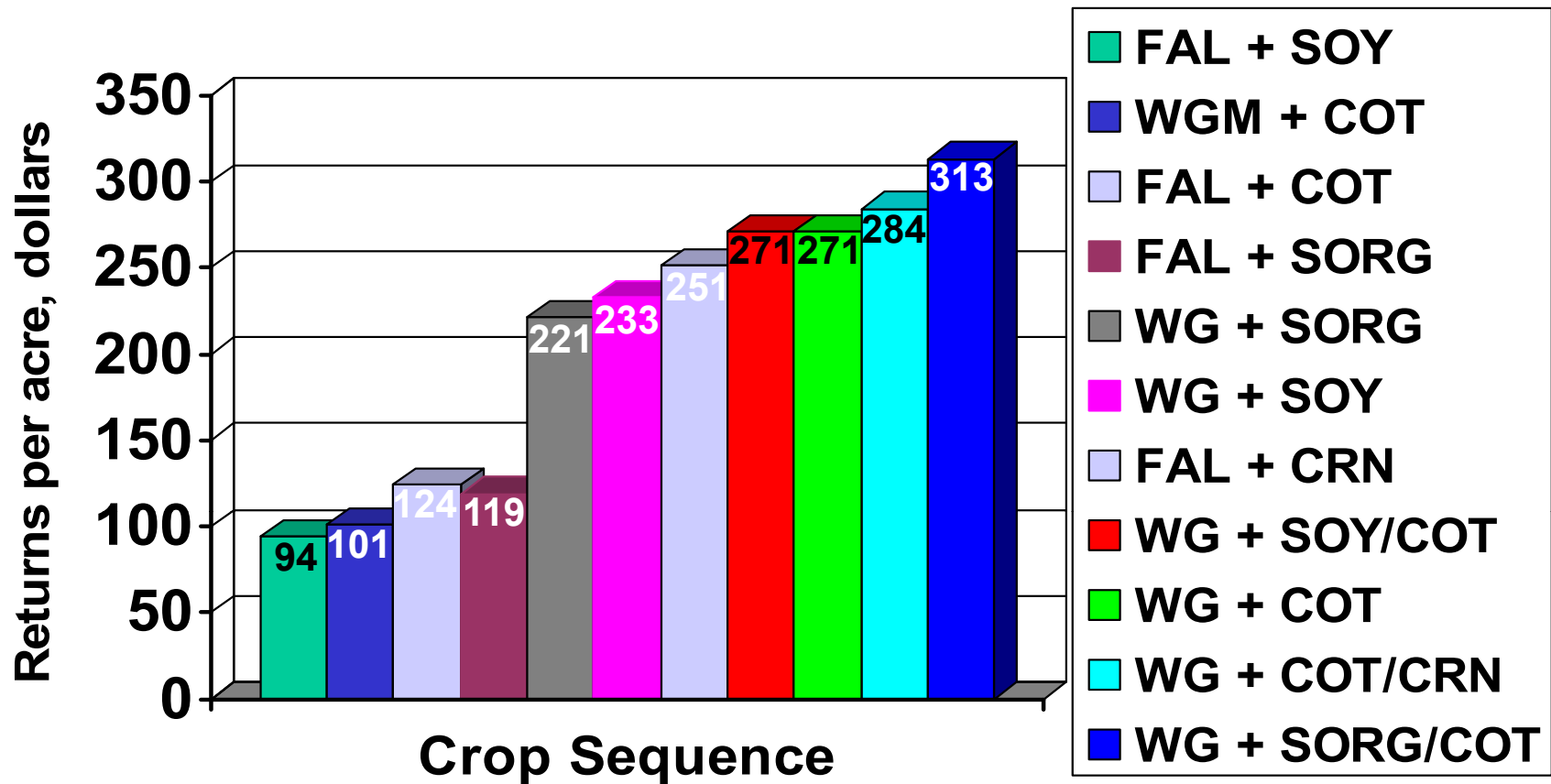
»Sequence Bu per acre

- Winter fallow – Corn 151
- Winter fallow – Sorghum 116
- Wheat grain\* – DC Sorghum 112

*Wheat yield \*57 bu per acre*

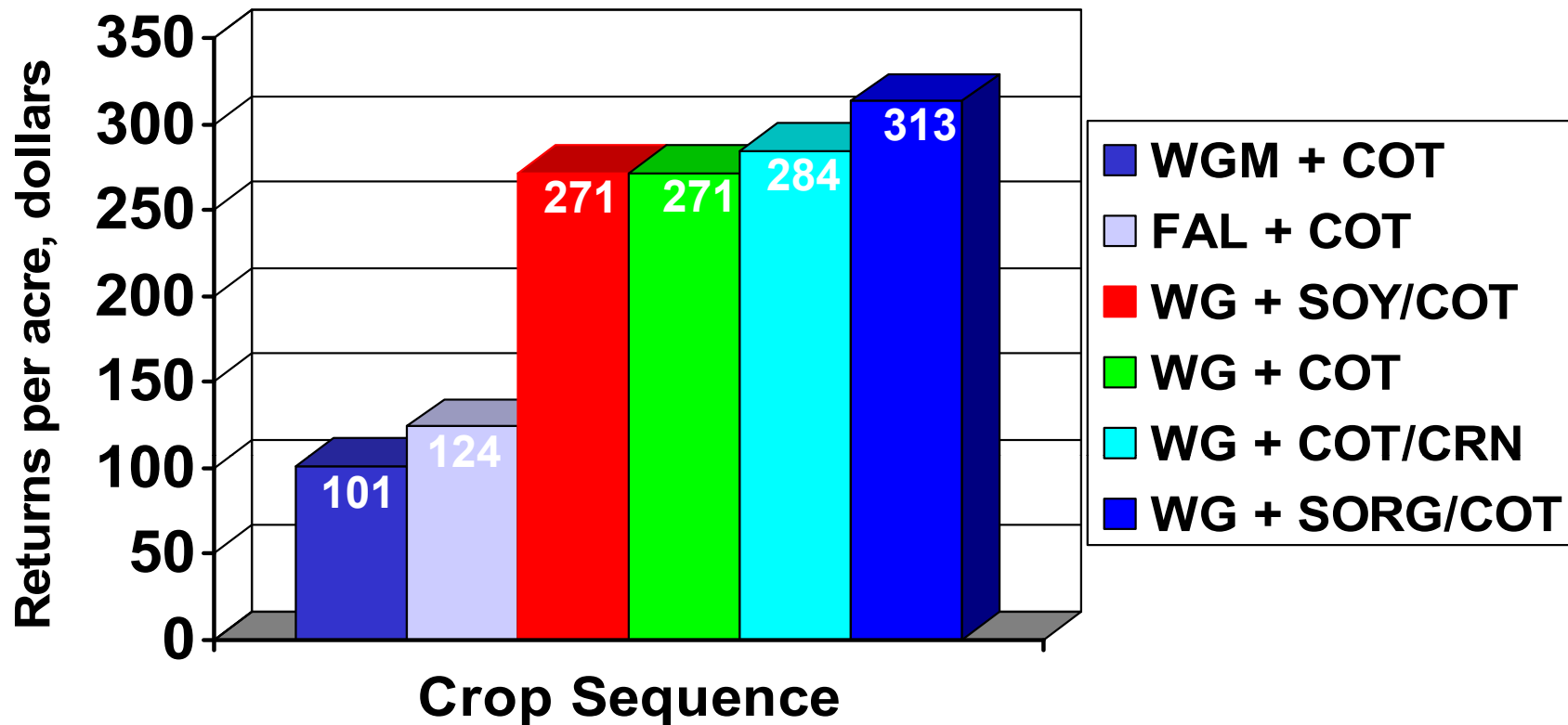
# **Net returns**

- **Returns above variable costs**



**Average annual net returns for cropping sequences in a BMP study, 2001-2007.** (*FAL, winter fallow; CRN, corn; WG, wheat grain; WGM, wheat green manure; SORG, grain sorghum; SOY, soybean; COT, cotton*)

*Economic analysis by Dr. Kenneth Paxton*



**Annual net returns for cropping sequences in a BMP study – 2001-2007.** (*FAL, winter fallow; CRN, corn; WG, wheat grain; WGM, wheat green manure; SORG, grain sorghum; SOY, soybean; COT, cotton*)

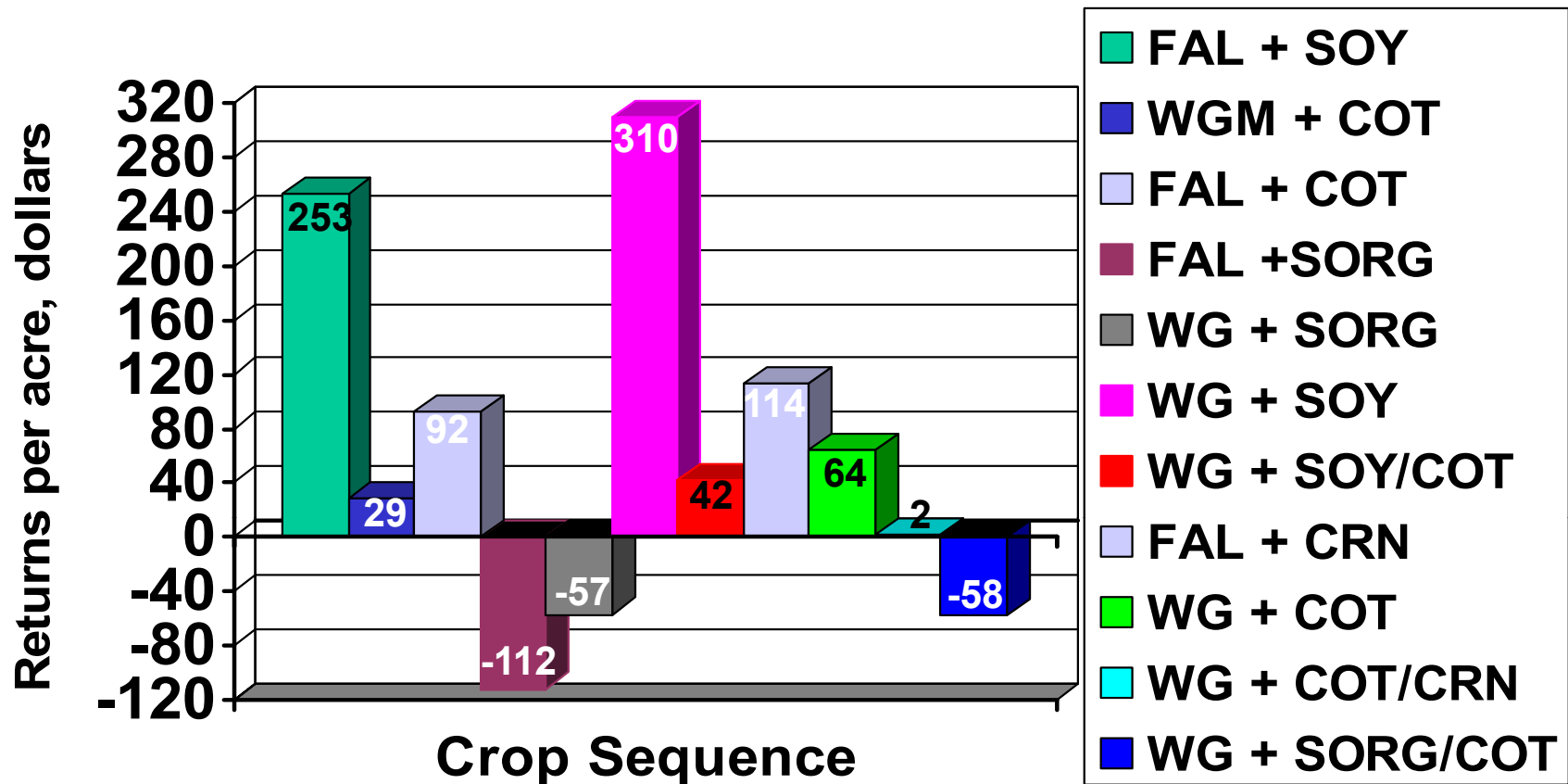
*Economic analysis by Dr. Kenneth Paxton*

**2008**

**Year of the Hurricanes**

**Gustav**

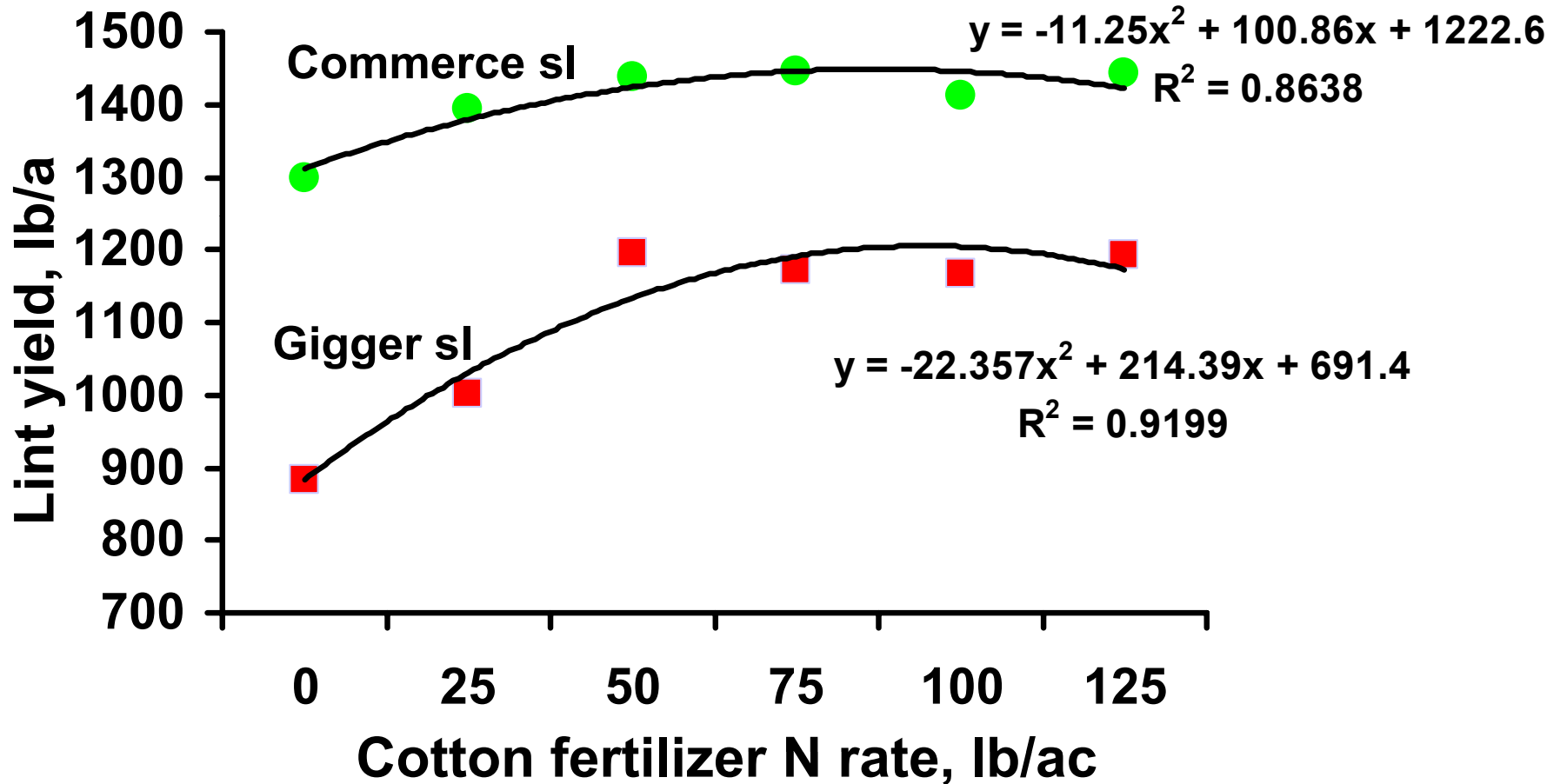
**Ike**



**Annual net returns for cropping sequences in a BMP study – 2007-2008.** (*FAL*, winter fallow; *CRN*, corn; *WG*, wheat grain; *WGM*, wheat green manure; *SORG*, grain sorghum; *SOY*, soybean; *COT*, cotton)

*Economic analysis by Dr. Kenneth Paxton*

# Response of cotton yield following corn to fertilizer N rate on Gigger sl and Commerce sl, 4-yr avg.



# **Benefits of Rotational Cropping Systems**

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- **Increase crop yield**
  - **Increase profits**
  - **Benefits to soil productivity**
  - **Weed control**
  - **Use of residual fertility**
  - **Disease and nematode control**
  - **Manage production risk**
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# Acknowledgement

The research presented in this presentation was partially funded by Cotton Incorporated, The Louisiana Cotton State Support Committee and the Louisiana Soybean and Grain Research and Promotion Board.

