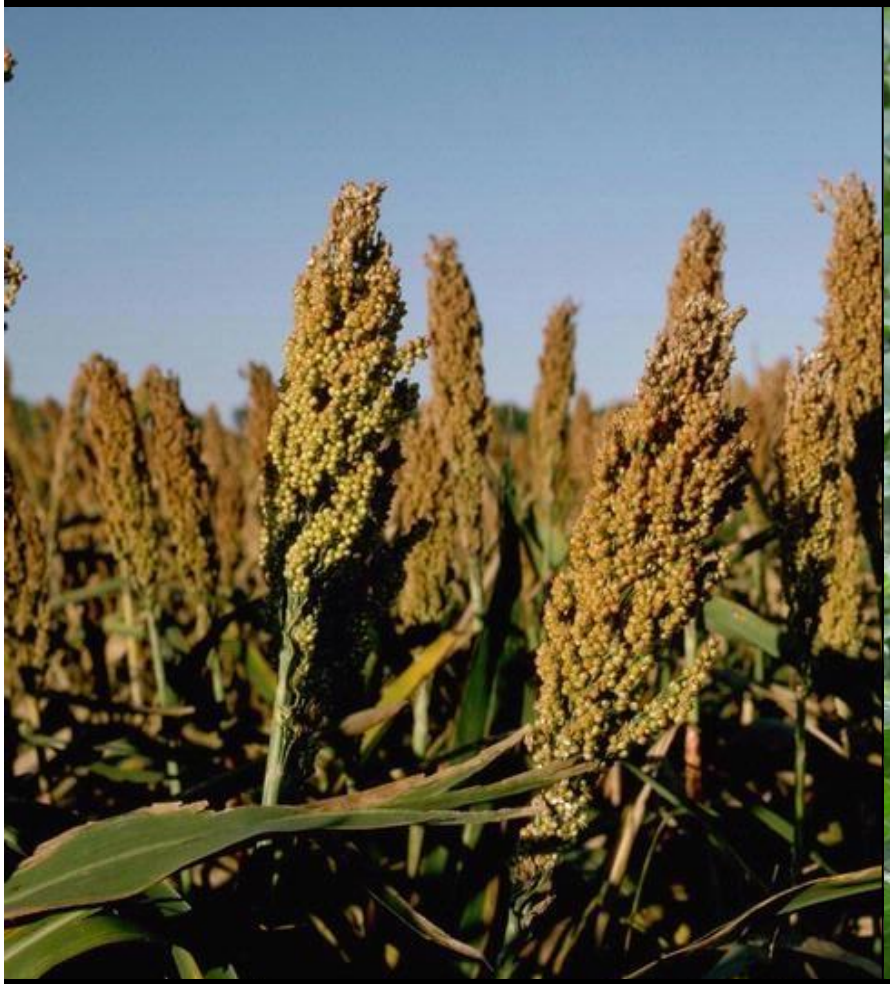
2012: Weed Management and Crop Injury when Intercropping Melons and Cotton

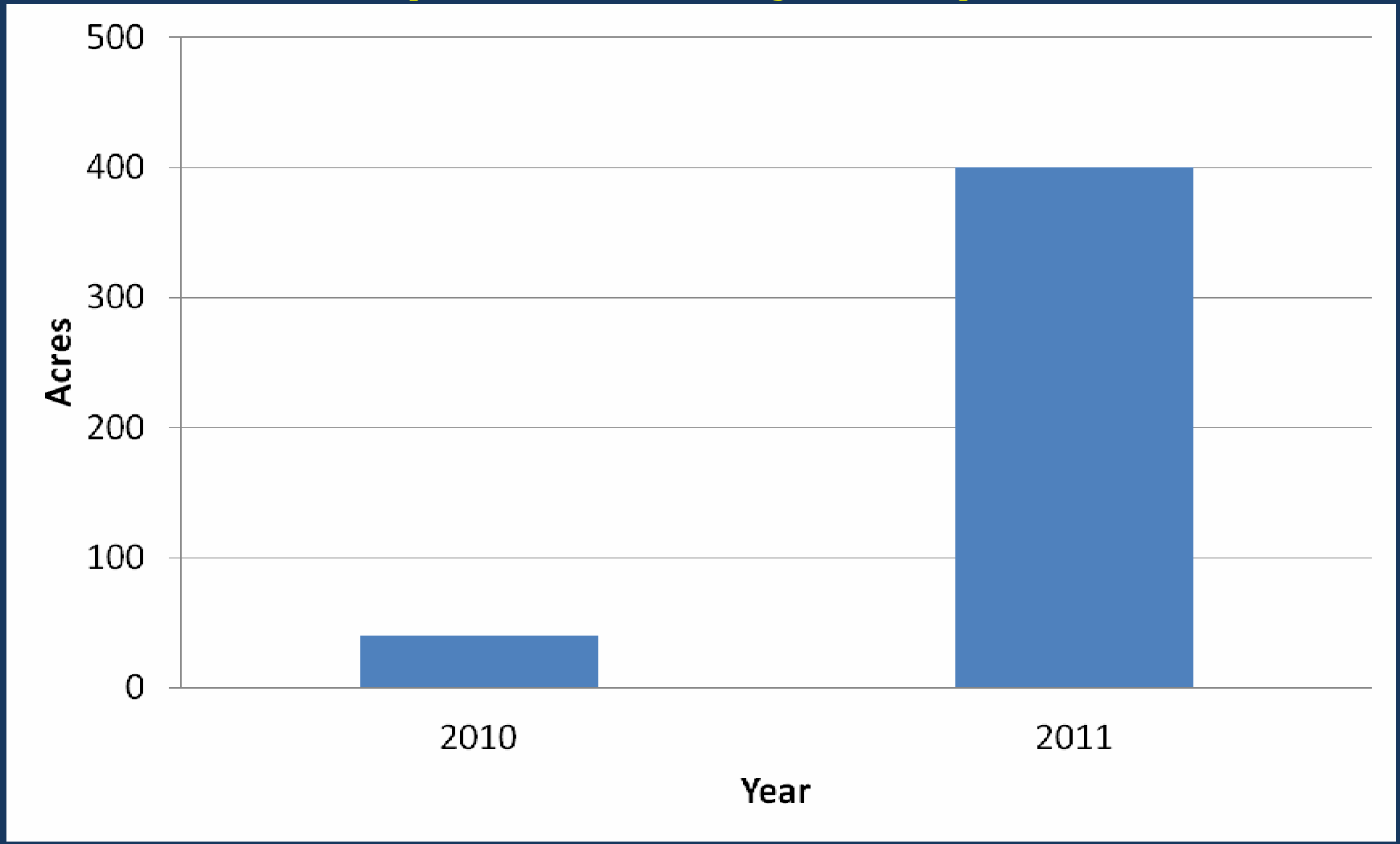


Peter Eure*, Stanley Culpepper, Brian Tankersley, and Rand Merchant
The University of Georgia
Tifton, Ga

Introduction

- Cantaloupe or watermelon intercropped with cotton
  - Increase resource efficiency
  - Improve grower profit
  - Stability in production

Cantaloupe and Cotton Intercropped (Tift County, GA)



Objectives

1. Identify herbicide systems to manage troublesome weeds in melon-cotton intercropping production

2. Determine the profitability of melon-cotton intercropping versus a monoculture of melon or cotton

Hypothesis

1. Herbicide options exist to adequately control weeds in melon-cotton intercropping systems

2. Crop value per acre will be greater when melon and cotton are intercropped versus a monoculture of melon or cotton

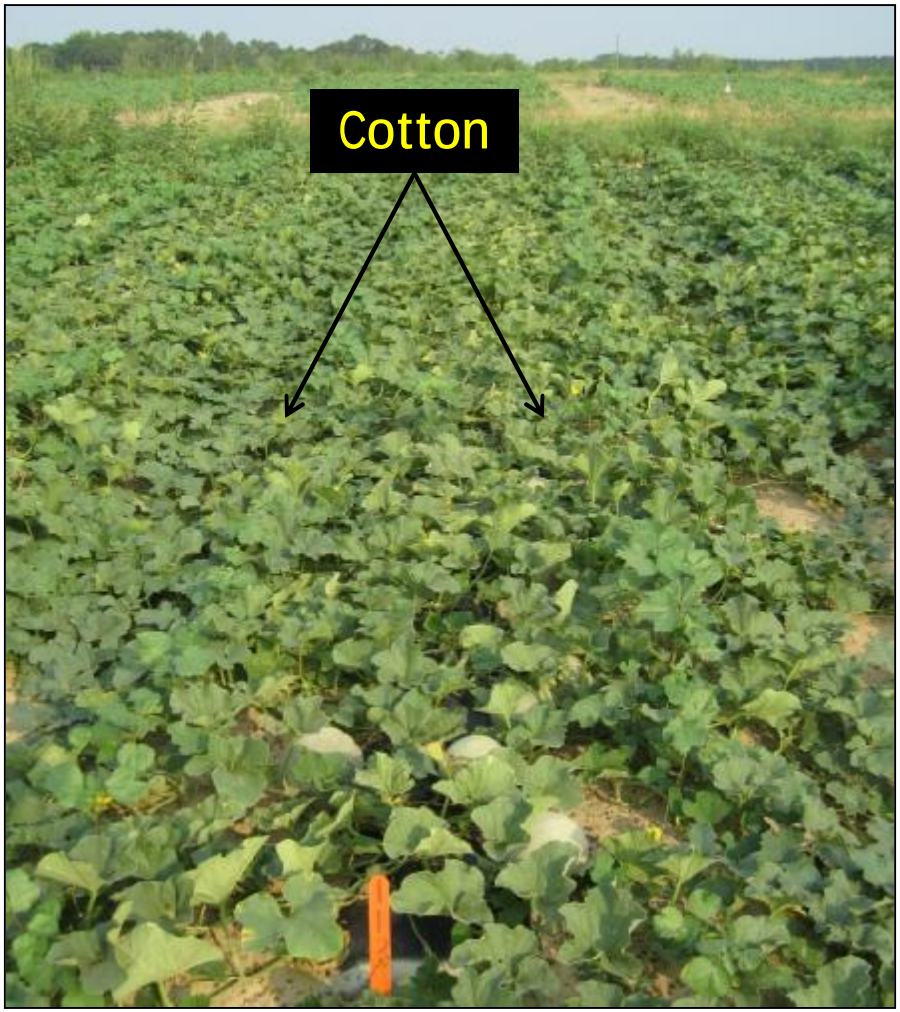
Materials and Methods

- Two separate field studies conducted at Ty Ty, Georgia on a Tifton loamy sand during 2011
  - Cantaloupe
  - Watermelon

- Each study consisted of:
  - Two planting dates of melon-cotton intercrops, three herbicide systems and a non-treated control
  - Melon and cotton alone were planted for each planting date to serve as comparisons

Materials and Methods

- Melons were transplanted into a 0.8 mil plastic mulch having an 18” wide bed top
- Cotton plantings for each planting date were made when the initial melon vine reached the mulch edge
- PHY 499 WRF was planted on 36 inch row spacing, using a 2-row planter centered over the plastic mulch



Intercropping systems were managed for melon production until harvest

Material and Methods

- Data recorded throughout the season:
  - Visual estimates of Palmer amaranth control
  - Melon and cotton injury
  - Melon vine length
  - Cotton height
  - Melon and cotton yield
    - Melon harvested by hand
    - Cotton harvested using a spindle picker designed for small plot research

Material and Methods

- Total crop value per acre of intercropping systems and monoculture systems were calculated
  - Total crop value/A=value of total products generated-cost to produce crop
- Data subjected to ANOVA and means separated using Fisher's Protected LSD ($p \leq 0.05$) when appropriate

Cantaloupe-cotton intercropping

"Athena" cantaloupe transplanted:

- Transplant date 1: April 5, 2011
- Transplant date 2: April 20, 2011

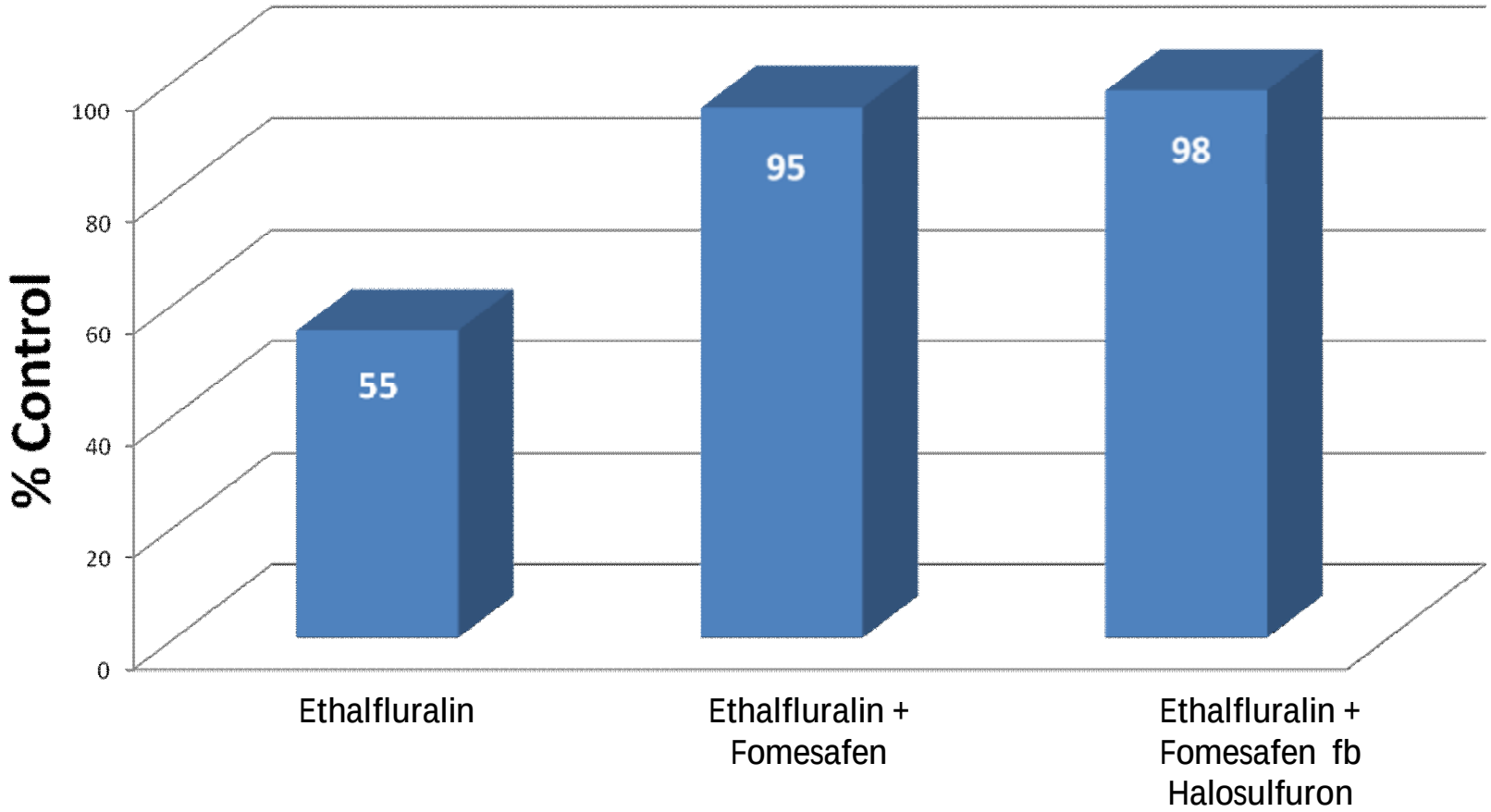
Herbicide treatments in intercropping systems:

1. Ethalfluralin (0.75 lbs ai/A) preplant
2. Ethalfluralin + Fomesafen (0.25 lb ai/A) preplant
3. Ethalfluralin + Fomesafen preplant fb Halosulfuron (0.032 lb ai/A) + NIS (0.25% v/v) 10 days after transplant
4. Non-treated control

Herbicide treatments in monoculture systems:

- Melon: Ethalfluralin + Fomesafen preplant
- Cotton: Sequential applications of Glufosinate + S-metolachlor or Glyphosate + Acetochlor when sensitive weeds were less than three inches tall

Palmer amaranth control prior to cantaloupe harvest



LSD(P≤0.05)=2

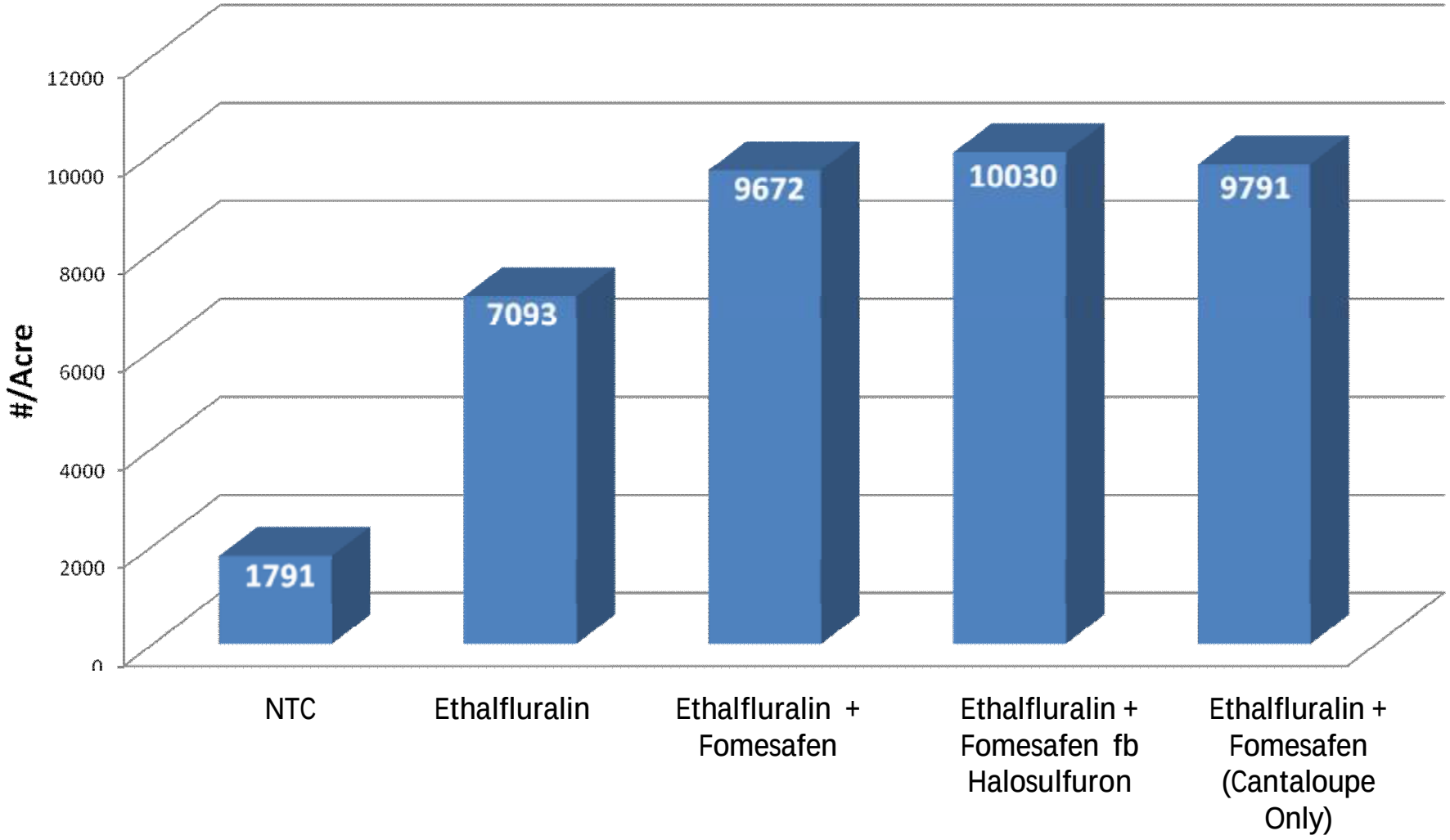
Non-treated control

Ethalfluralin + Fomesafen fb Halosulfuron

*Average of 57 Palmer amaranth in NTC

**Picture taken 8 weeks after transplant

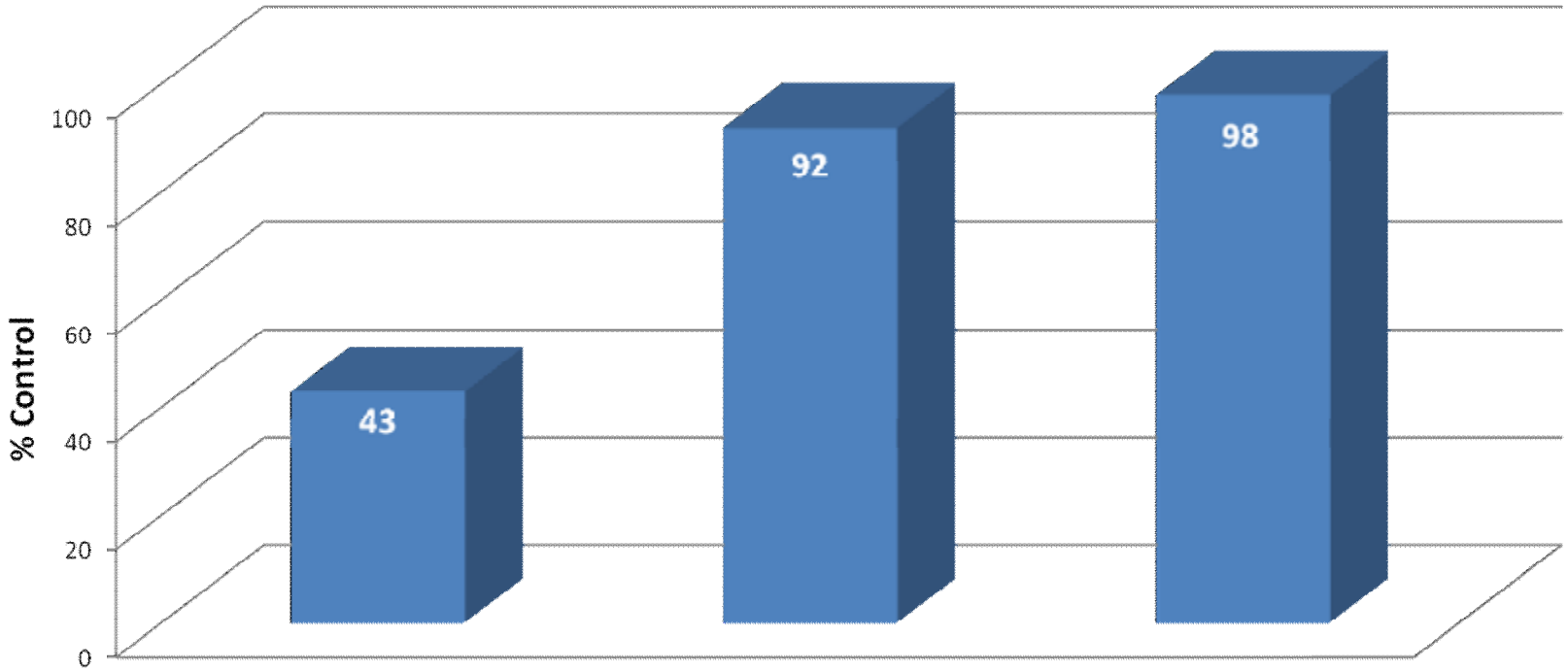
Cantaloupe Yield



LSD(P≤0.05)=558

*Data pooled over planting and harvest

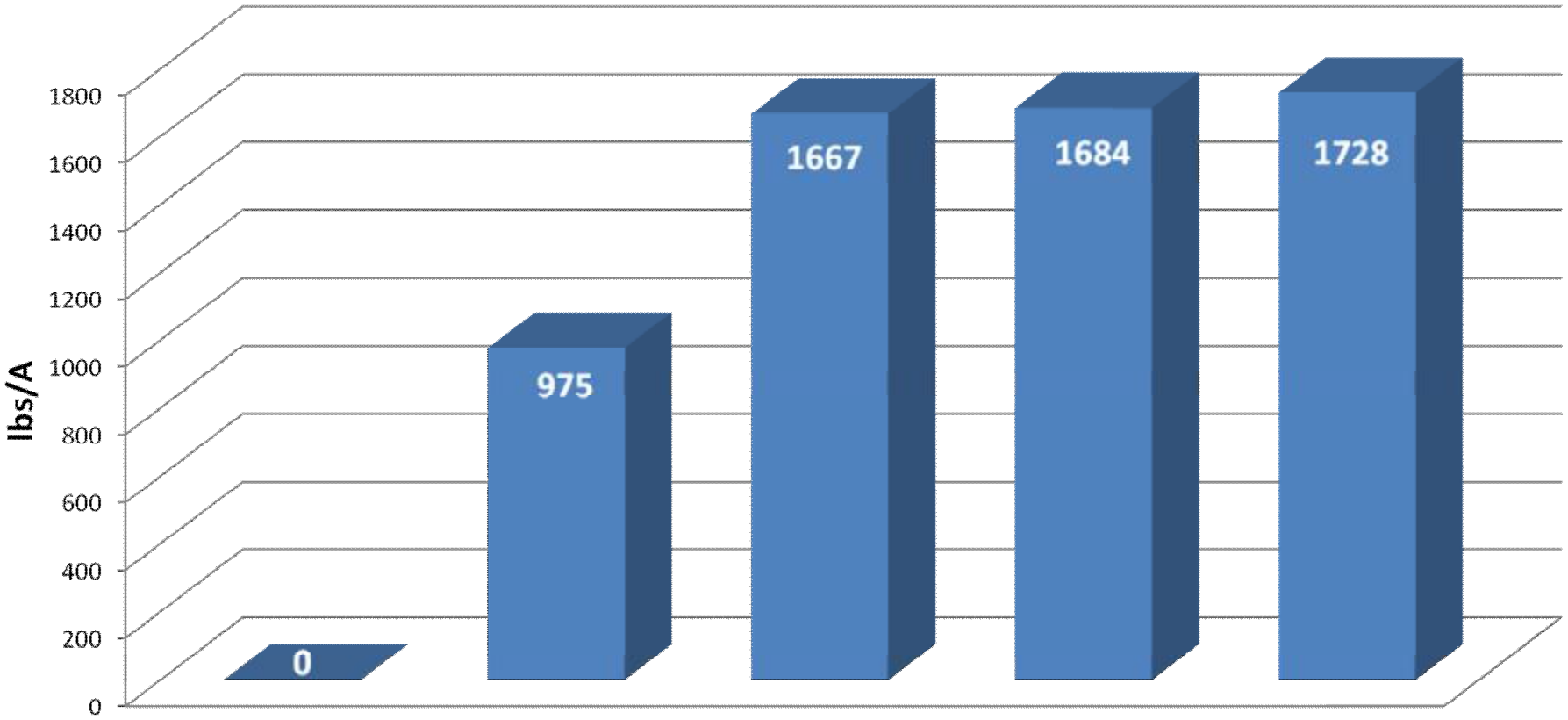
Palmer amaranth control prior to cotton harvest



LSD(P≤0.05)=5

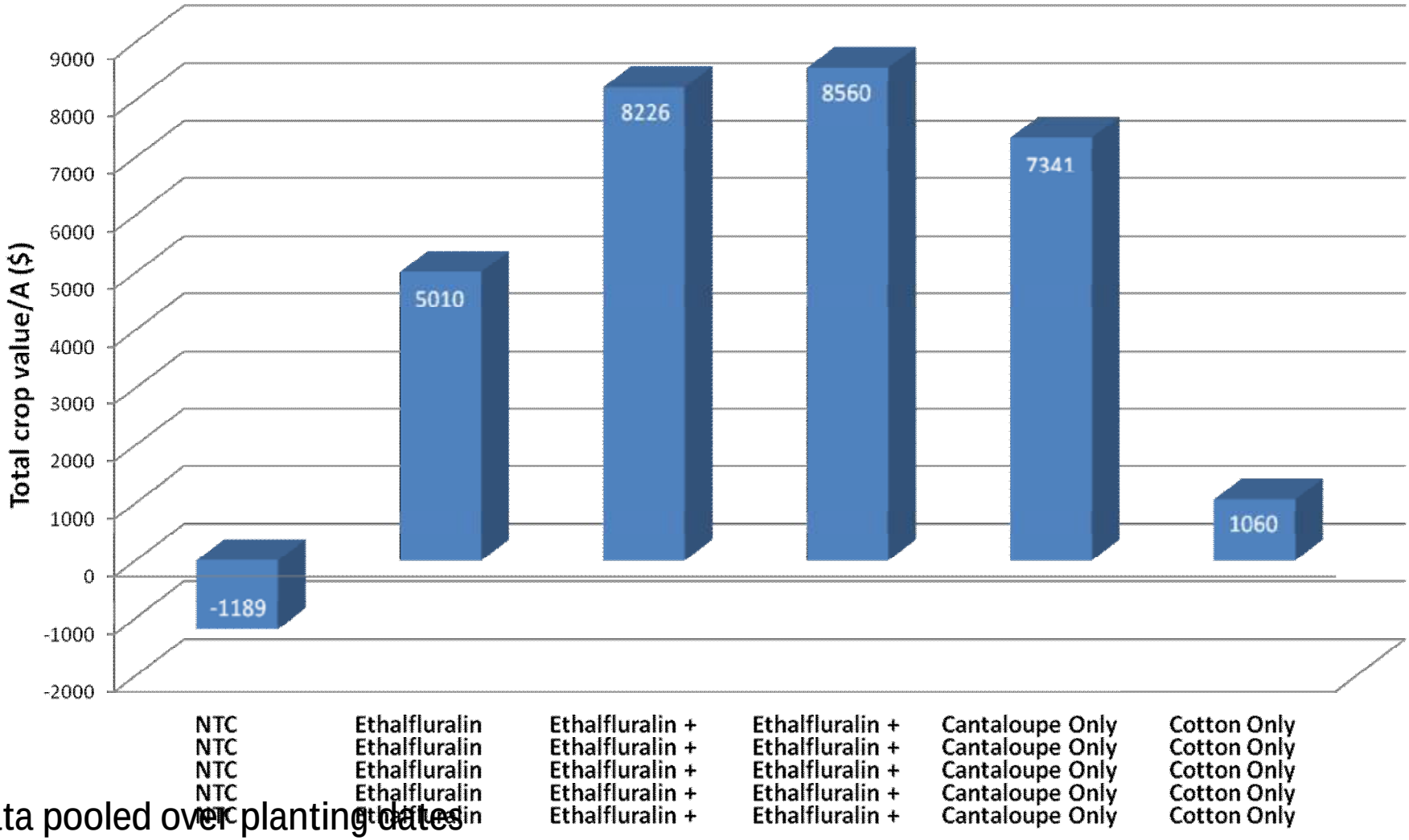
*Data pooled over planting dates

Lint Cotton Yield



LSD(P≤0.05)=119

Cantaloupe-cotton intercropping vs. monoculture



*Data pooled over planting dates

**Calculated using $530 and $2,450 as the cost to produce and harvest cotton and cantaloupe, respectively. Cotton value set at $0.92/lb. and cantaloupe value set at $1.00/fruit.

Watermelon-cotton intercropping

"Melody" (seedless) watermelon transplanted:
•For pollination, "Sangria" transplanted every fourth plant

- Transplant date 1: March 23, 2011
- Transplant date 2: April 7, 2011

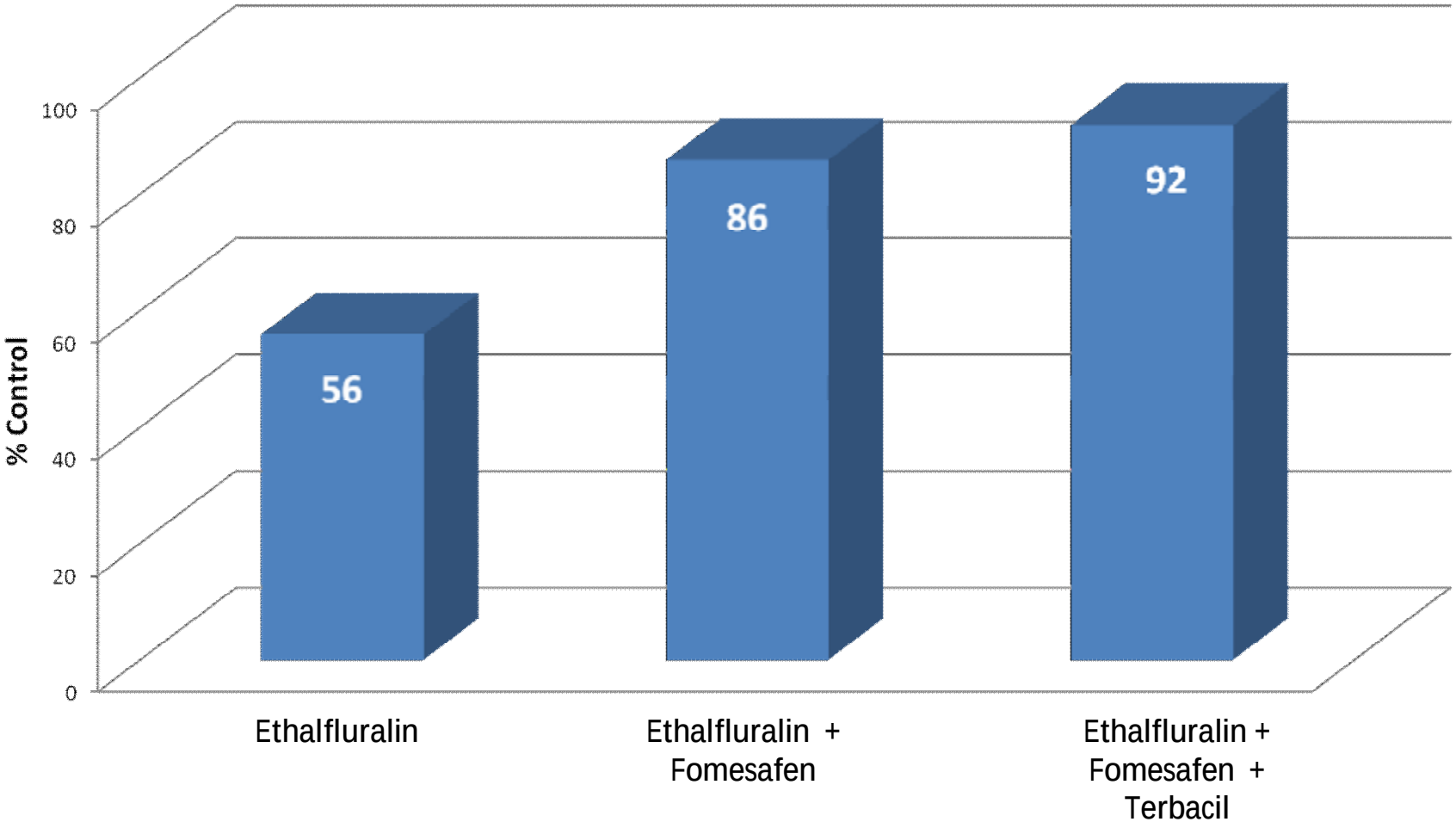
Herbicide treatments in intercropping systems
1.Ethalfluralin (0.75 lbs ai/A) preplant
2.Ethalfluralin + Fomesafen (0.25 lb ai/A) preplant
3.Ethalfluralin + Fomesafen + Terbacil (0.2 lb ai/A) preplant
4.Non-treated control

Herbicide treatments in monoculture systems:

Melon: Ethalfluralin + Fomesafen preplant

Cotton: Sequential applications of Glufosinate + S-metolachlor or Glyphosate + Acetochlor when sensitive weeds were less than three inches tall

Palmer amaranth control prior to watermelon harvest



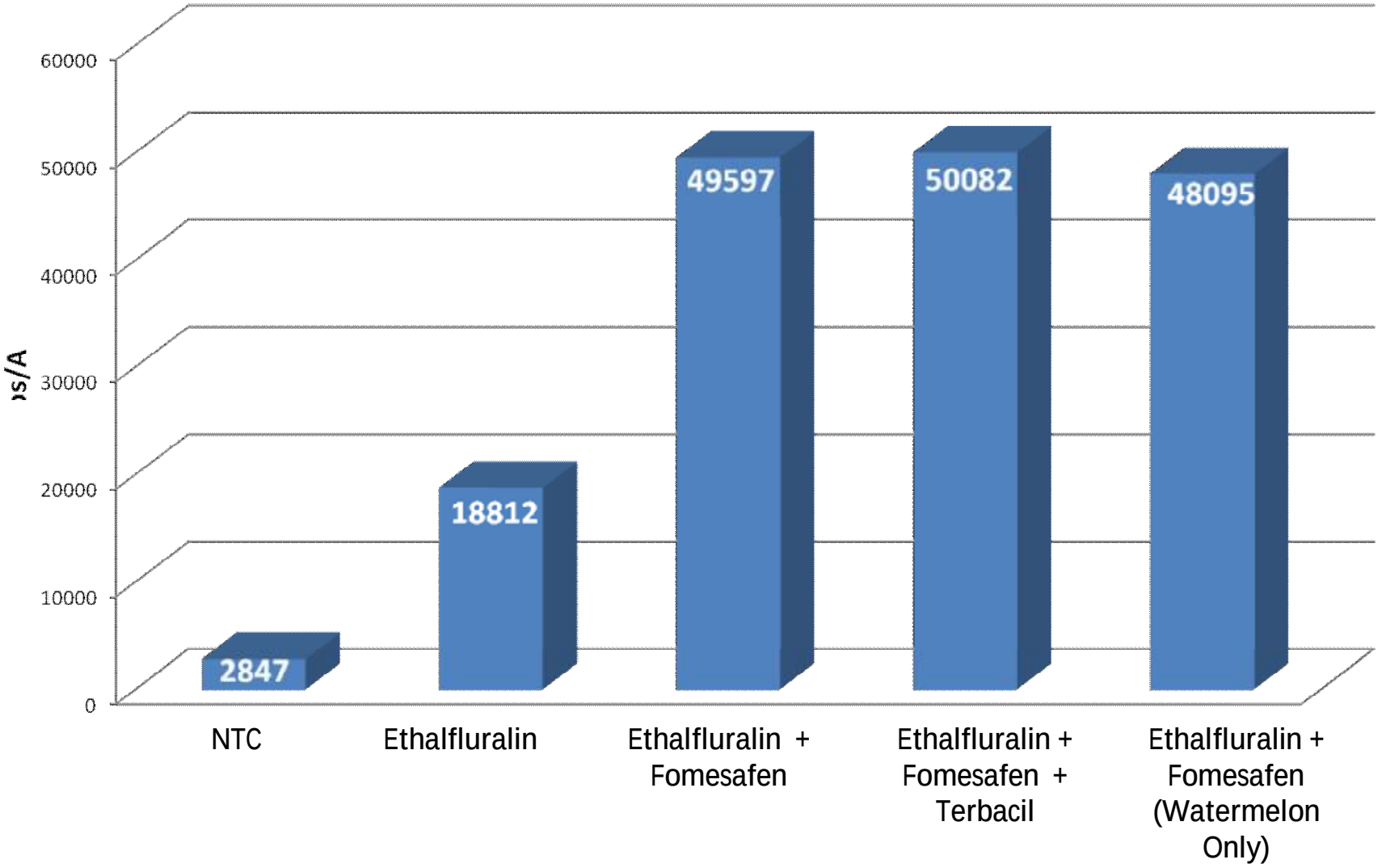
Non-treated control

Ethalfluralin + Fomesafen

*Average of 160 Palmer amaranth in NTC
**Picture taken 8 weeks after transplant

Terbacil Injury

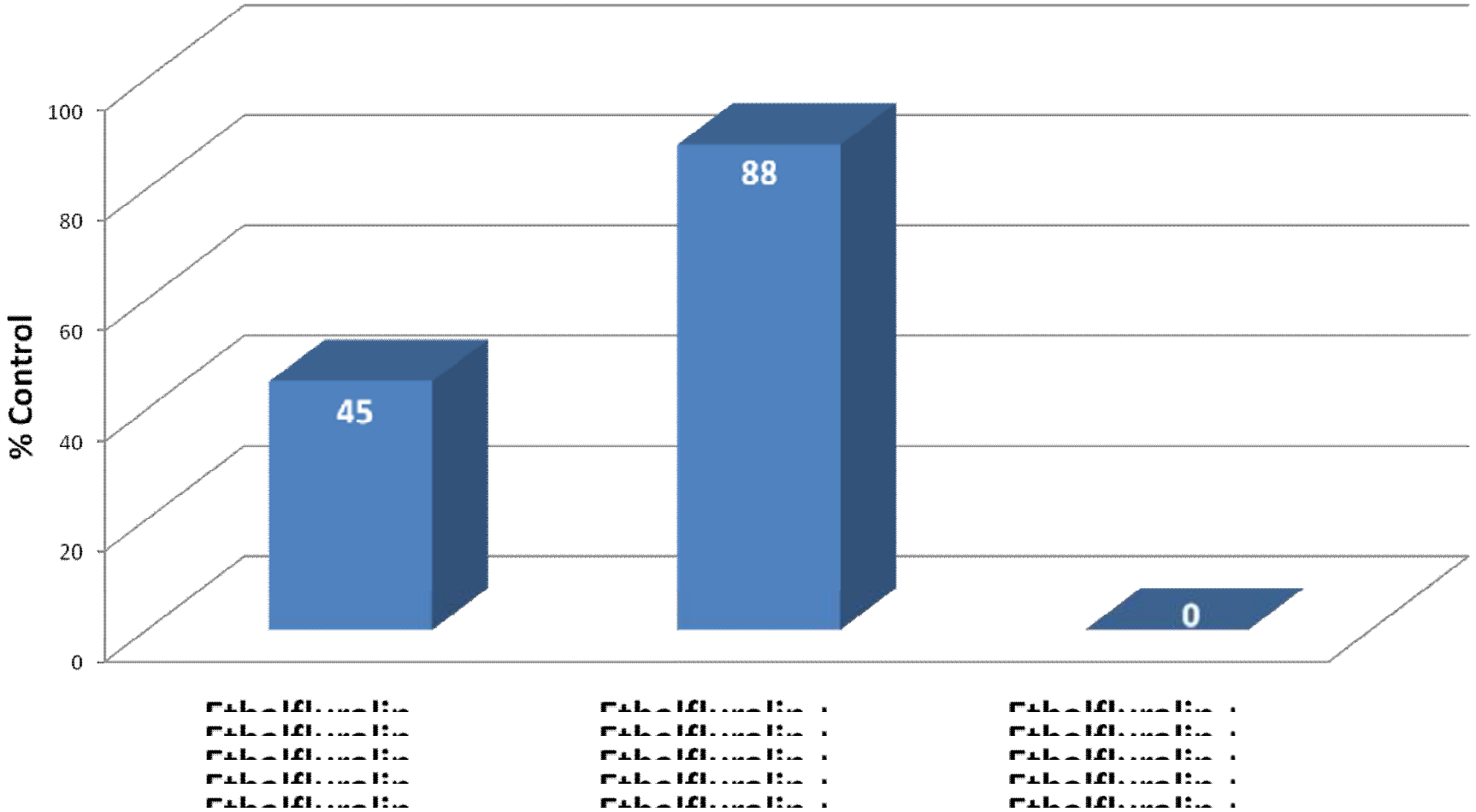
Watermelon Yield



LSD(P≤0.05)= 6696

*Data pooled over planting and harvest dates

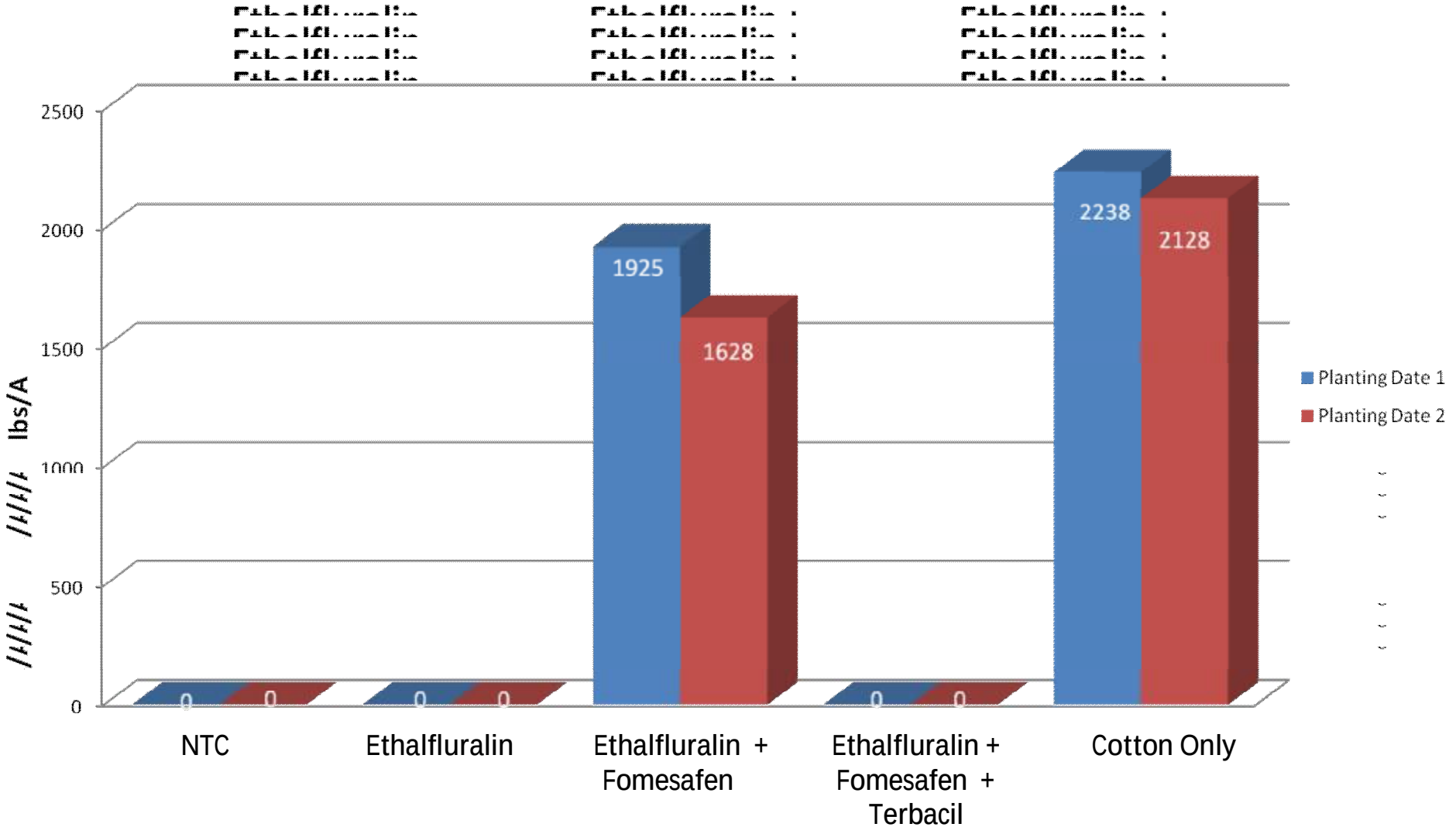
Palmer amaranth control prior to cotton harvest



LSD(P≤0.05)= 7

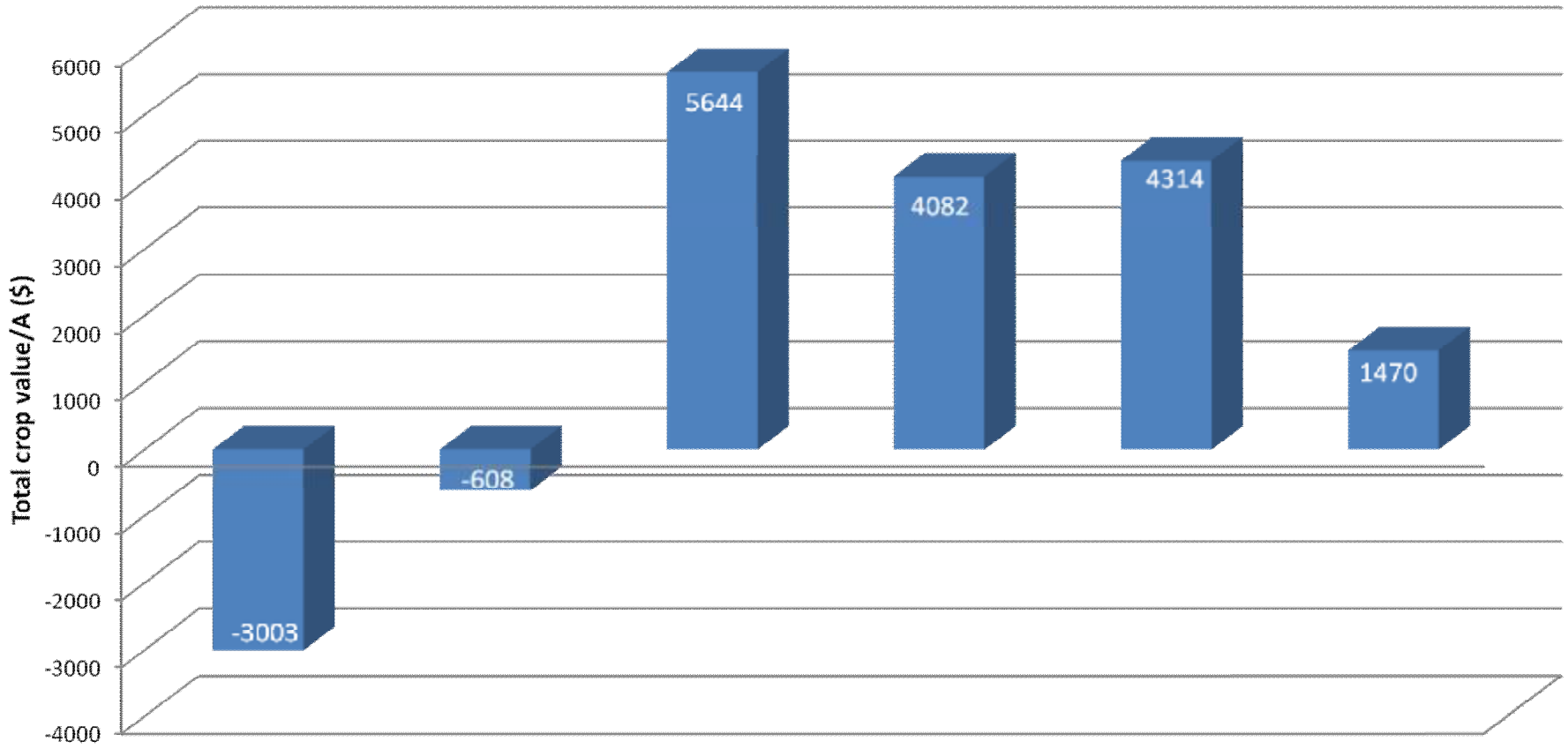
*Data pooled over planting dates

Lint Cotton Yield



LSD(P≤0.05)= 41

Watermelon-cotton intercropping vs. monoculture



*Data pooled over planting dates

**Calculated using $530 and $2900 as the cost to produce and harvest cotton and watermelon, respectively. Cotton value set at $0.92/lb. and watermelon value set at $0.15/lb.

Conclusions

- Melon-cotton intercropping improved total crop value per acre as compared to a monoculture of melons or cotton
- Herbicide options exist for adequate control of troublesome weeds in melon-cotton intercropping systems
  - Fomesafen is not registered for use in watermelon or cantaloupe
  - Halosulfuron and ethalfluralin are not registered for use in cotton

Future Research

- Registration of fomesafen for use in watermelon and cantaloupe
- Registration of preplant applications of halosulfuron and ethalfluralin for cotton
- Complete a comprehensive economic budget comparison of these systems


Questions or Comments?

Introduction

- Background on spring melon production
  - Transplant late March to late April
  - Harvest mid to late June
  - Melons followed by plant grain sorghum

Sensitivity Analysis of Grain Sorghum, Irrigated

Net Returns Above Variable Costs Per Acre

Varying Prices and Yields (Bushel)

	-25%	-10%	Expected	+10%	+25%
Price \ Bushel/Acre	75	90	100	110	125
$2.50	**-$106.04**	**-$68.54**	**-$43.54**	**-$18.54**	**$18.96**
$3.00	**-$68.54**	**-$23.54**	**$6.46**	**$36.46**	**$81.46**
$3.50	**-$31.04**	**$21.46**	**$56.46**	**$91.46**	**$143.96**
$4.00	**$6.46**	**$66.46**	**$106.46**	**$146.46**	**$206.46**
$4.50	**$43.96**	**$111.46**	**$156.46**	**$201.46**	**$268.96**

Smith and Smith, 2011