

# Validation of COTMAN Decision Guides for Late Season Insect Control of Tarnished Plant Bug

Tina Gray Teague



# COTMAN



Bourland



Cochran



Oosterhuis



Tugwell

Team Approach to Cotton Research

When to Quit?





**Spokesman for cotton insect management and the cotton industry. Chair of Beltwide Cotton Insect Research and Control Conference for many years.**

**Visionary organizer of “community insect management” programs and area-wide management of tobacco budworm and bollworm in Arkansas cotton.**

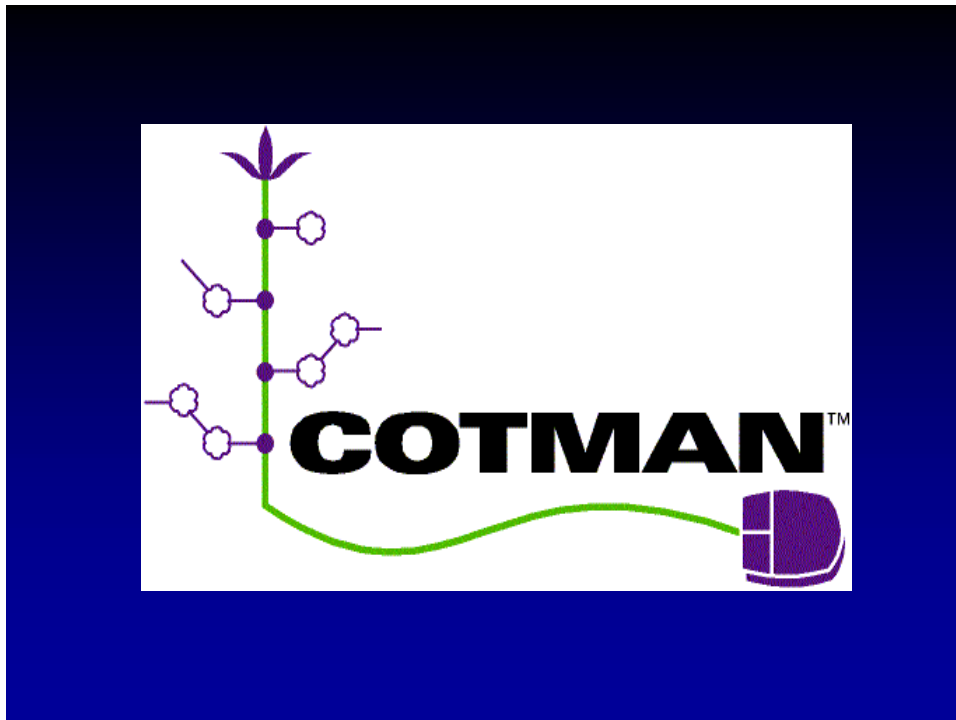
**Devoted student of Isely and Lincoln, student advocate, and friend of Arkansas cotton farmers.**

*Professor Jacob R. “Jake” Phillips, University of Arkansas, 1960s – 1990s.*

# Benefits of Insecticide Termination

- Eliminate unnecessary insecticide sprays
  - Reduce input costs and save producers money
  - Reduce “insults” of agriculture on the environment

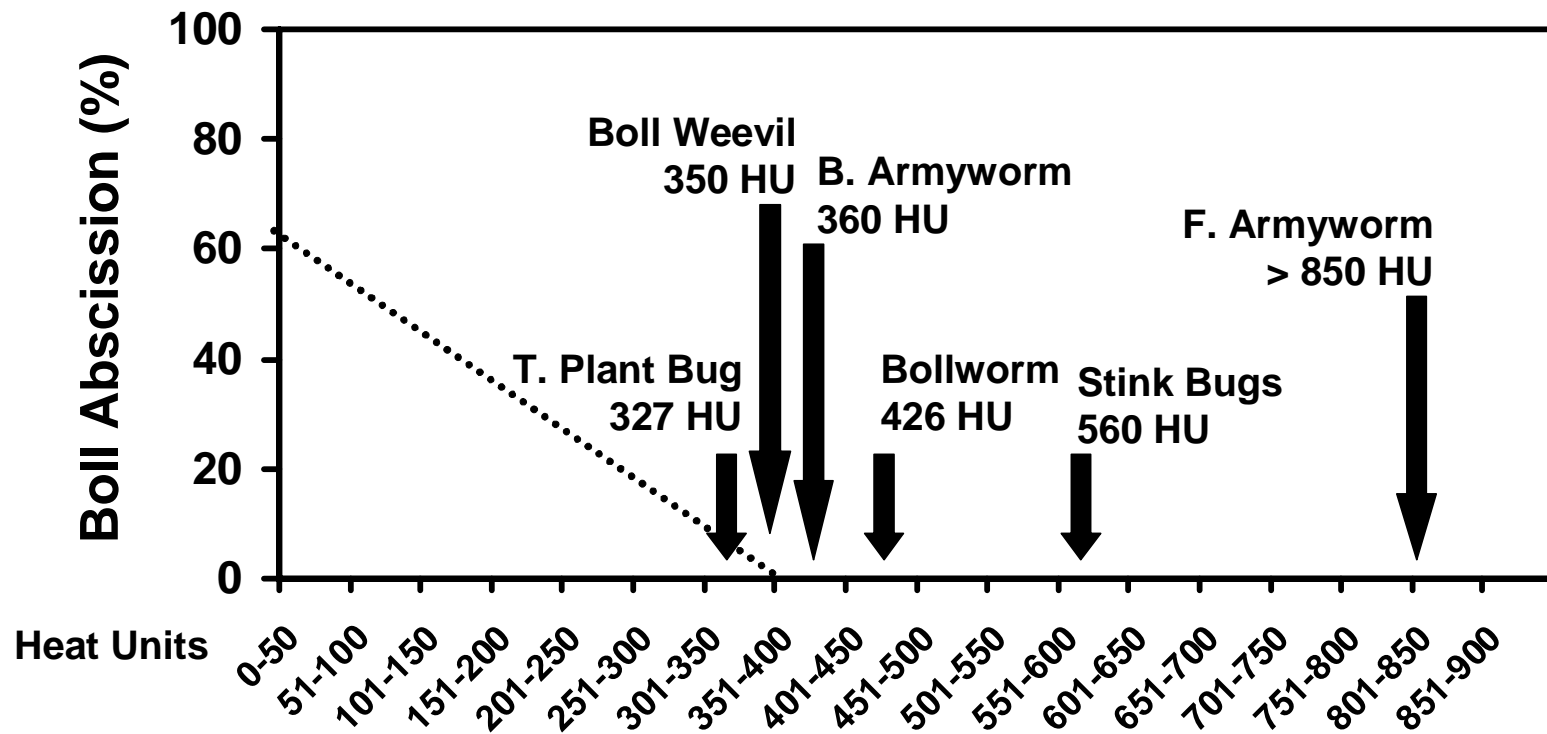
# Insecticide Termination Tarnished Plant Bug



# Insecticide Termination for TPB

- Mississippi State cage trials
  - Little to no boll damage after 250 DD60s in no-choice cage studies (Horn et al. 1999)
- LSU cage trials
  - TPB did not sufficiently penetrate boll wall to result in abscission if the boll had accumulated  $> 300$  DD60s (Russell et al. (1999))

# No choice cage tests

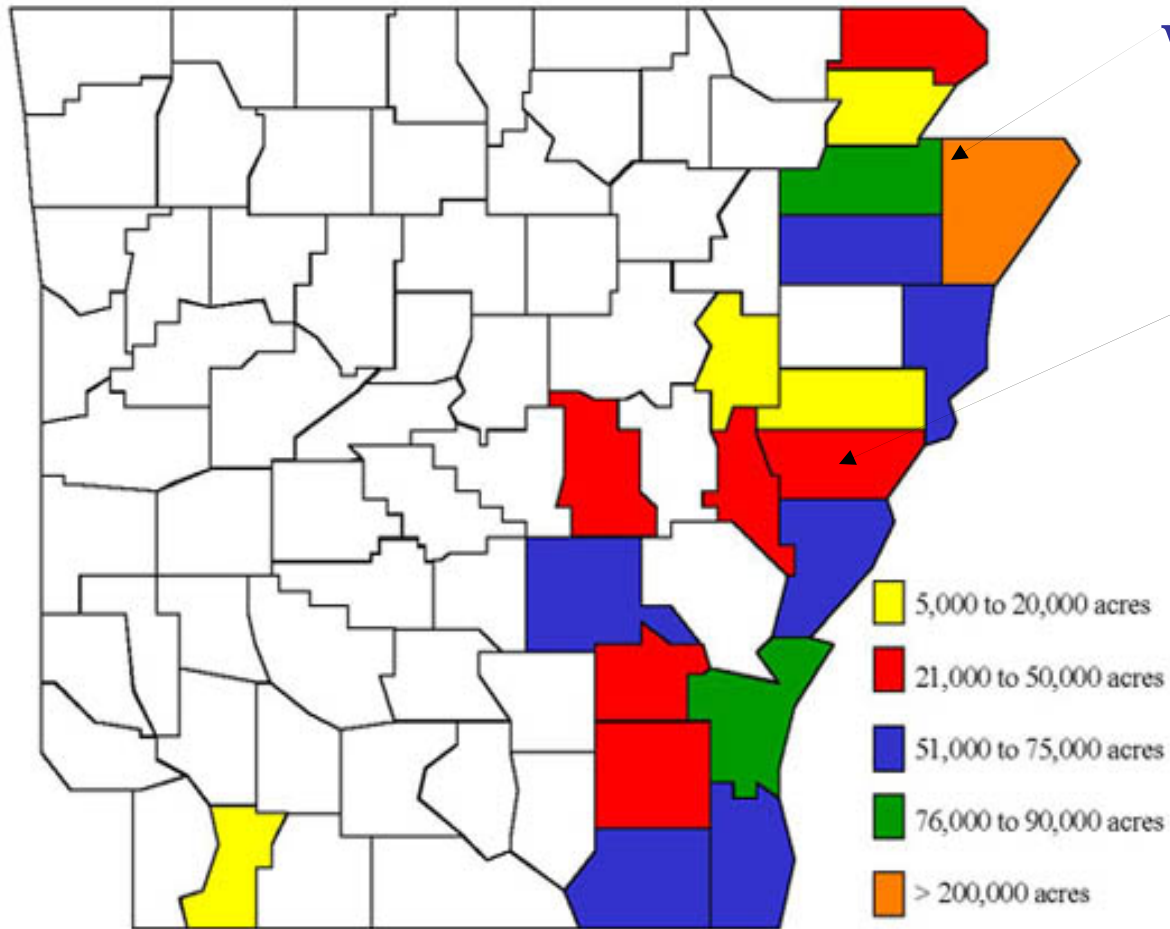


From B.R.Leonard 2006



**Leachville  
Wildy Farms  
(31 July)**

**Marianna  
UA CBS  
(9 August)**



# Northeast Arkansas TPB

## Experimental

Procedure: Release bugs at different stages after crop cutout and determine when crop is “safe” from TPB effects

Location: Wildy Farms, near Manila 2001, 2002



# TPB Nymphs Release Methods





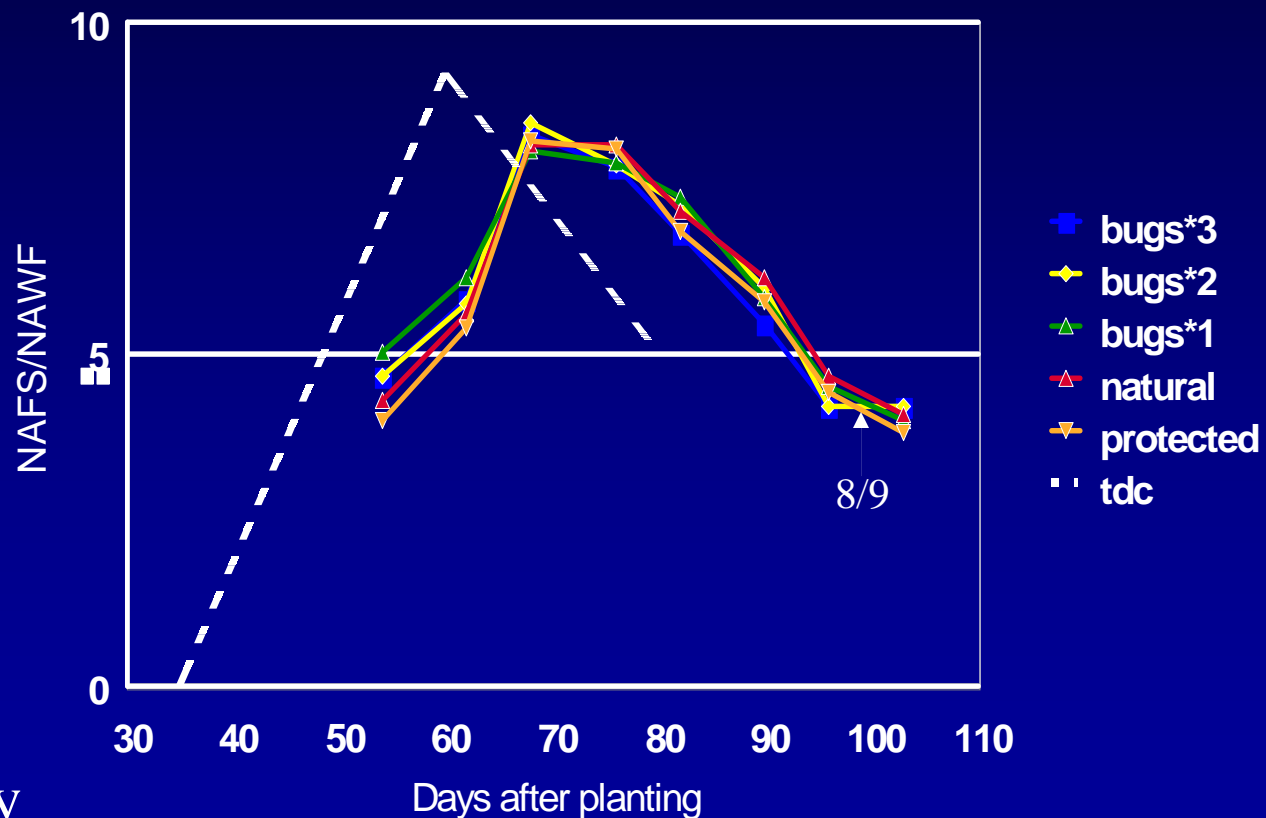
# 2001 Crop Susceptibility to Late Season Tarnished Plant Bug

<b>Treatment</b>	<b>Date of Application</b>	<b>DD60s after Physiological Cutout</b>
Bugs 1,2,3	10,17& 24 Aug	156
Bugs 2,3	17&24 Aug	296
Bugs 3	24 Aug	375
Natural		
Protected	10,16,22&28 Aug	488

Plots separated by 85 ft buffer; 4 reps, RCB  
2 rows 15 ft; Stv 4892

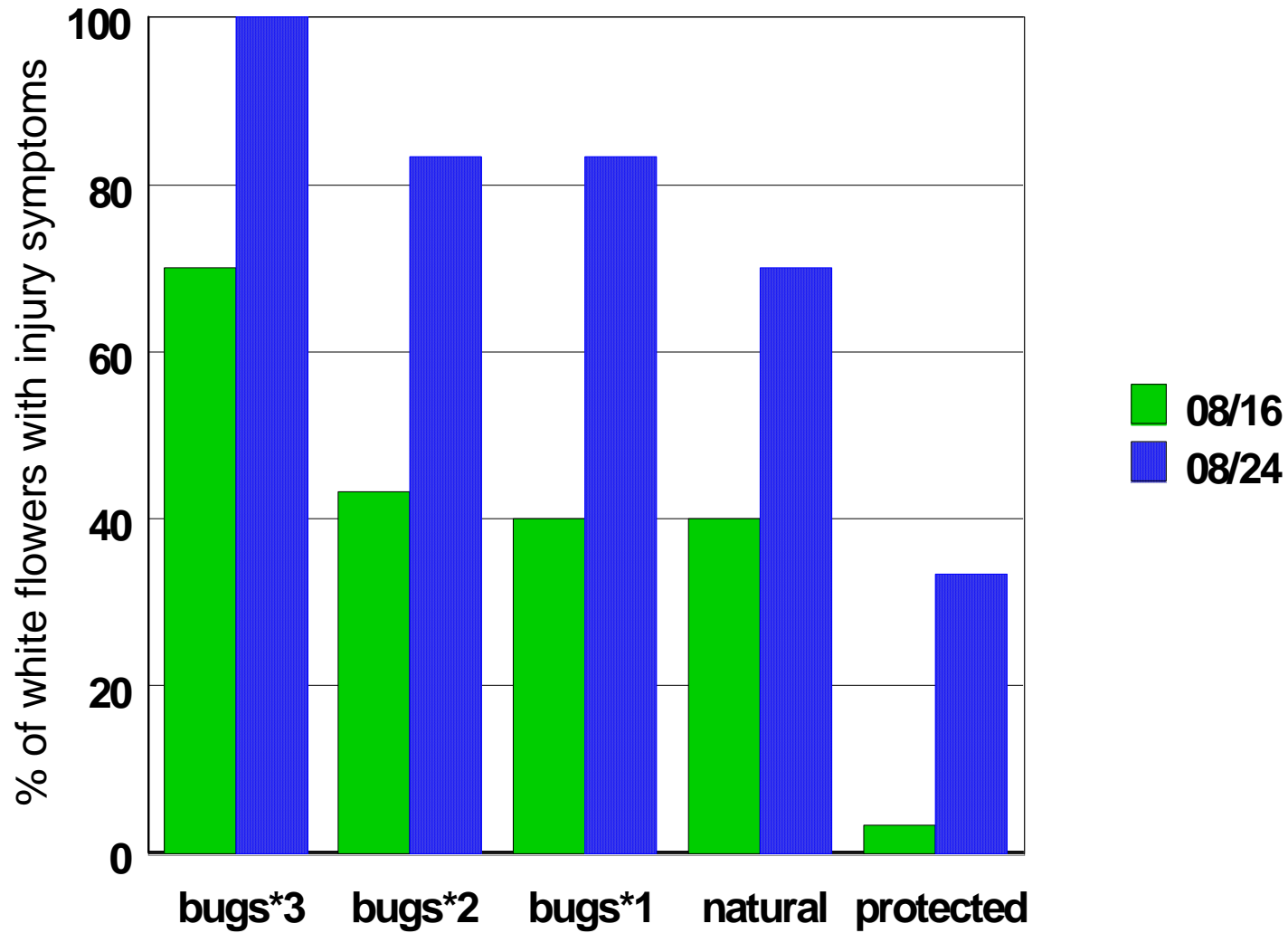
Bugs provided by USDA-ARS, Dr. Eric Villavaso

# 2001 TPB Termination – Crop Growth Curves

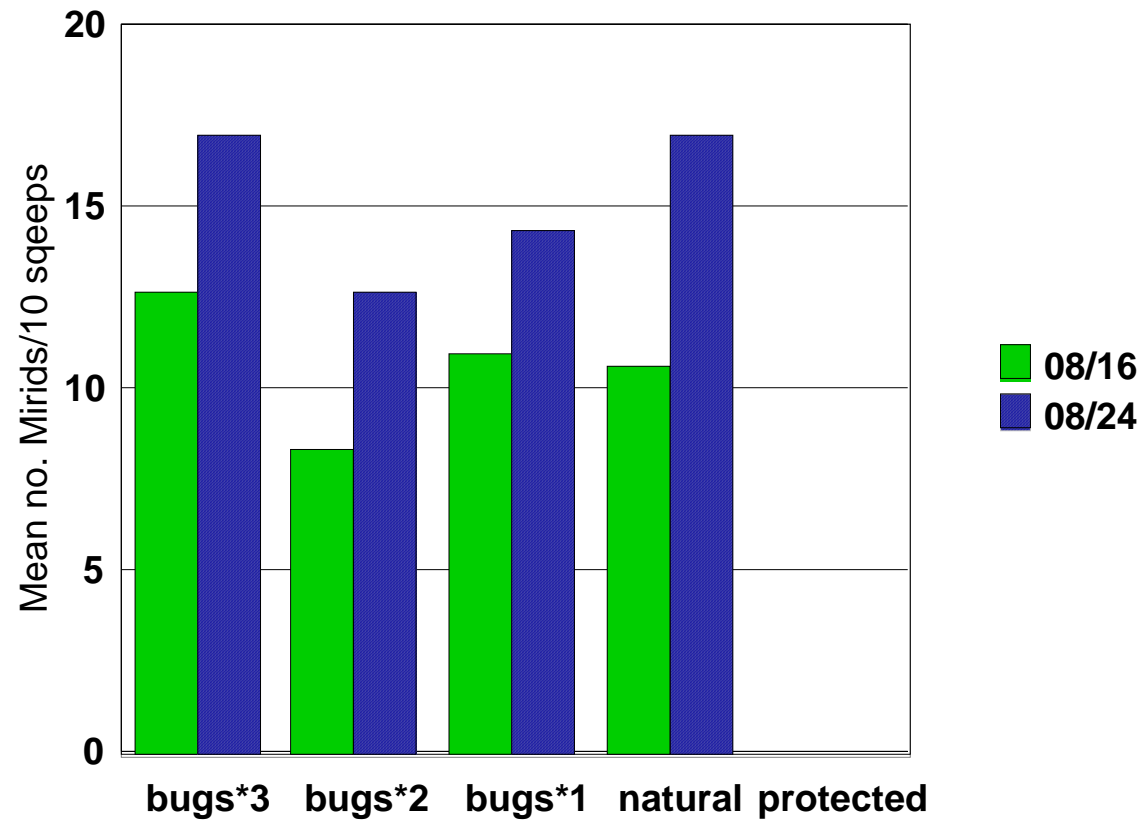


DOP 6 May  
Stv 4892

# 10 white flowers – anther injury



# Sweep Net Samples



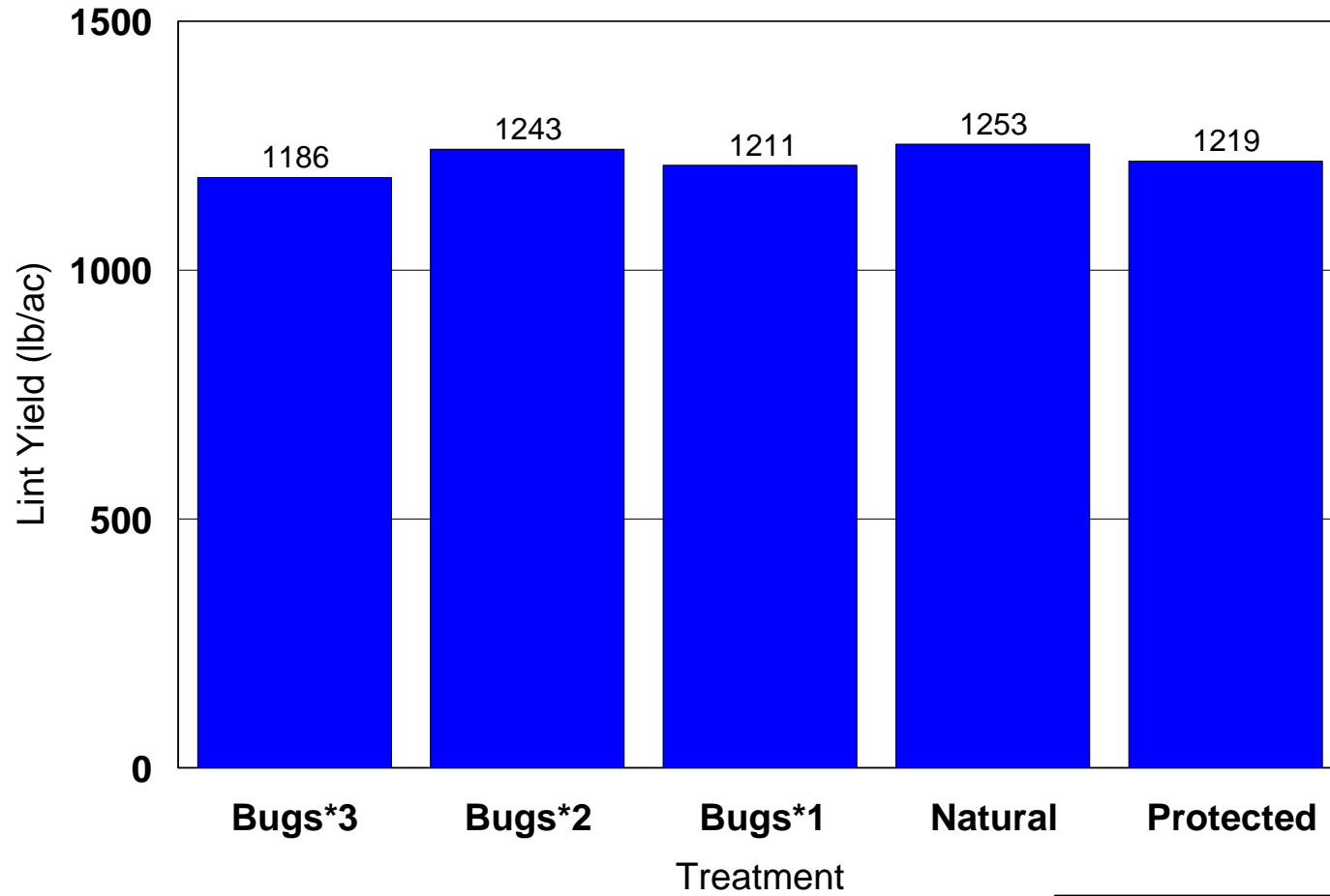


yuck





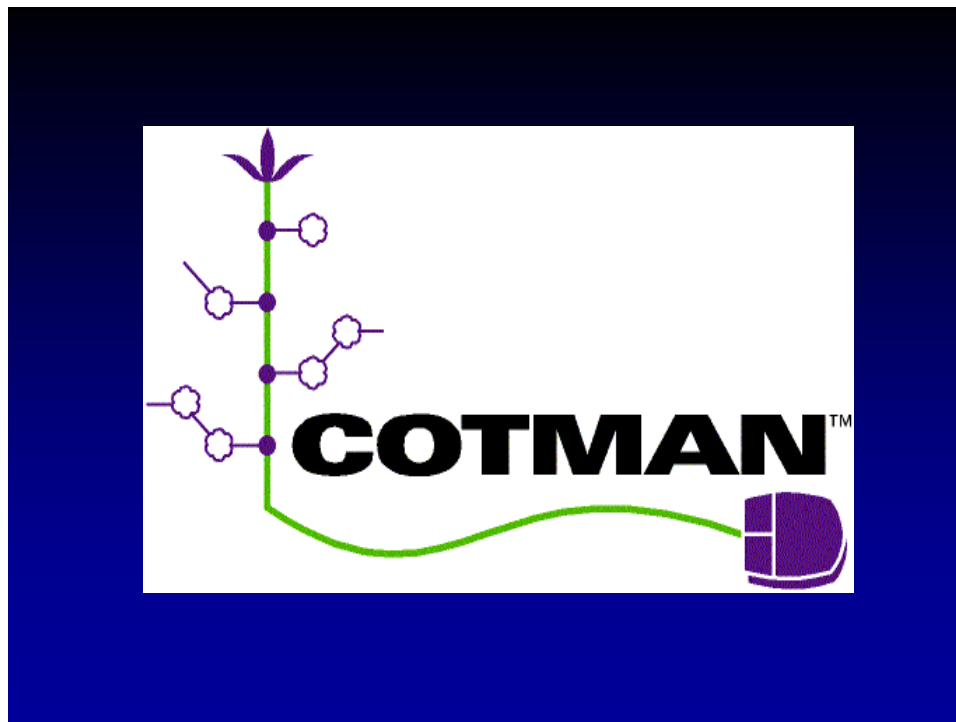
# 2001 TPB Termination Yields



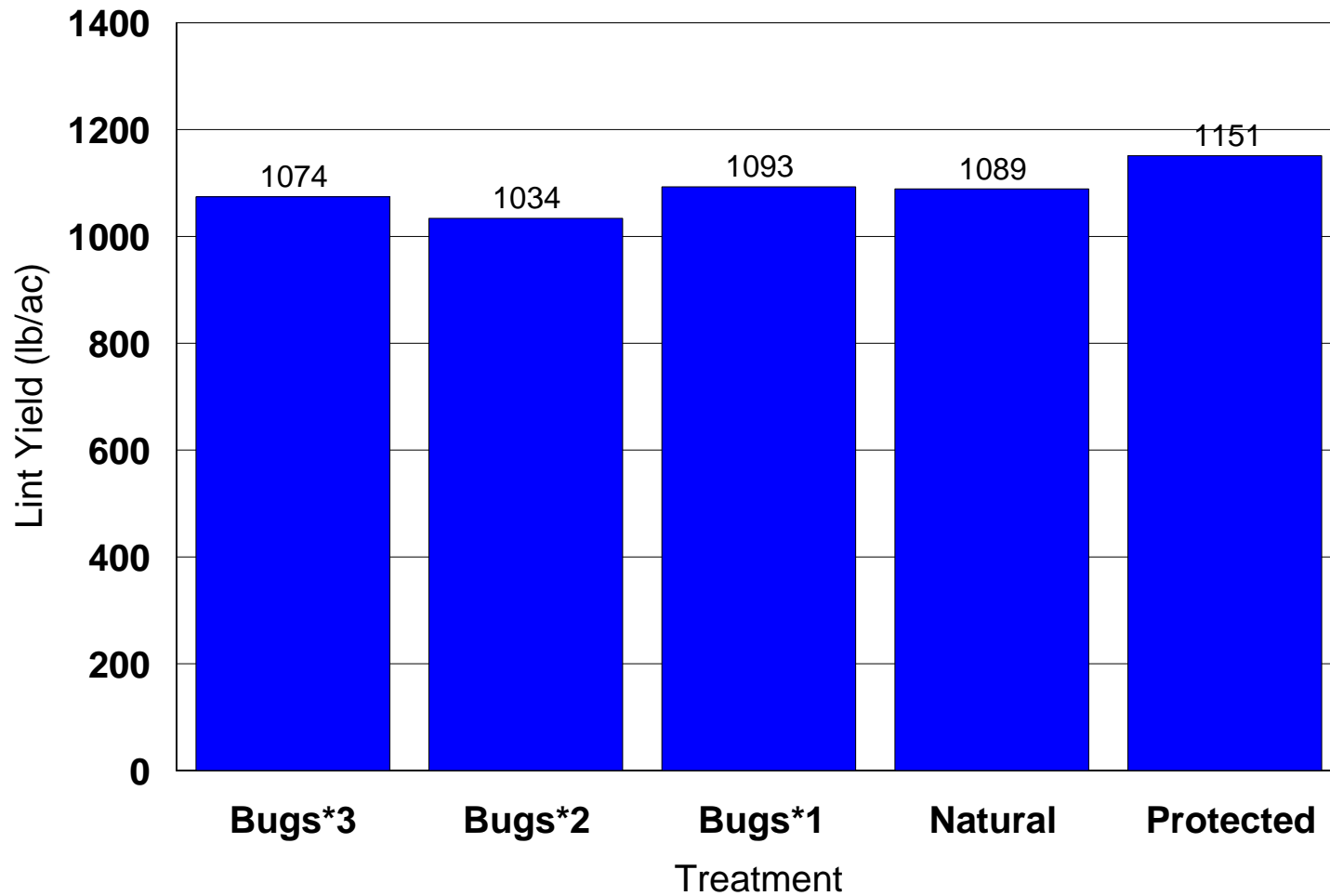
Treatment	Date of Application	DD60s from NAWF=5
Bugs 1,2,3	10,17 & 24 Aug	156
Bugs 2,3	17&24 Aug	296
Bugs 3	24 Aug	375
Natural		
Protected	10,16,22&28 Aug	

Teague et al 2001 Beltwide

# 2002 Experiment same treatments but weevils, too



# 2002 TPB Termination Yields



2003 – skip for BWE

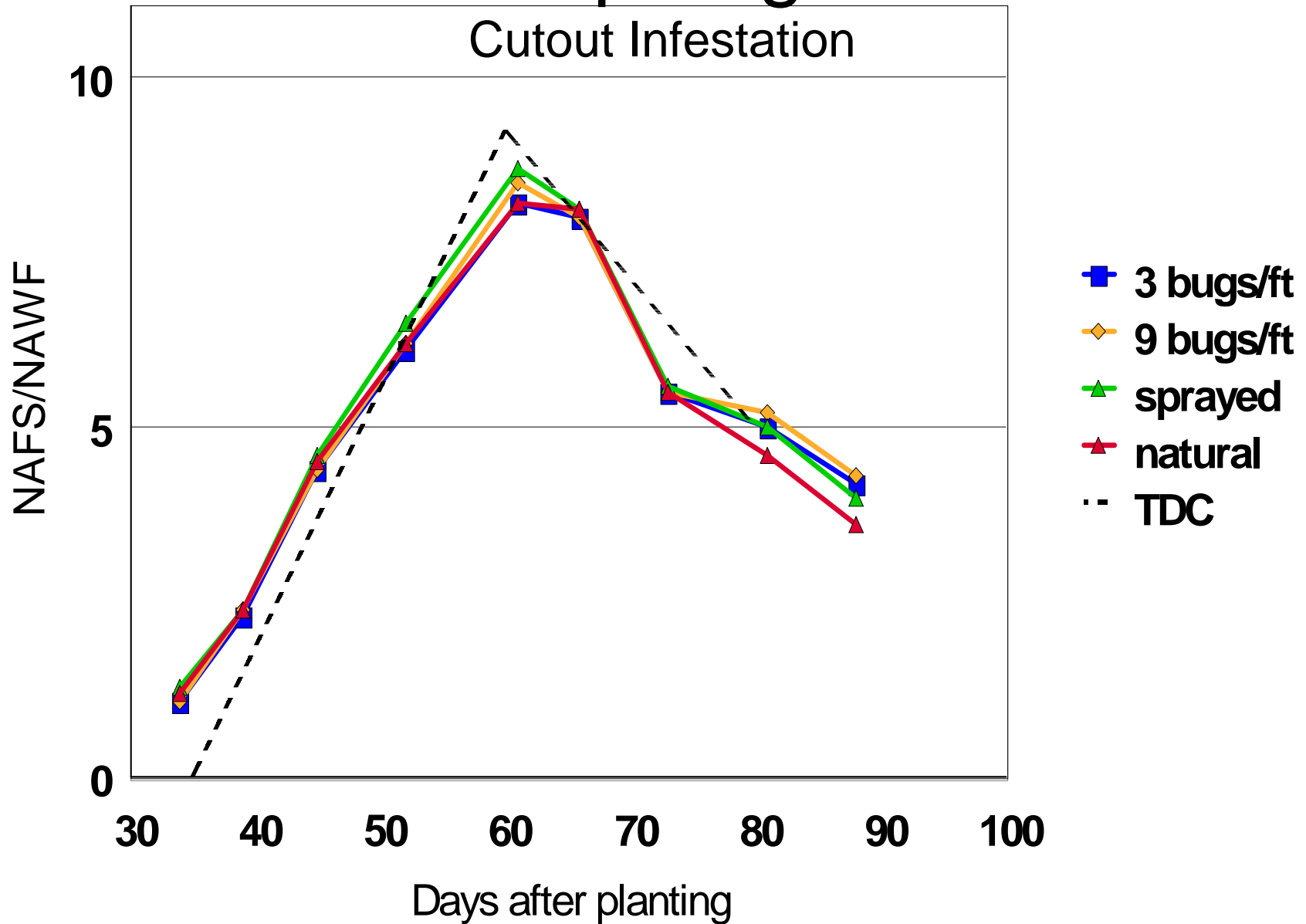
2004 – Start at cutout

1. Sprayed 3 times (til +300 HU)
2. Untreated
3. 3 bugs/ft
4. 9 bugs/ft

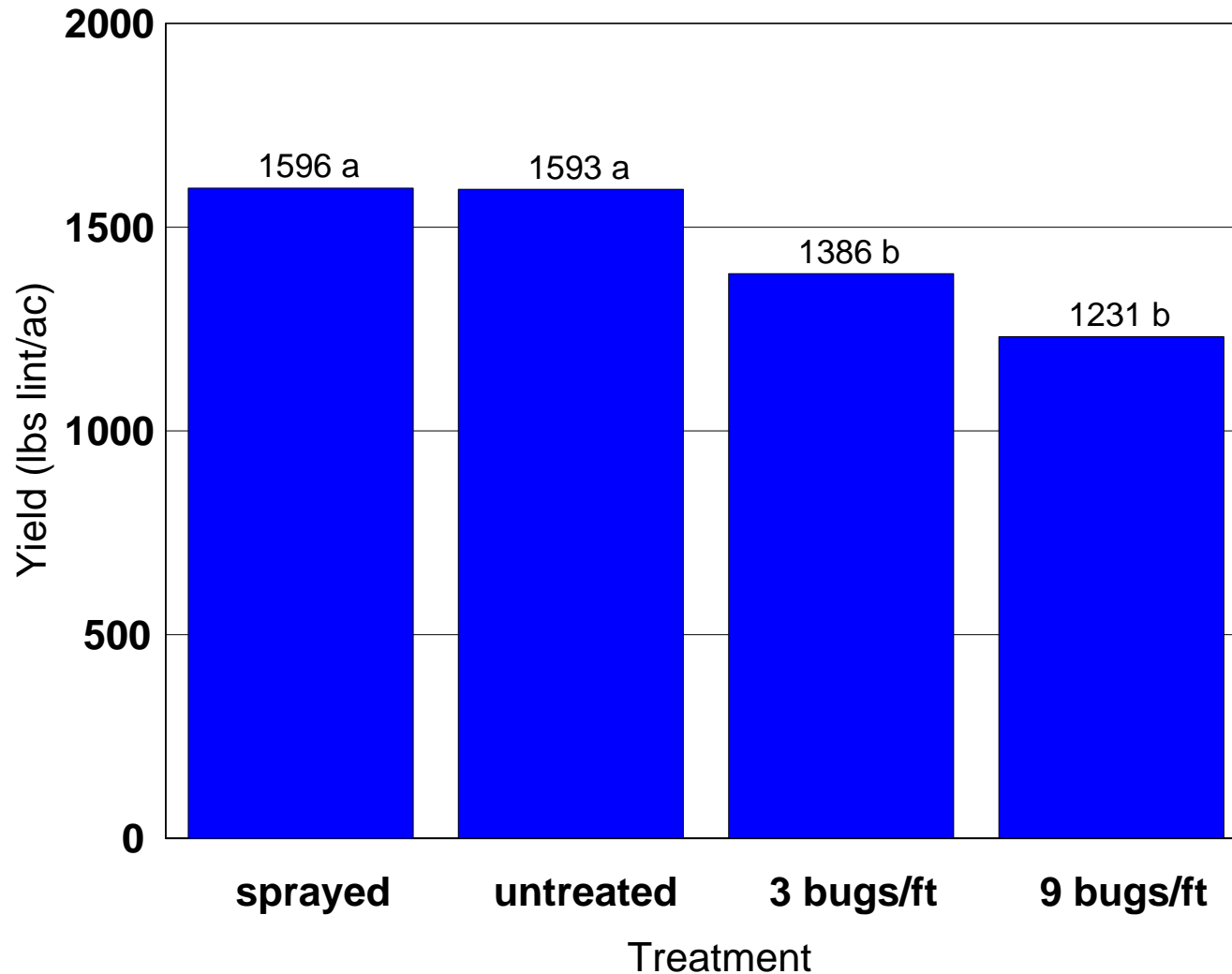
Teague et al 2005



# TDC - Drip Irrigated 04

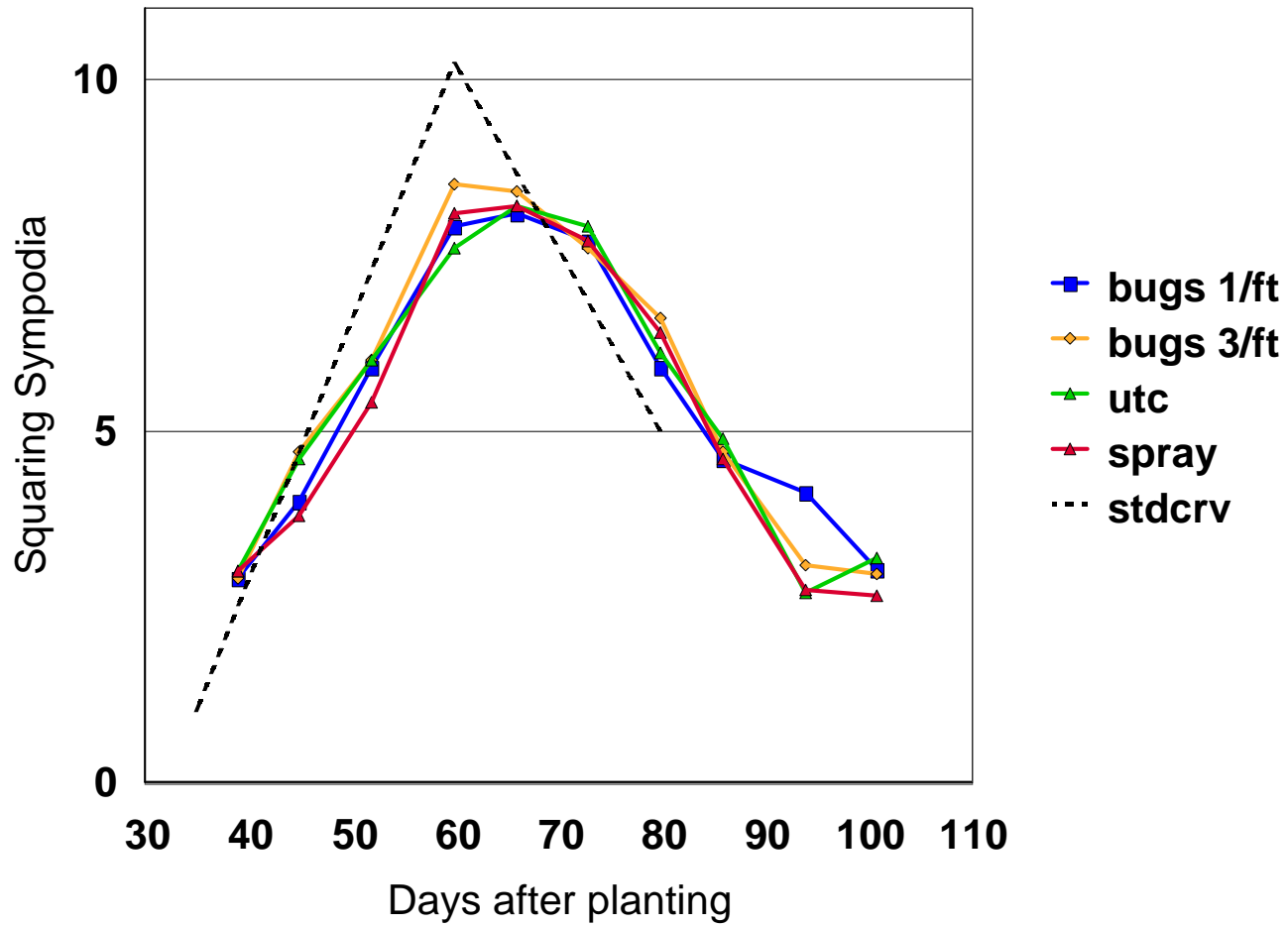


# TPB at Cutout 2004



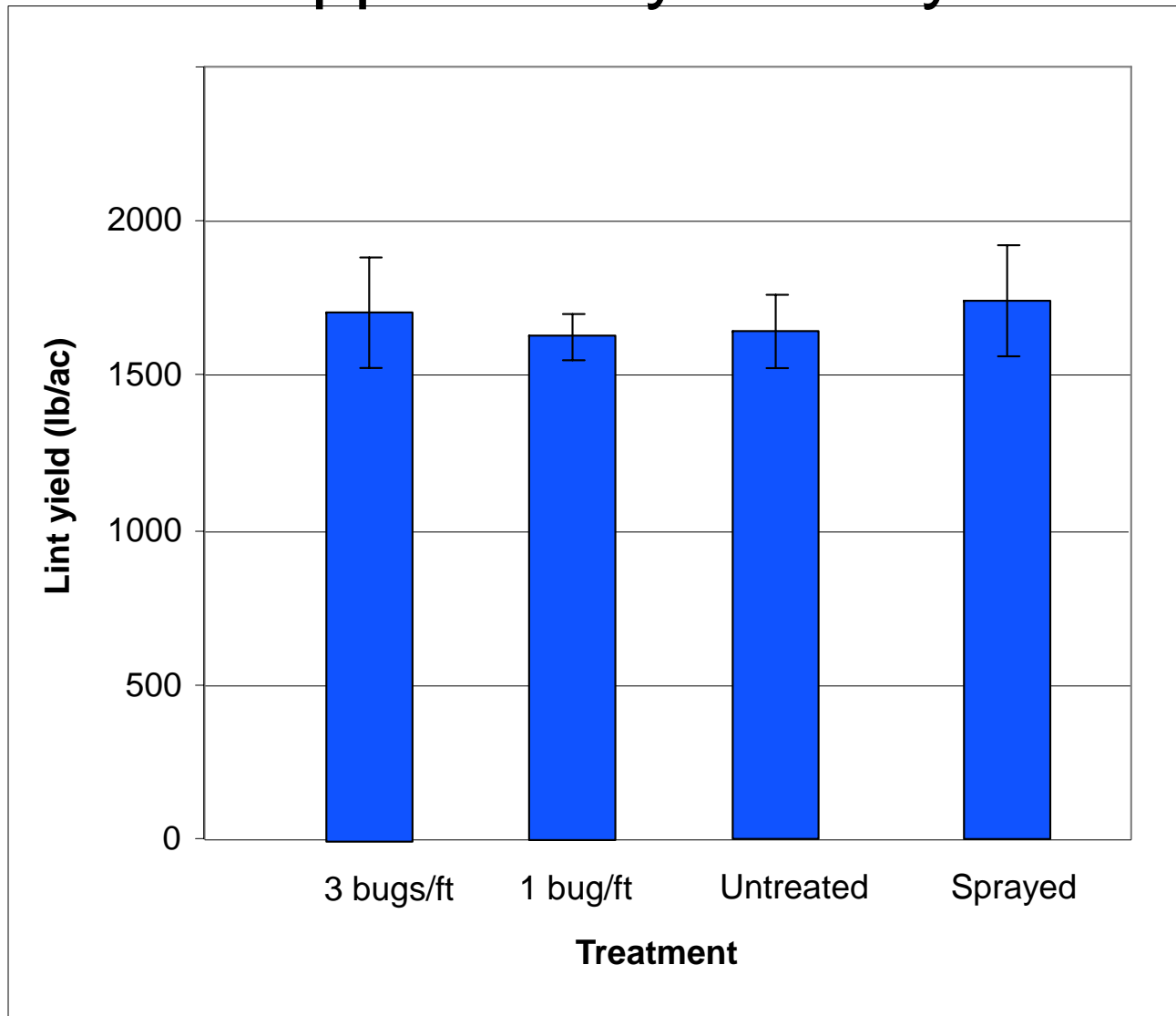
**Leachville 2004 Wildy Farms**  
**8 reps – drip irrigated**

# 2005 – WF



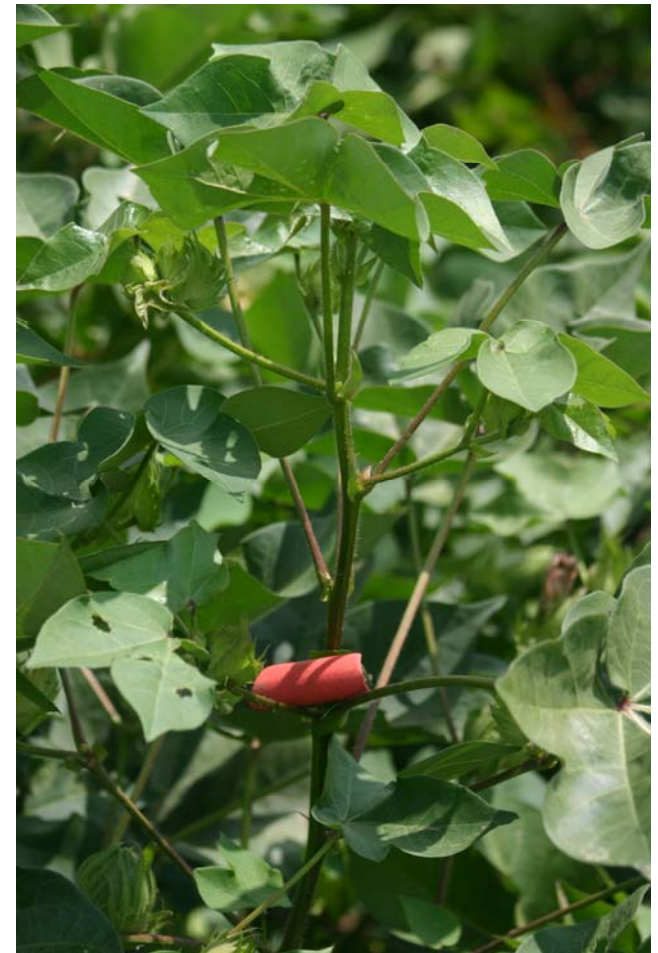
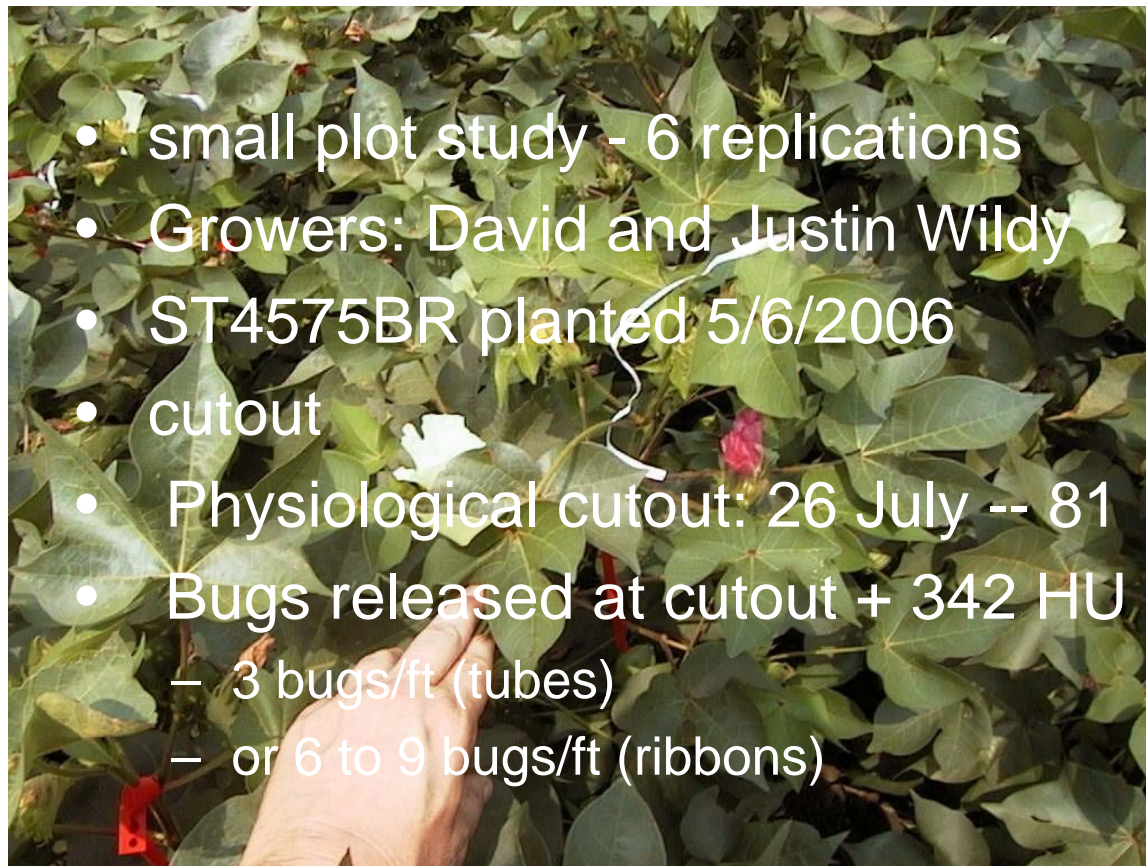
infested 89 DAP

# 2005 TPB Control Termination Mississippi County – Wildy Farms

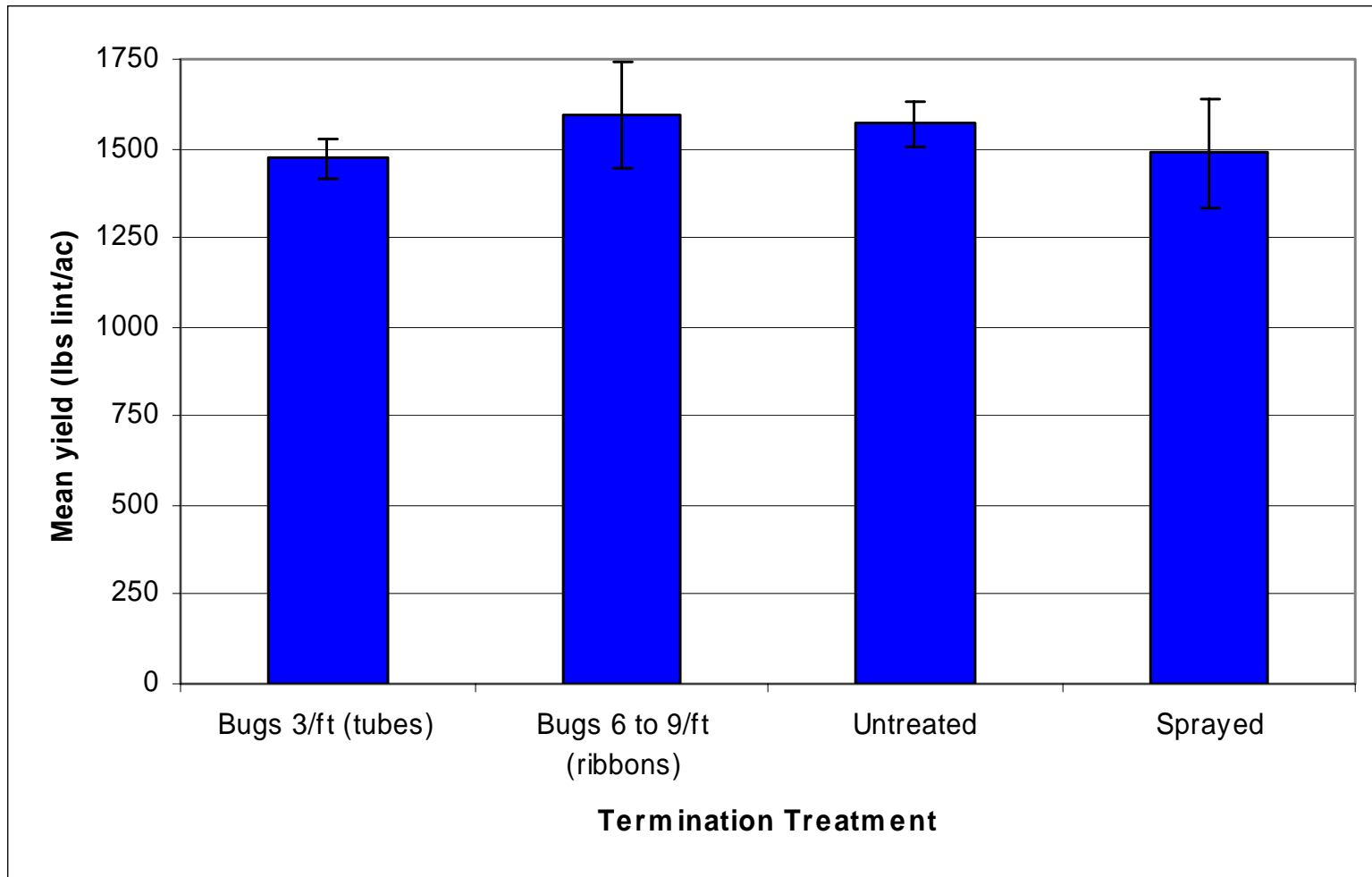




# 2006 TPB Control Termination Mississippi County – Wildy Farms



# 2006 Termination Wildy Farms– Lint Yield



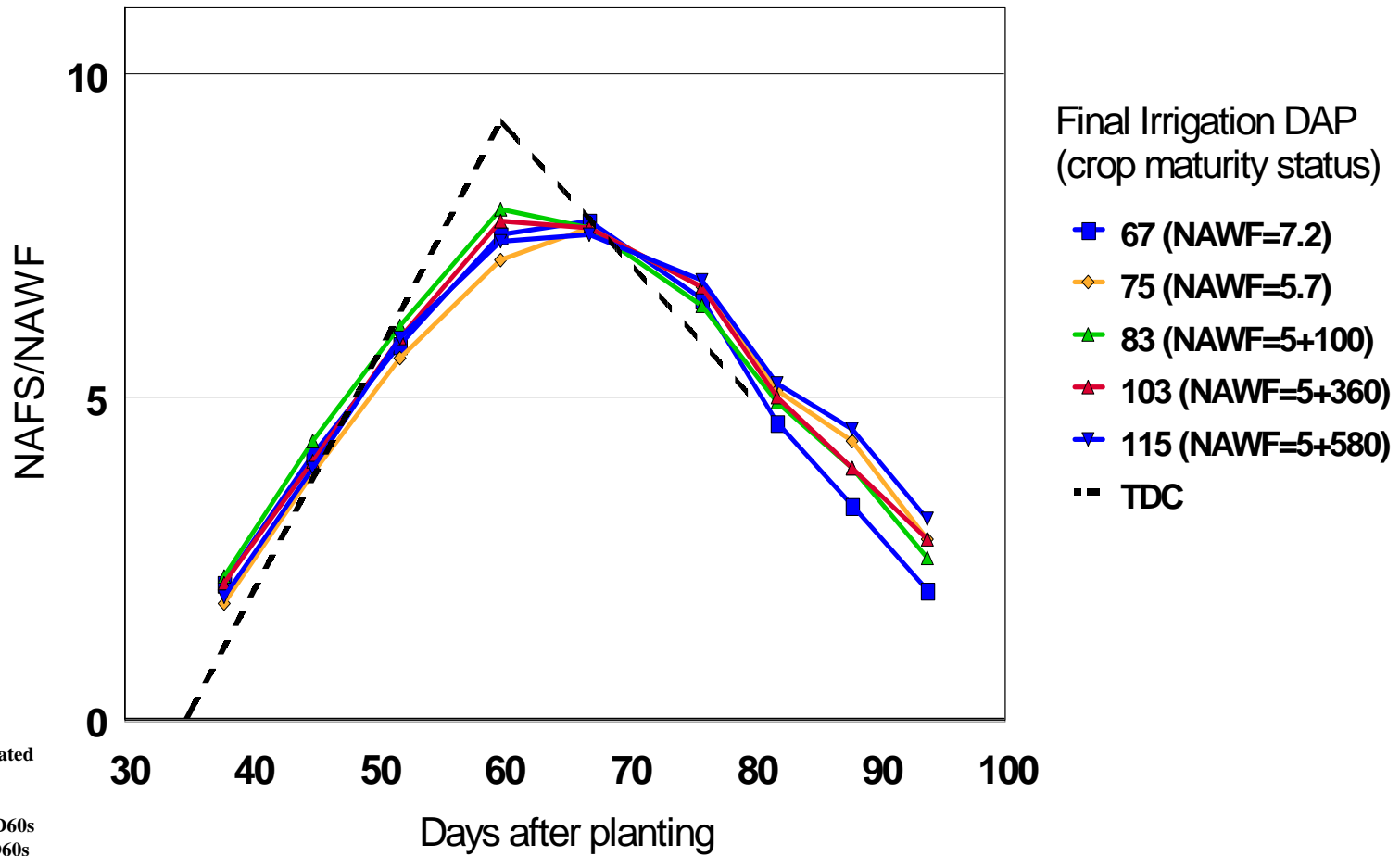
# 2004 Termination -- Arkansas

Irrigation \* Insecticide Interaction – Year 1 of a 3 year Study at the Lon Mann Research Center (Cotton Branch Station) in Marianna.

# 2004 5\*4 Factorial – Irrigation\*Bugs

Treatment <sup>1</sup>	Date of Final Appl.	DAP	Crop maturity status at final application
Irrigation	14-Jul	67	NAWF = 7.2
	22-Jul	75	NAWF = 5.6
	30-Jul	83	NAWF = 5 + 100 DD60s
	18-Aug	103	NAWF = 5 + 360 DD60s
	31-Aug	115	NAWF = 5 + 580 DD60s
Insecticide	16-Jul	69	NAWF = 7.2
	21-Jul	74	NAWF = 5.6
	8-Aug	92	NAWF = 5 + 240 DD60s
	24-Aug	108	NAWF = 450 DD60s

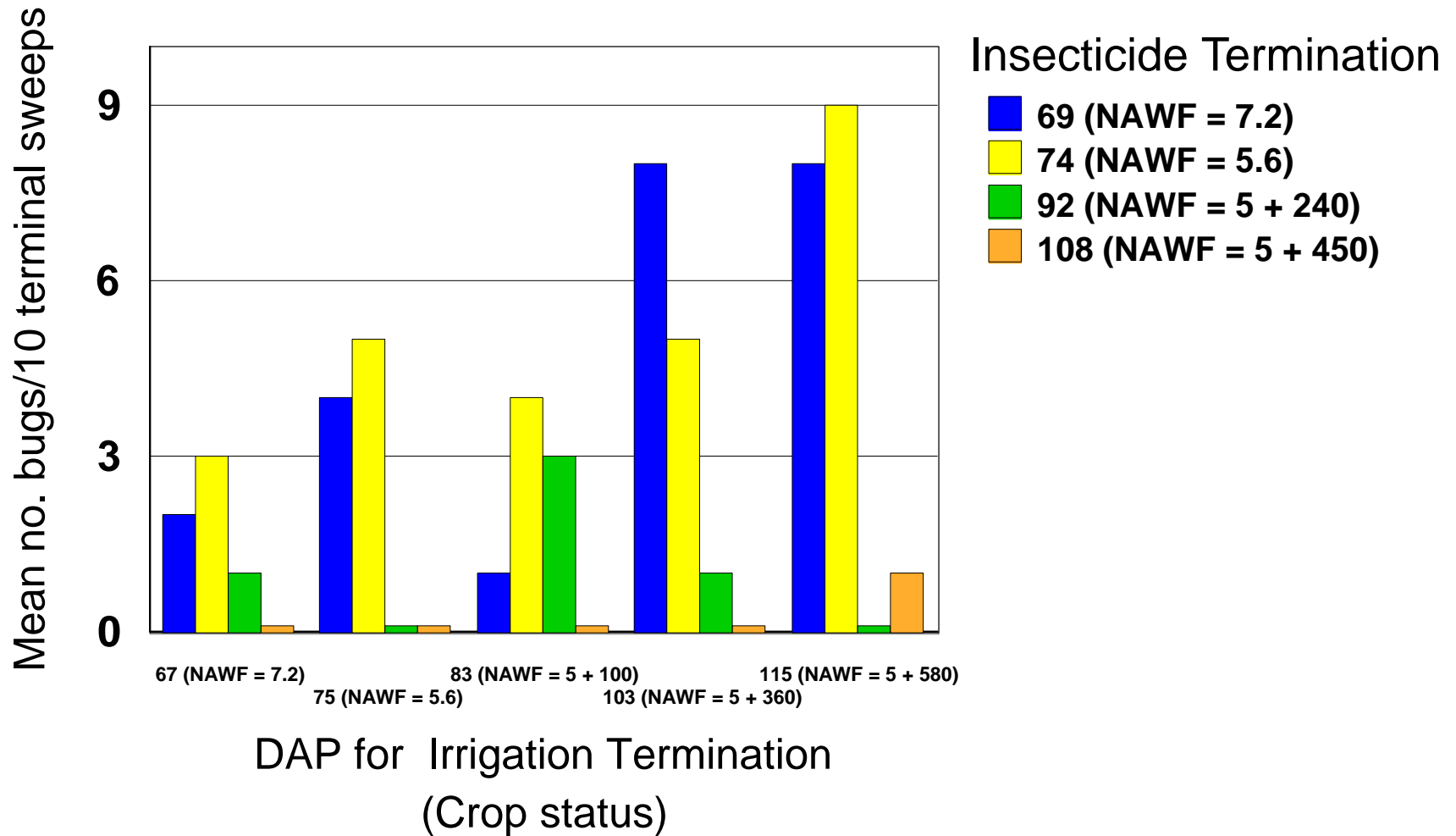
# Growth Curves – Irrigation\*Bug Termination 2004



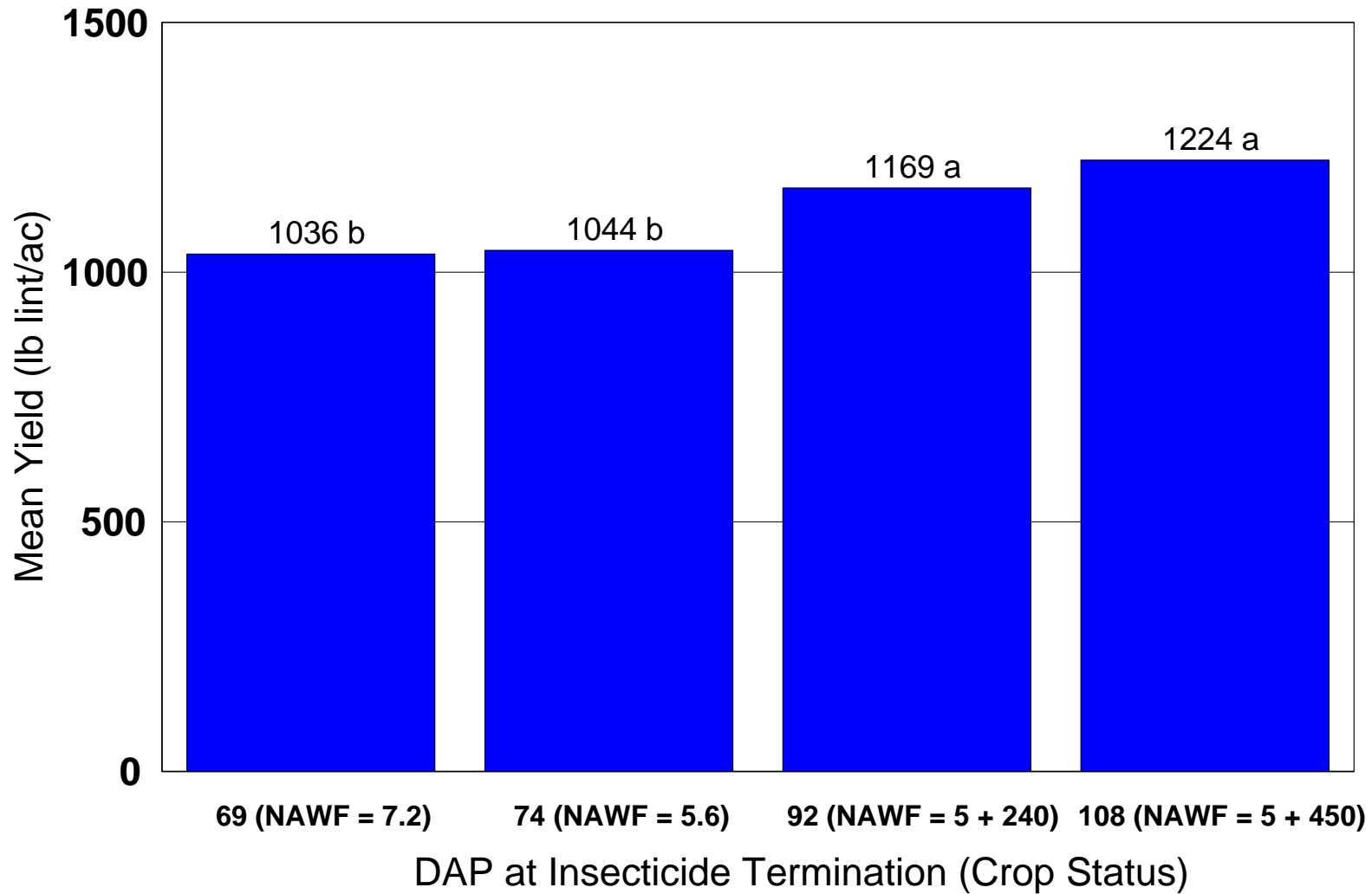
2004

# Bug counts on 17 Aug (101 DAP)

## NAWF = 5 + 335 DD60s



# Yield - Insecticide Effects



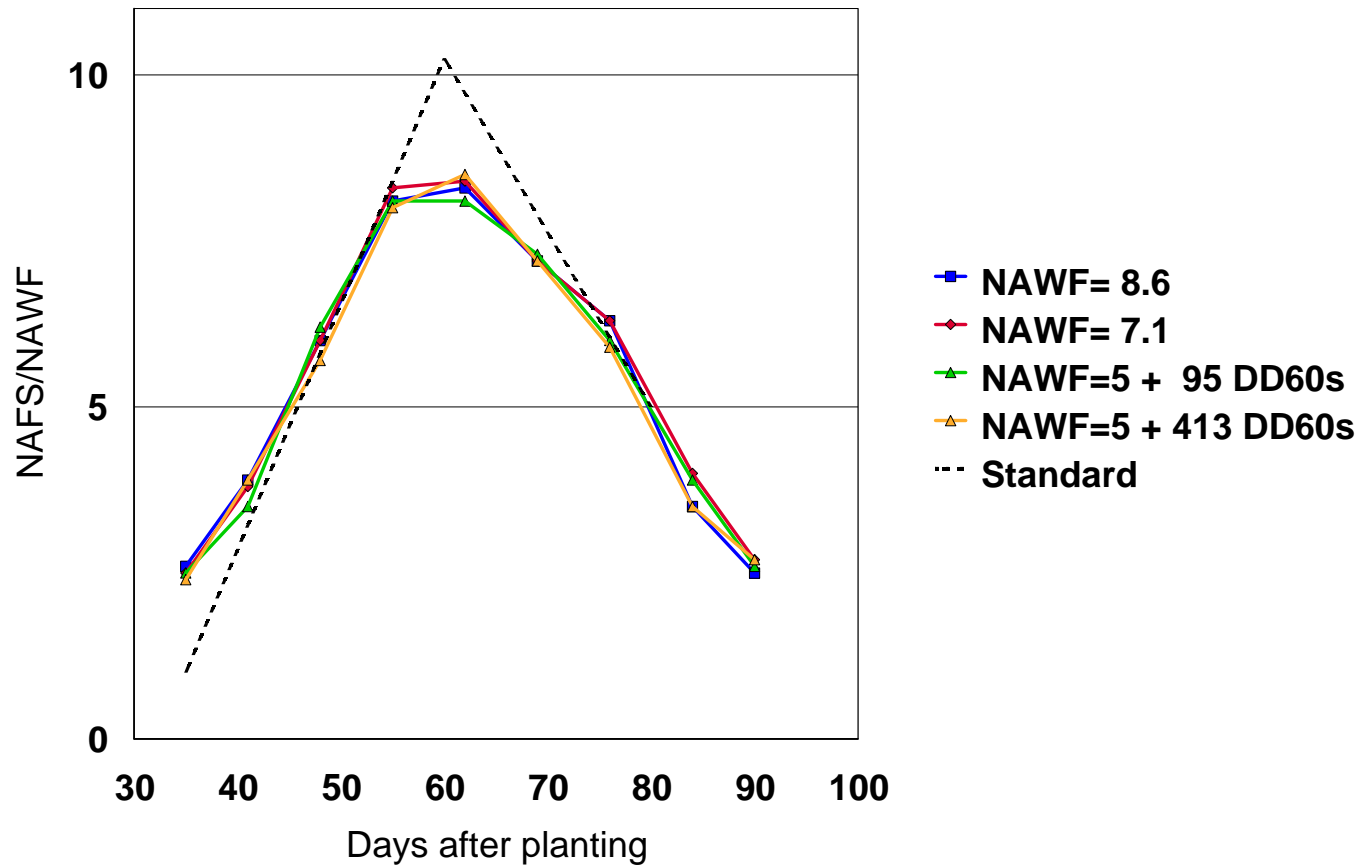
# 2005 Termination – Natural Population

Irrigation \* Insecticide Interaction – Year 2 of  
a 3 year Study at Marianna.



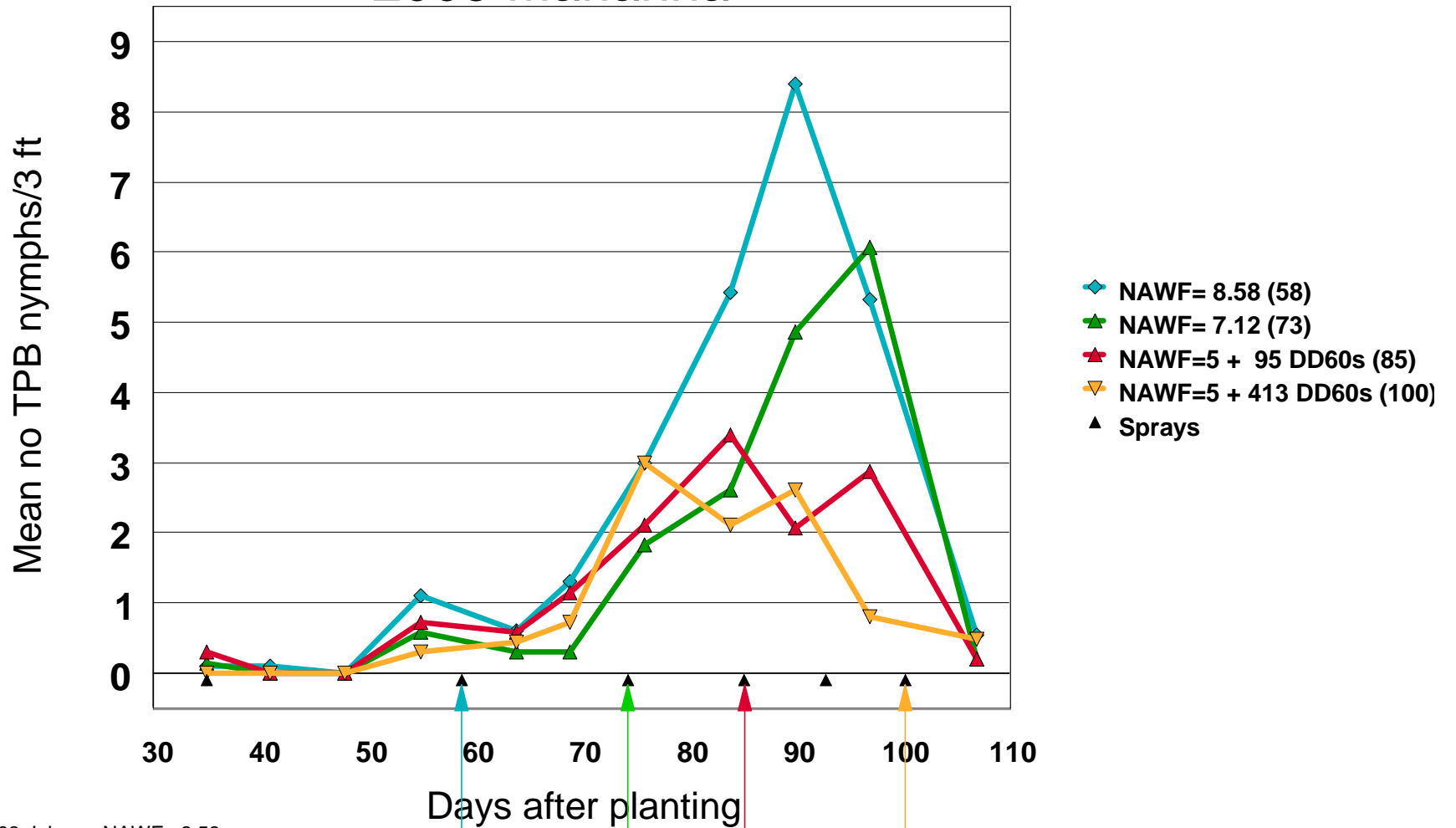
# 2005 Growth Curves

Insecticide Termination sub-plot effects



# TPB Nymphs/3 ft

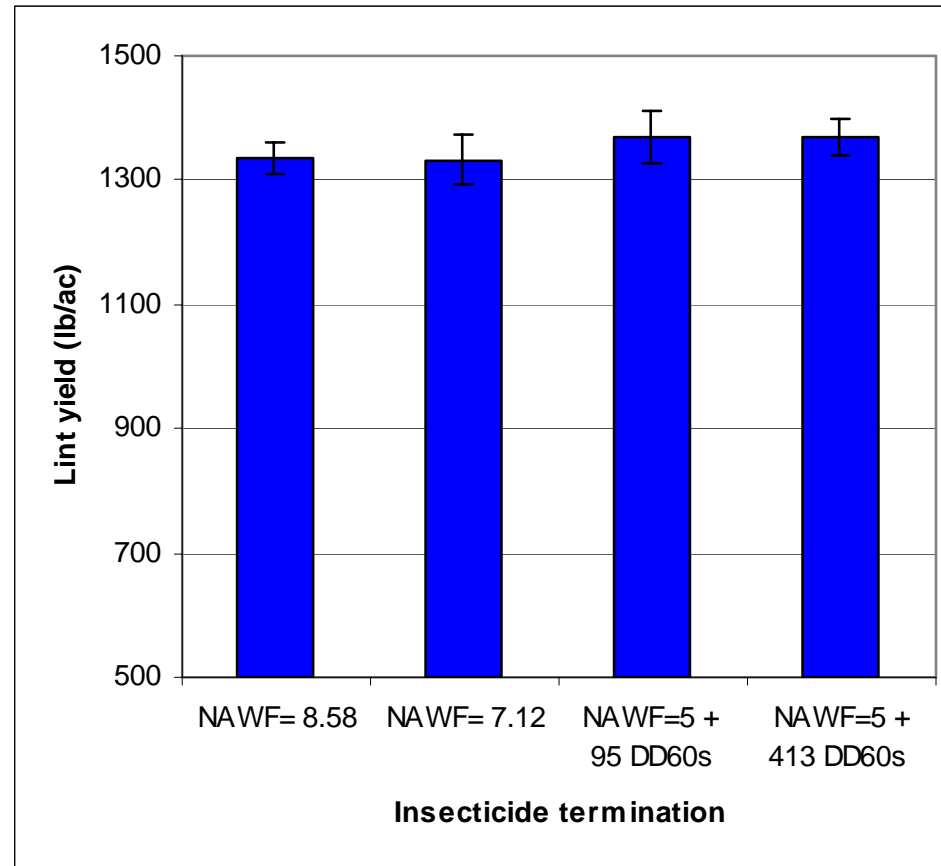
## 2005 Marianna



58 08-Jul NAWF= 8.58  
 73 23-Jul NAWF= 7.12  
 85 04-Aug NAWF=5 + 95 DD60s  
 100 19-Aug NAWF=5 + 413 DD60s

CUTOUT - 30 July, 80 DAP

# 2005 Marianna

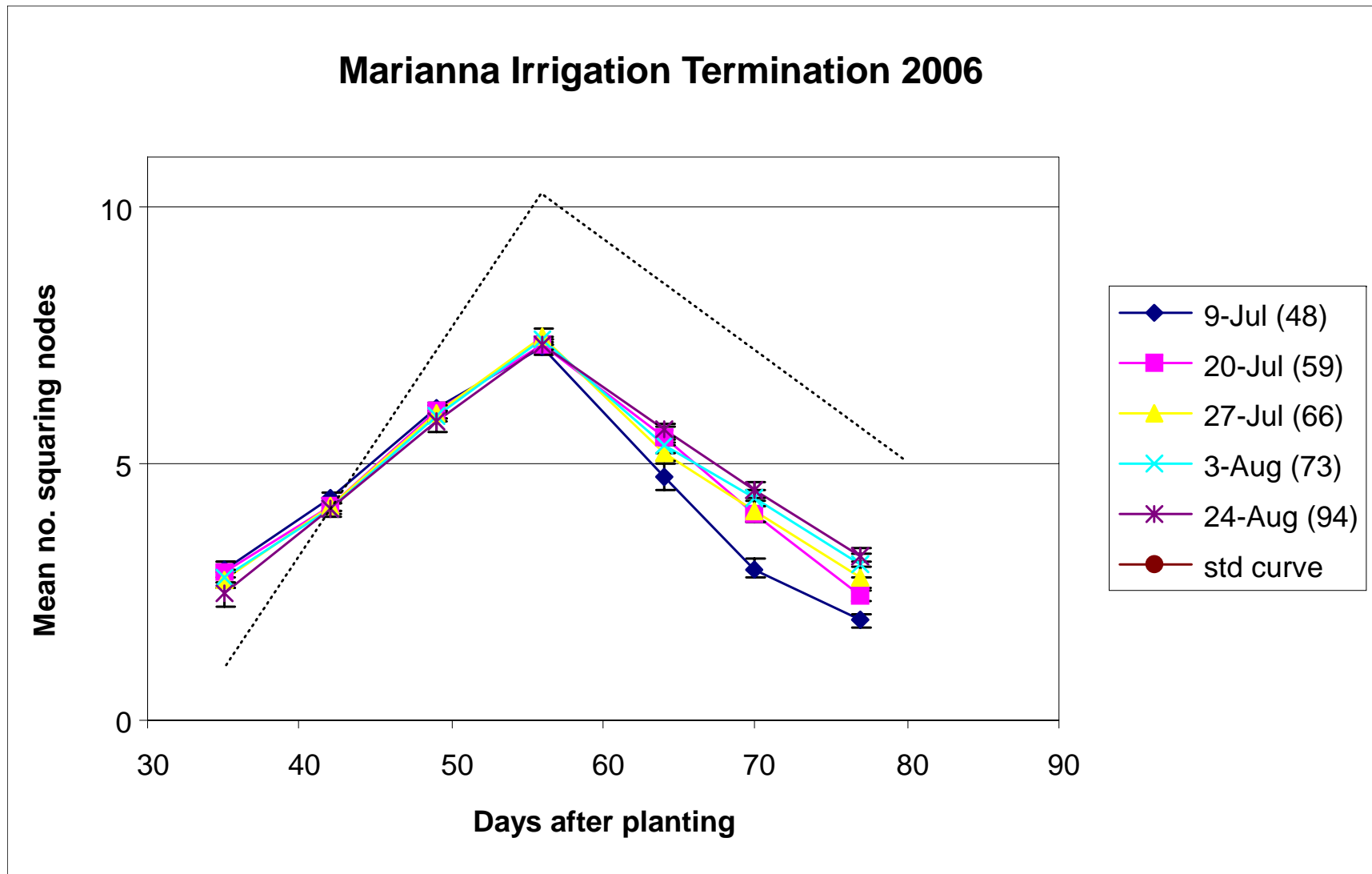


2 pre-flower applications (36 & 58 dap)  
0, 1, 2 or 4 sprays post flower

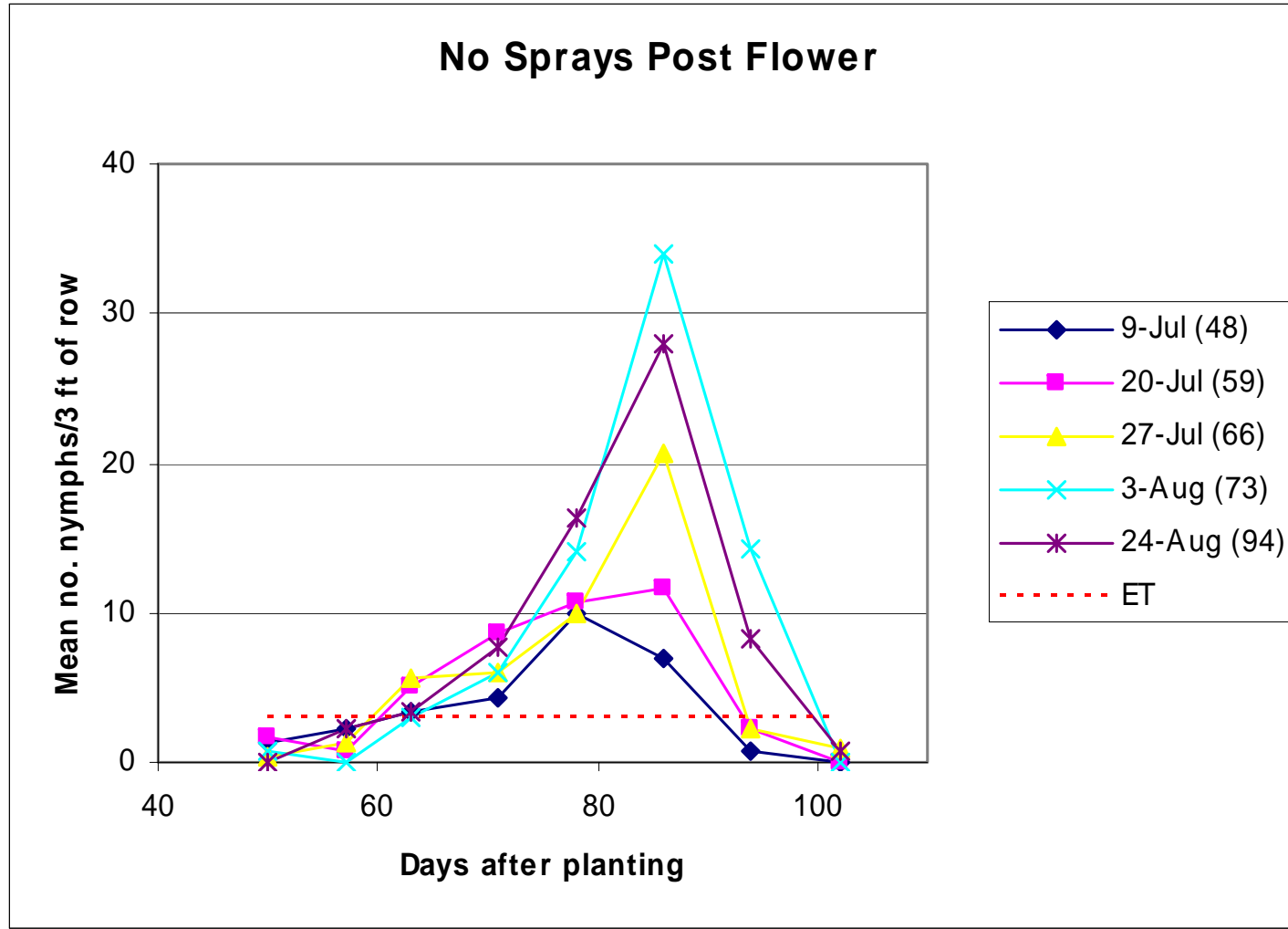
spray  
dates  
08-Jul  
23-Jul  
04-Aug  
19-Aug

Irrigated full season  
9 replications

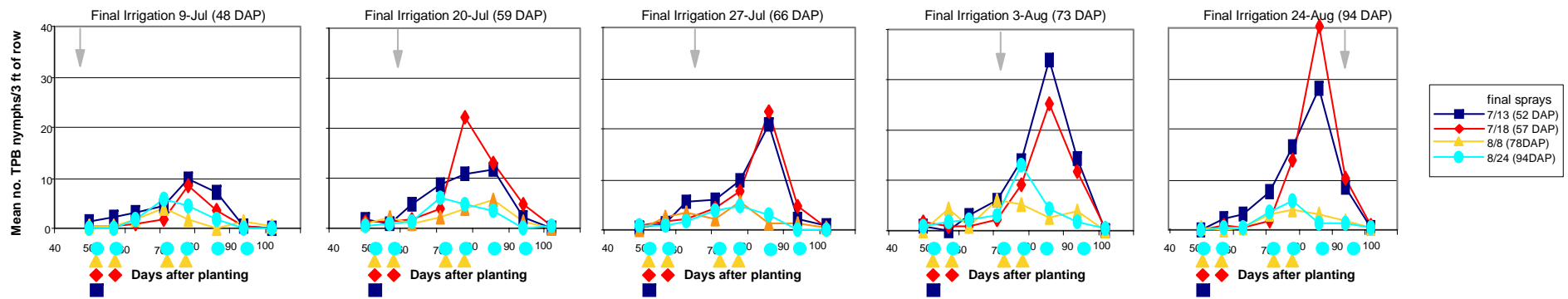
# Irrigation Effects CBS 2006



# TPB Nymphs/3 ft CBS 2006

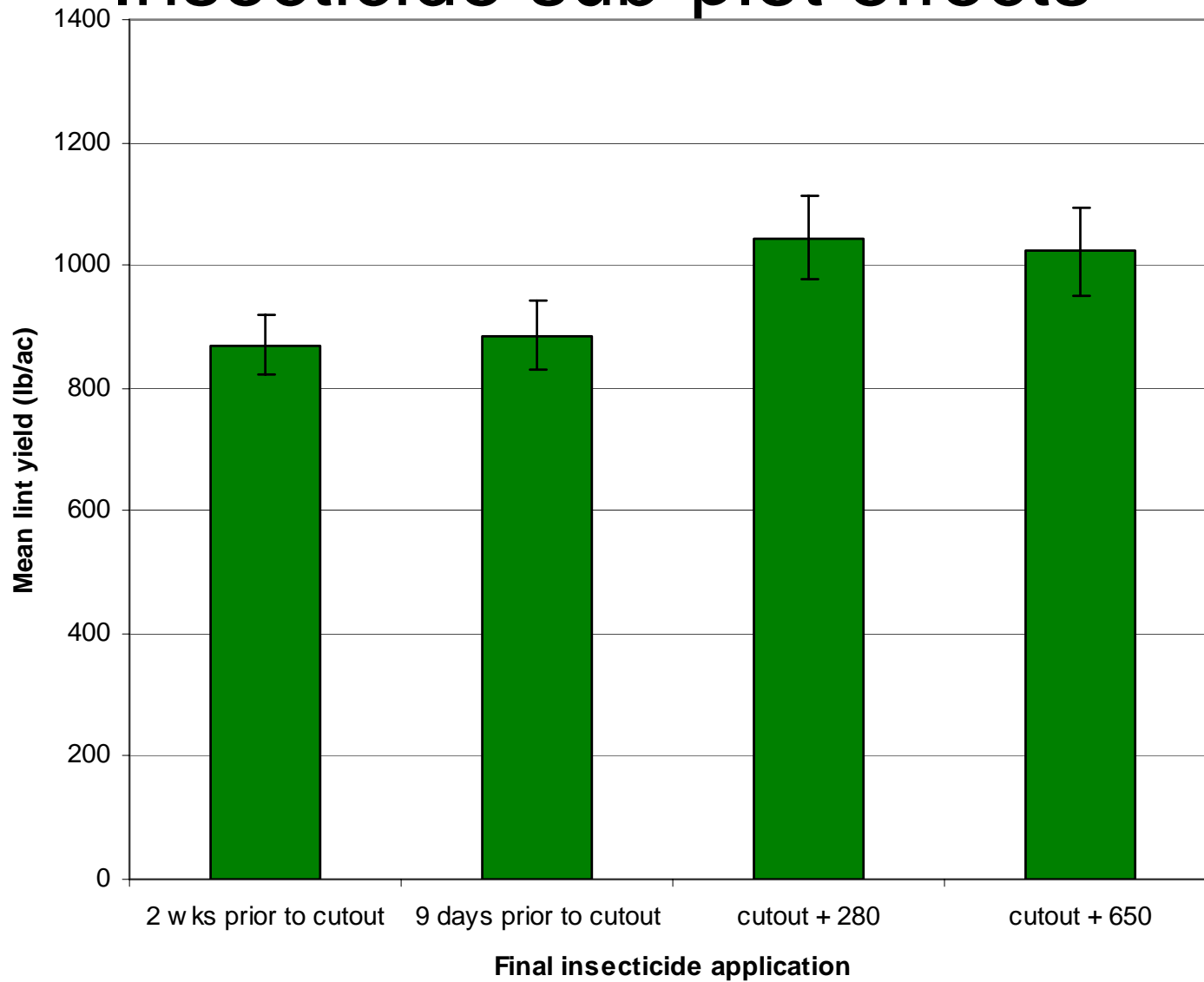


# Plant Bug Nymphs - Response to Irrigation and Insecticide Termination Timing -- CBS, Marianna 2006



# Lint Yield – CBS 2006

## Insecticide sub-plot effects



# 2006 MissCo TPB Validation - when to quit?

- Above threshold numbers of tarnished plant bugs prior to Physiological Cutout + 350
- Spray decision?

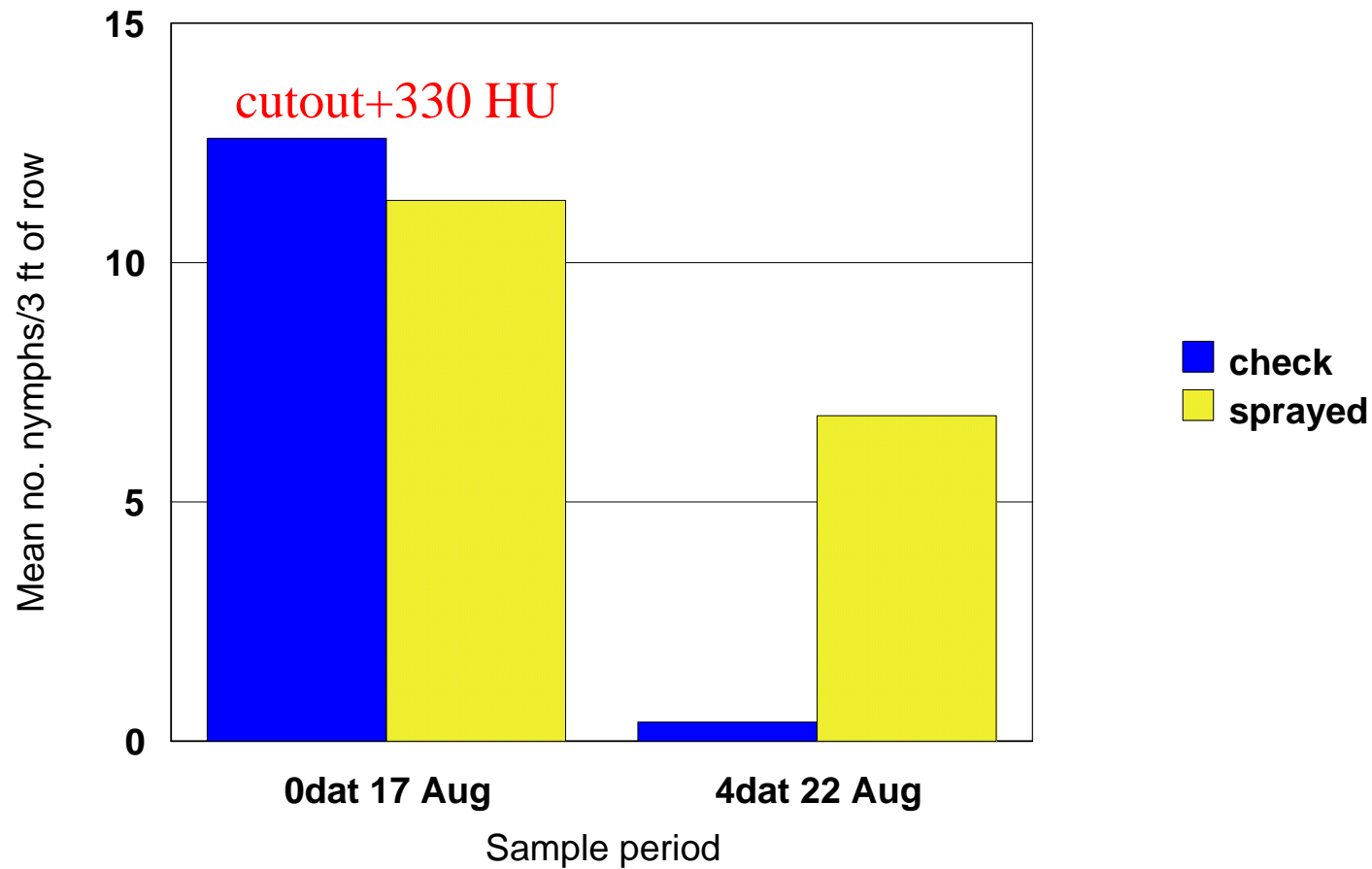
Grower: Cole Hawkins; CCA Dale Wells

0.56 acre plots replicated 3 times; 6.4 oz Bidrin on 17 Aug  
DPL 445BR planted 6 May; Physiological cutout on 3 Aug



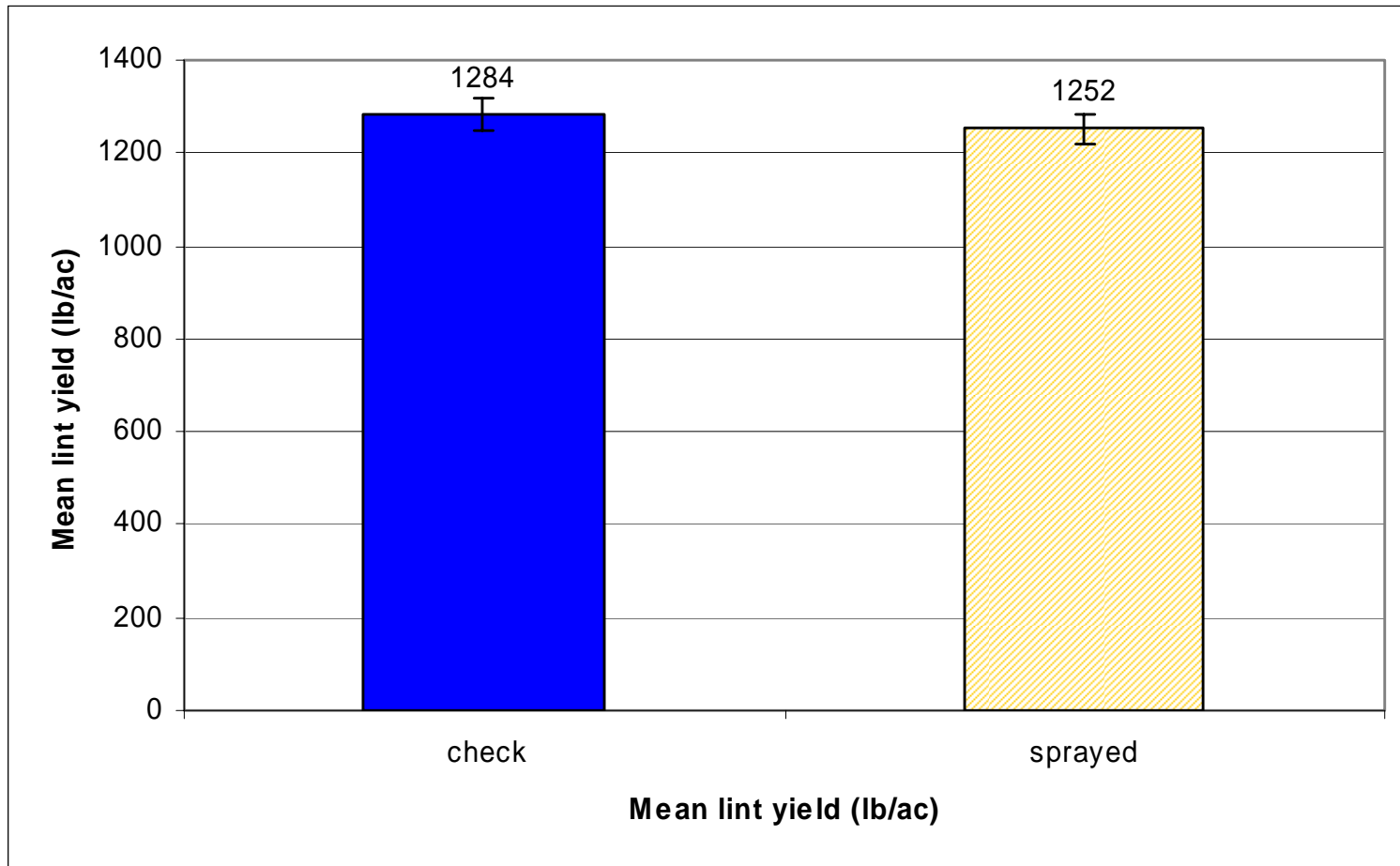
# 2006 COTMAN Validation

## Mississippi County – Cole Hawkins



# 2006 Lint Yield

TPB Validation Mississippi County – Cole Hawkins



# When is the crop no longer vulnerable?



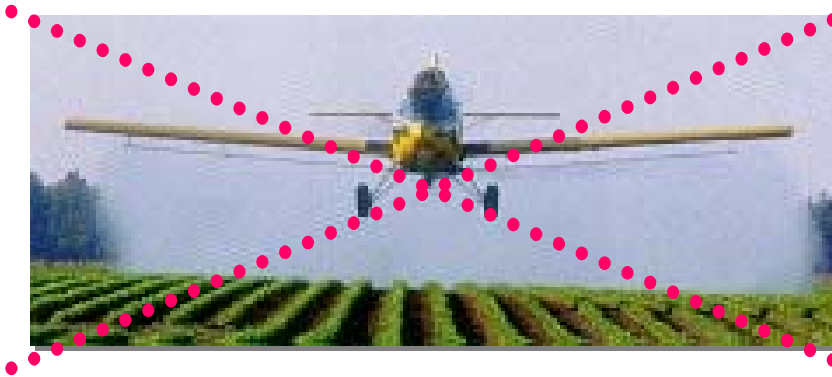
- Infestations after Cutout + 350 HU's



# COTMAN Termination Guides

- Use crop monitoring to determine flowering date of the last effective boll population
- Have confidence in crop termination guides

# When to Quit?



- Cutout + 350 HU's
- More than adequate for tarnished plant bug.



# Acknowledgments

- N.P. Tugwell
- David Wildy, Justin Wildy, Dale Wells
- Steven Coy, Jimmy Hornbeck, Jen Lund, M. Ismanov, Joe Stewart, Clayton Treat, Eric Villavaso, Claude Kennedy, Craig Shelton
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