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

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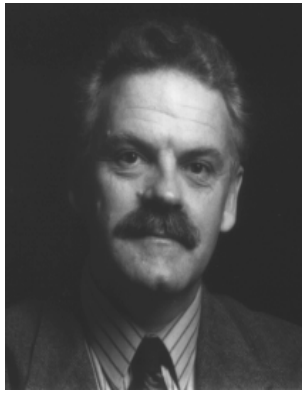
COTMAN

Bourland

Cochran

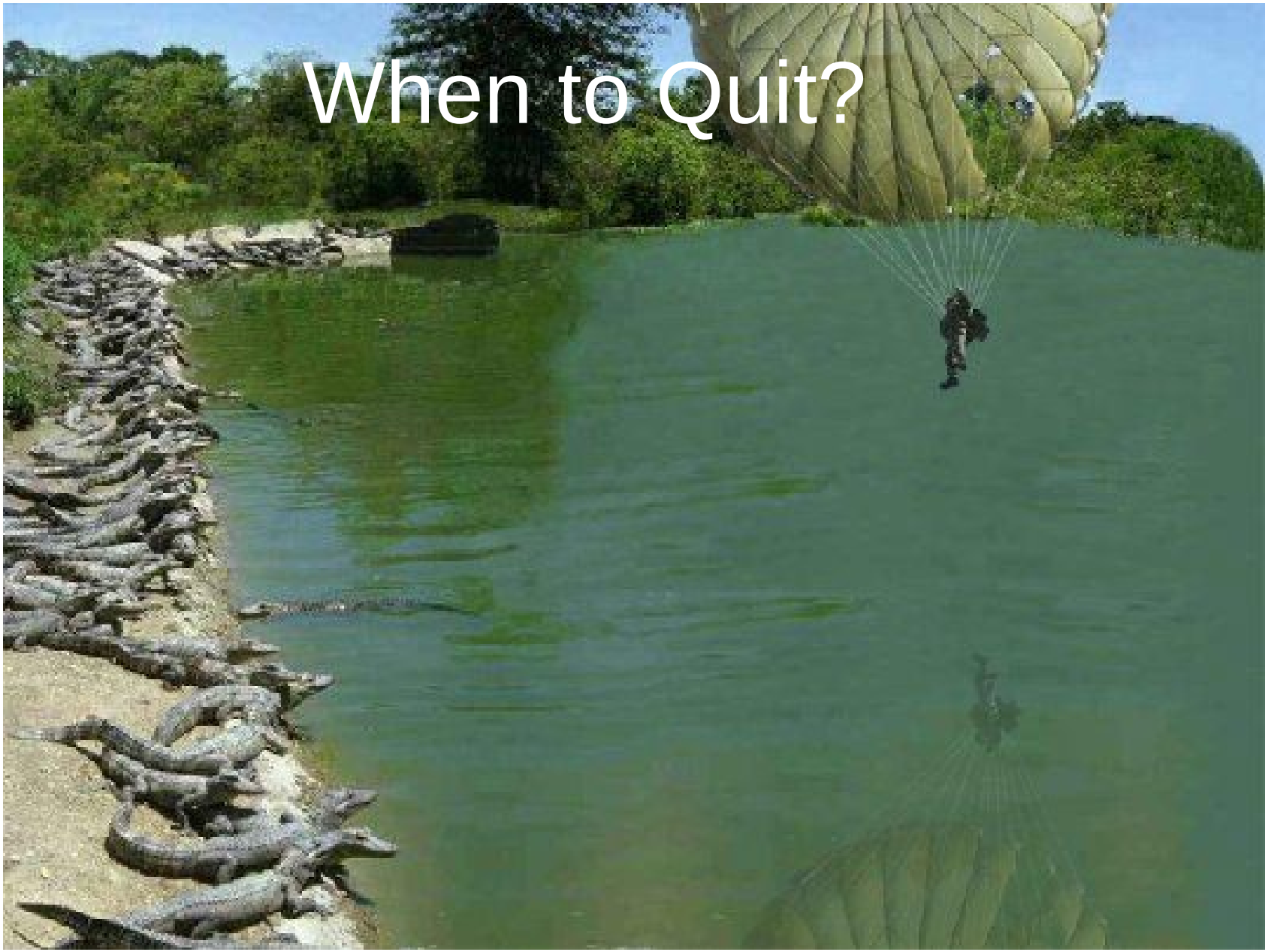


Oosterhuis

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

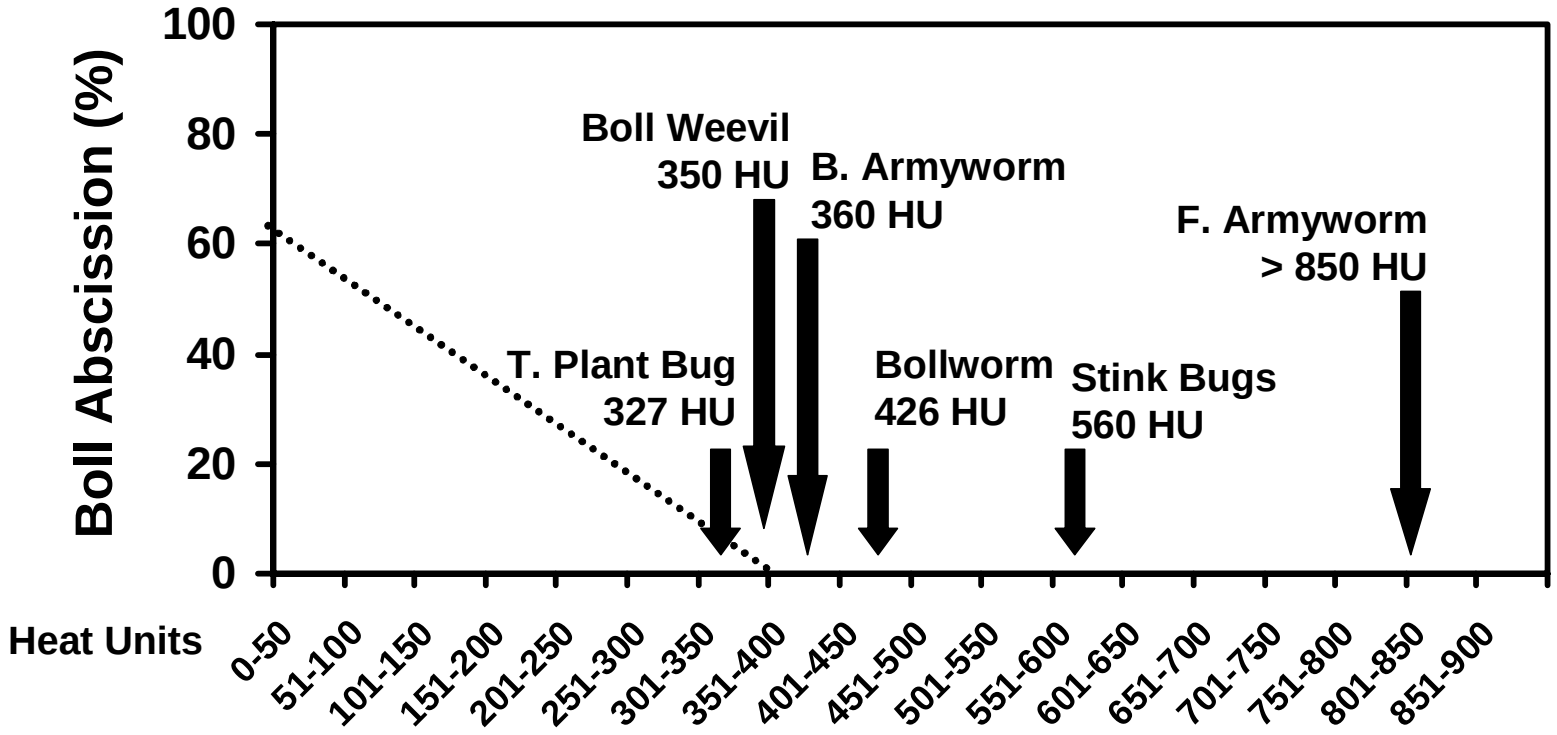
Insecticide Termination
Tarnished Plant Bug

COTMAN™

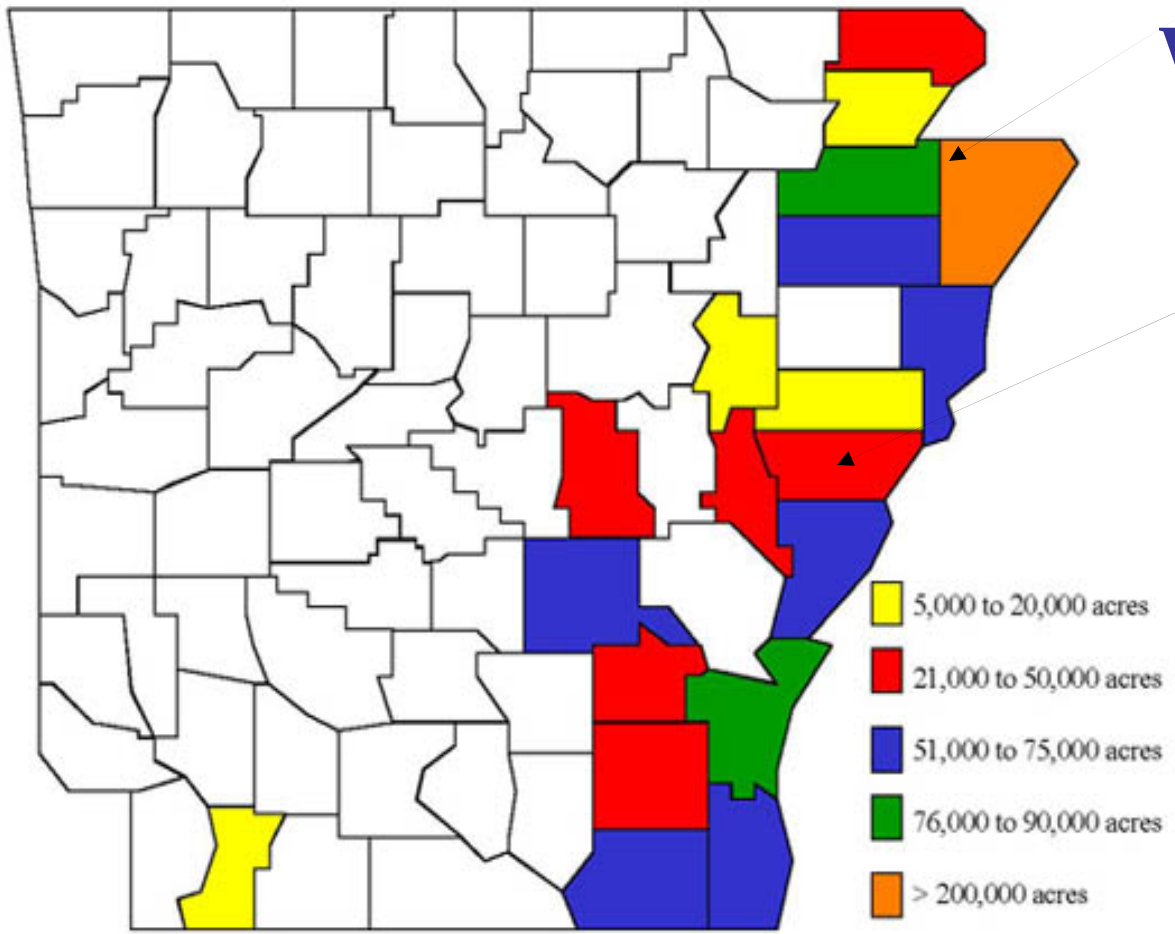
Insecticide Termination for TPB

- 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

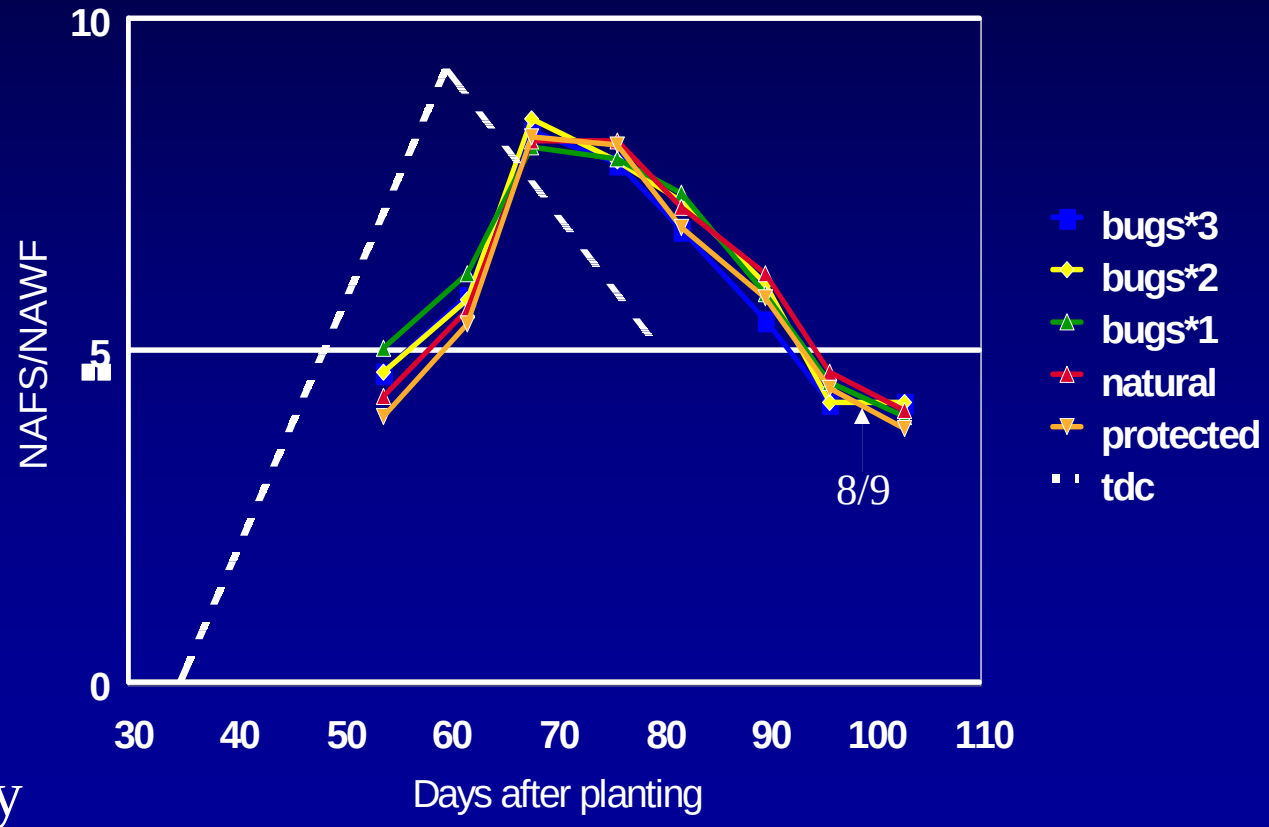
TPB Nymphs Release Methods

2001 Crop Susceptibility to Late Season Tarnished Plant Bug

Treatment	Date of Application	DD60s after Physiological Cutout
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

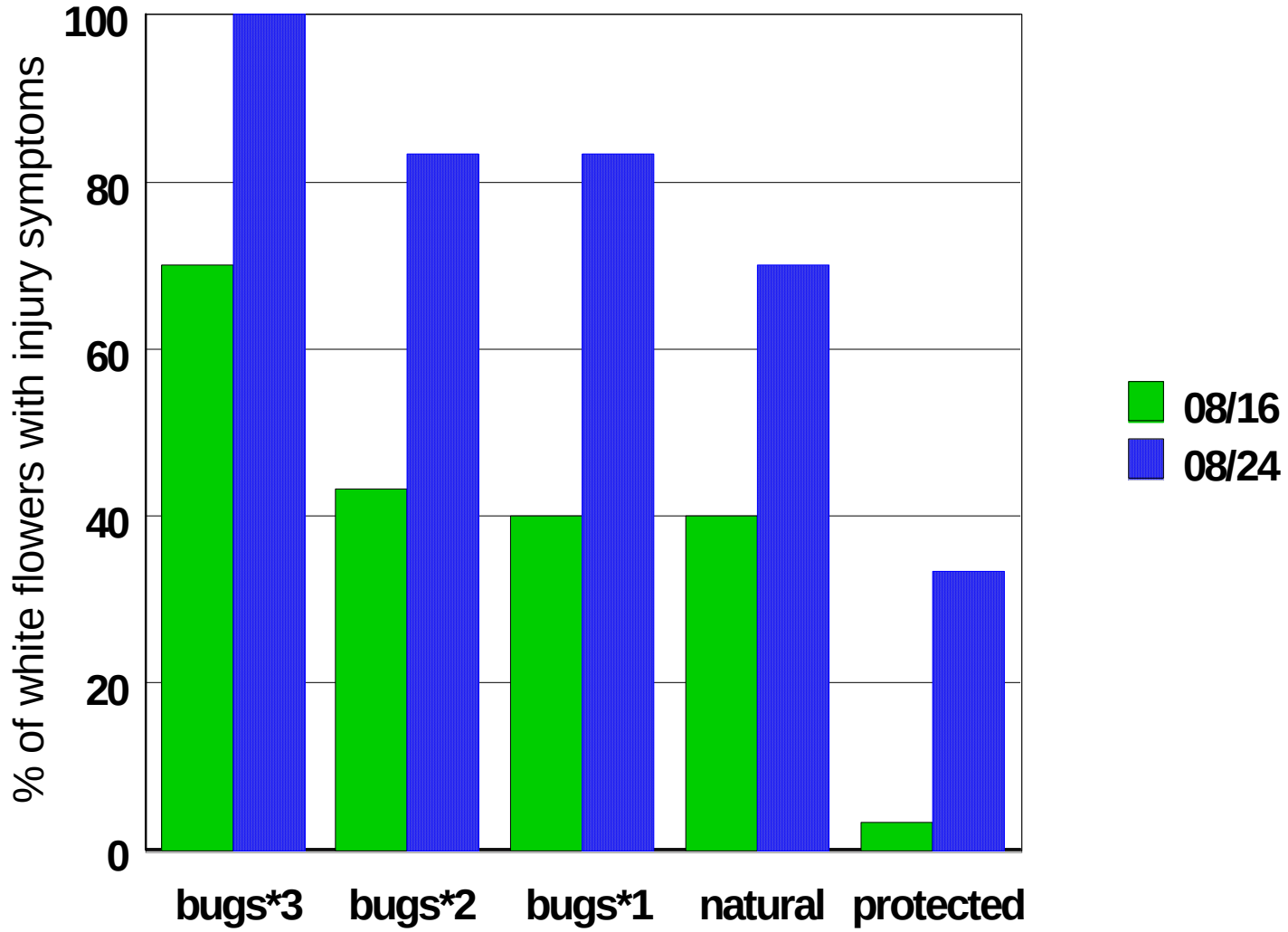
Plots separated by 85 ft buffer; 4 reps, RCB
2 rows 15 ft; Stv 4892
Bugs provided by USDA-ARS, Dr. Eric Villavaso

2001 TPB Termination – Crop Growth Curves

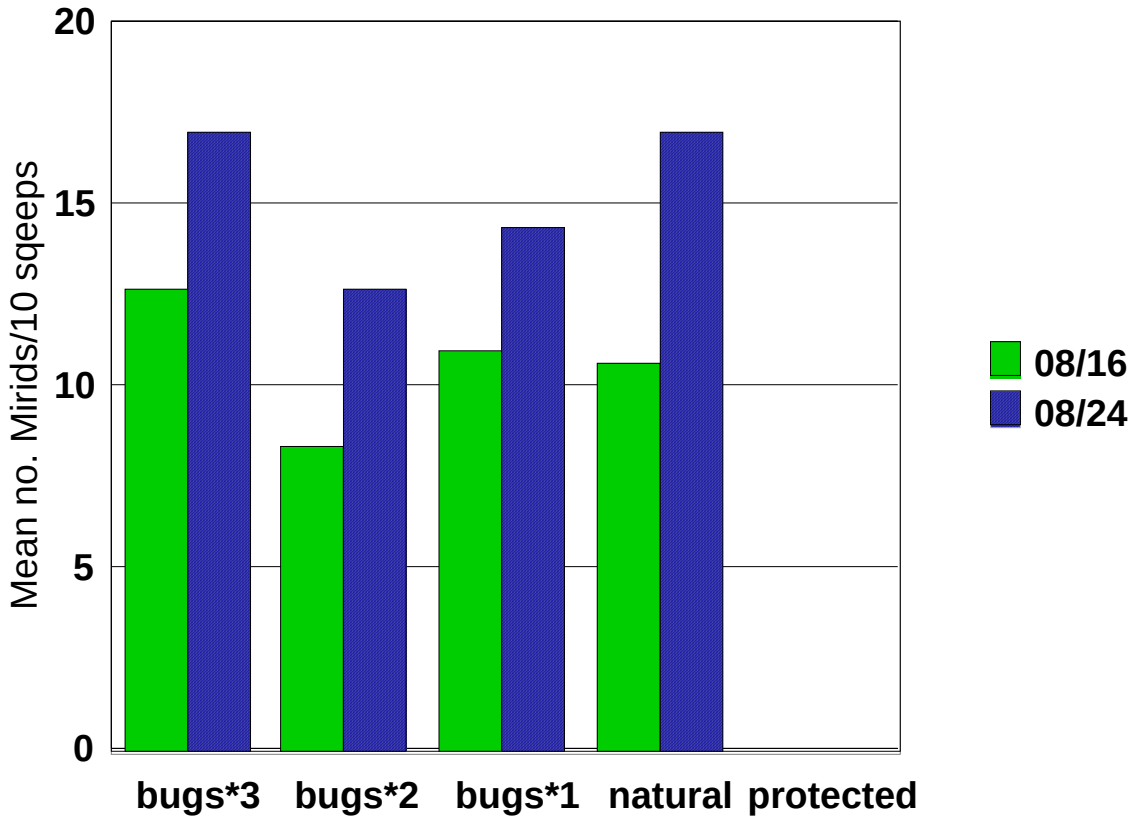


DOP 6 May
Stv 4892

10 white flowers – anther injury

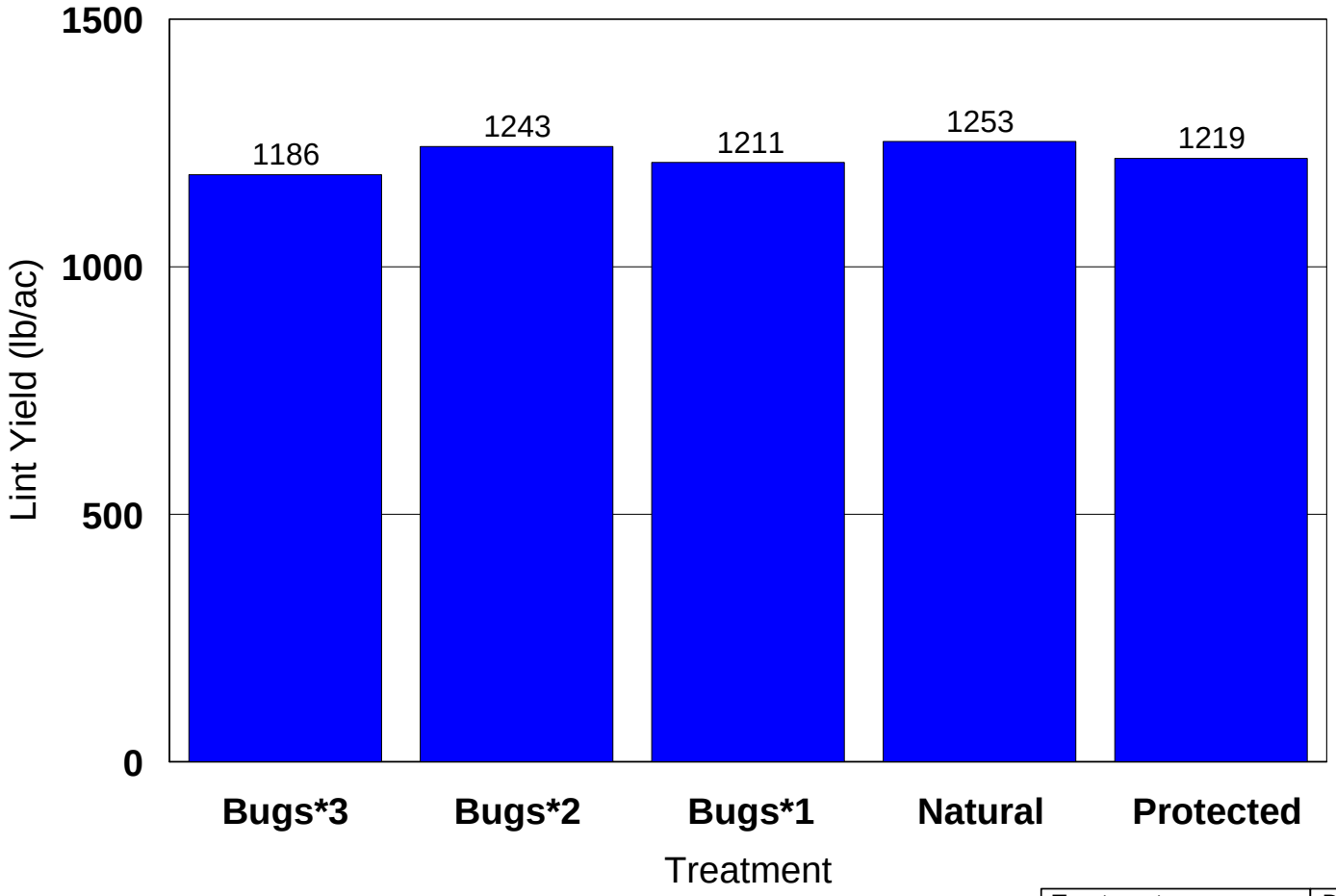


Sweep Net Samples



yuck

2001 TPB Termination Yields



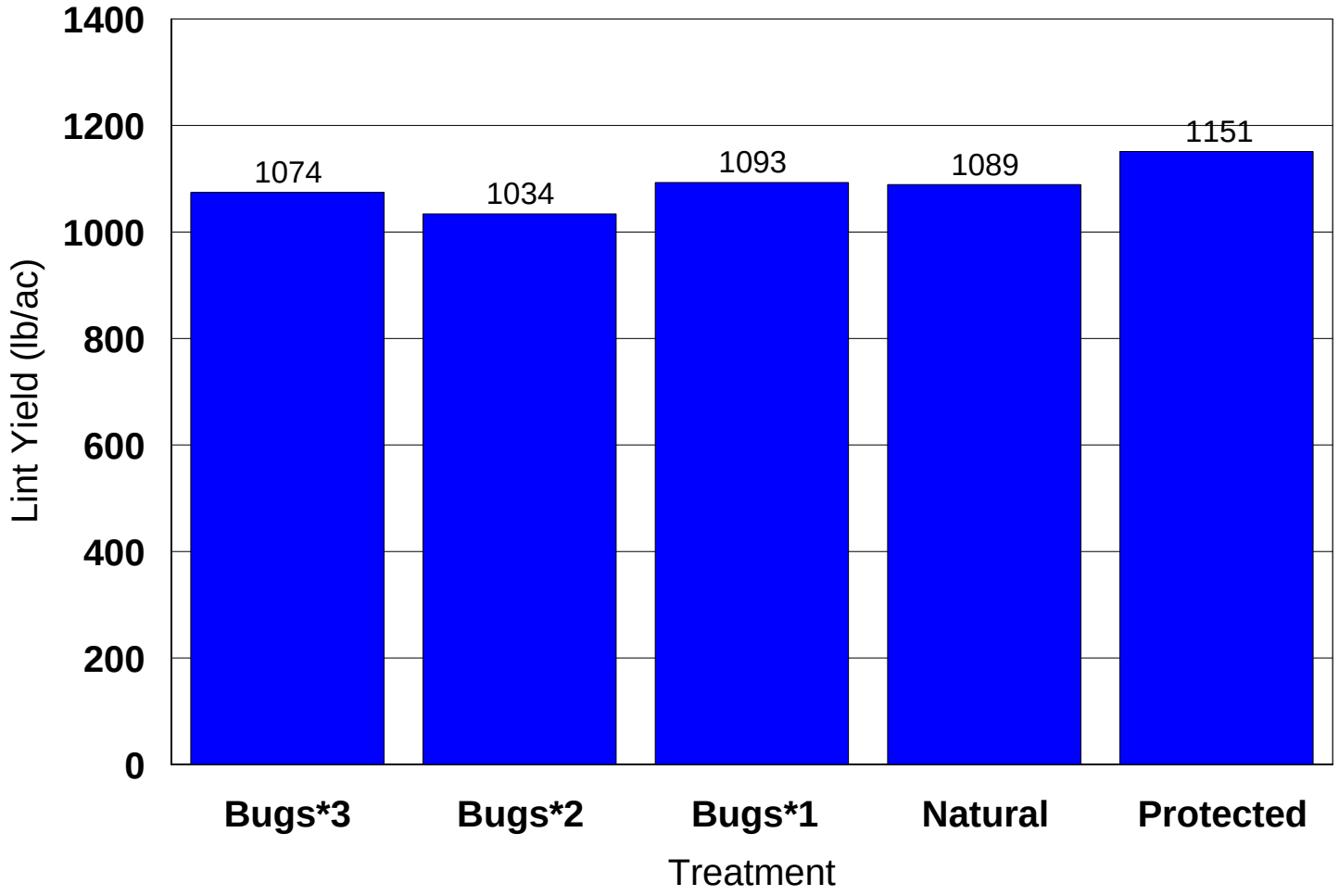
Treatment	Date of Application	DD60s from NAWF=5
Bugs 1,2,3	10,17 & 24 Aug	156
Bugs 2,3	17&24 Aug	296
Bugs 3	24 Aug	375
Natural		
Protected	10,16,22&28 Aug	

Teague et al 2001 Beltwide

2002 Experiment
same treatments but weevils, too

COTMAN™

2002 TPB Termination Yields



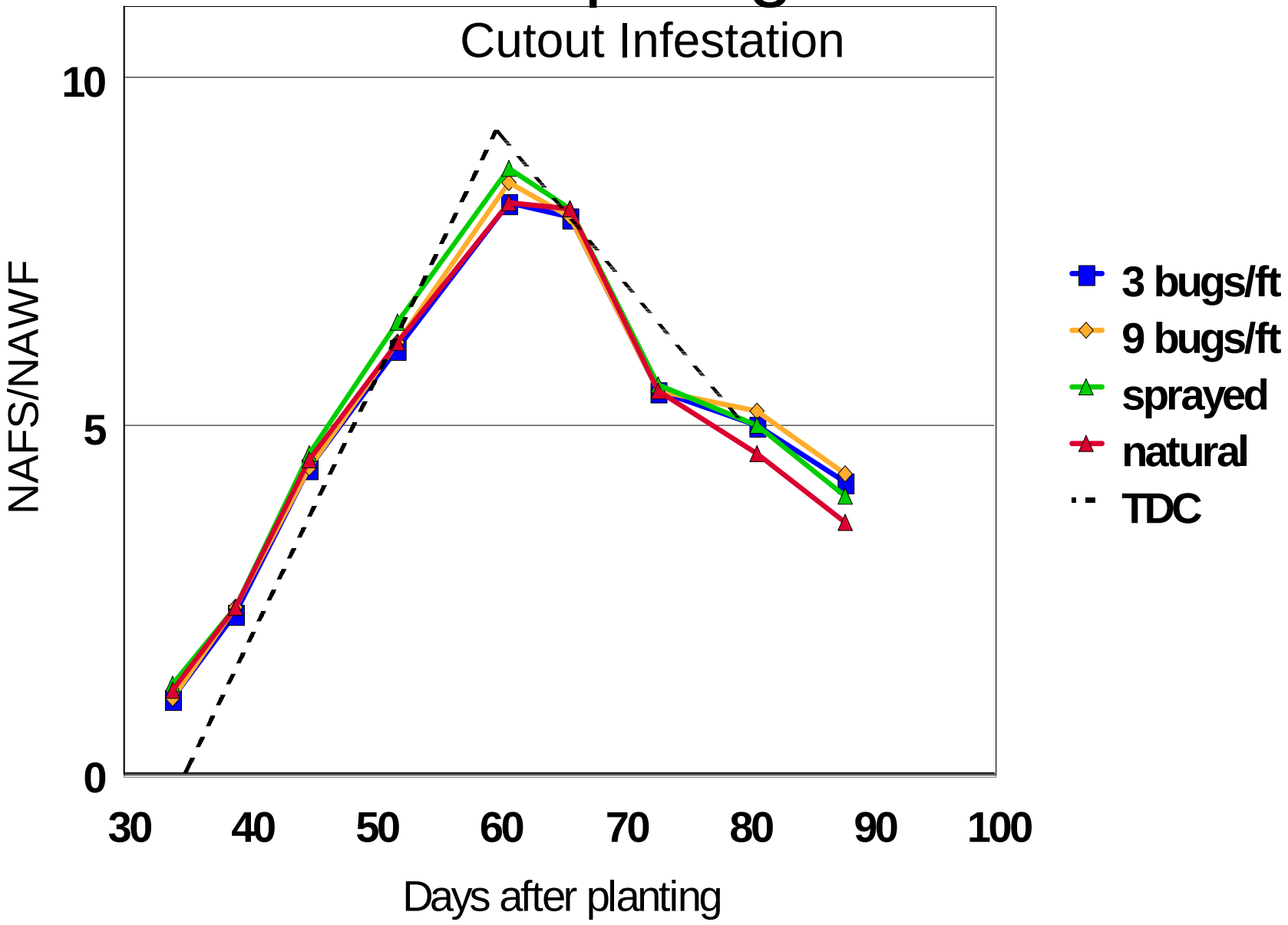
2003 – skip for BWE

2004 – Start at cutout

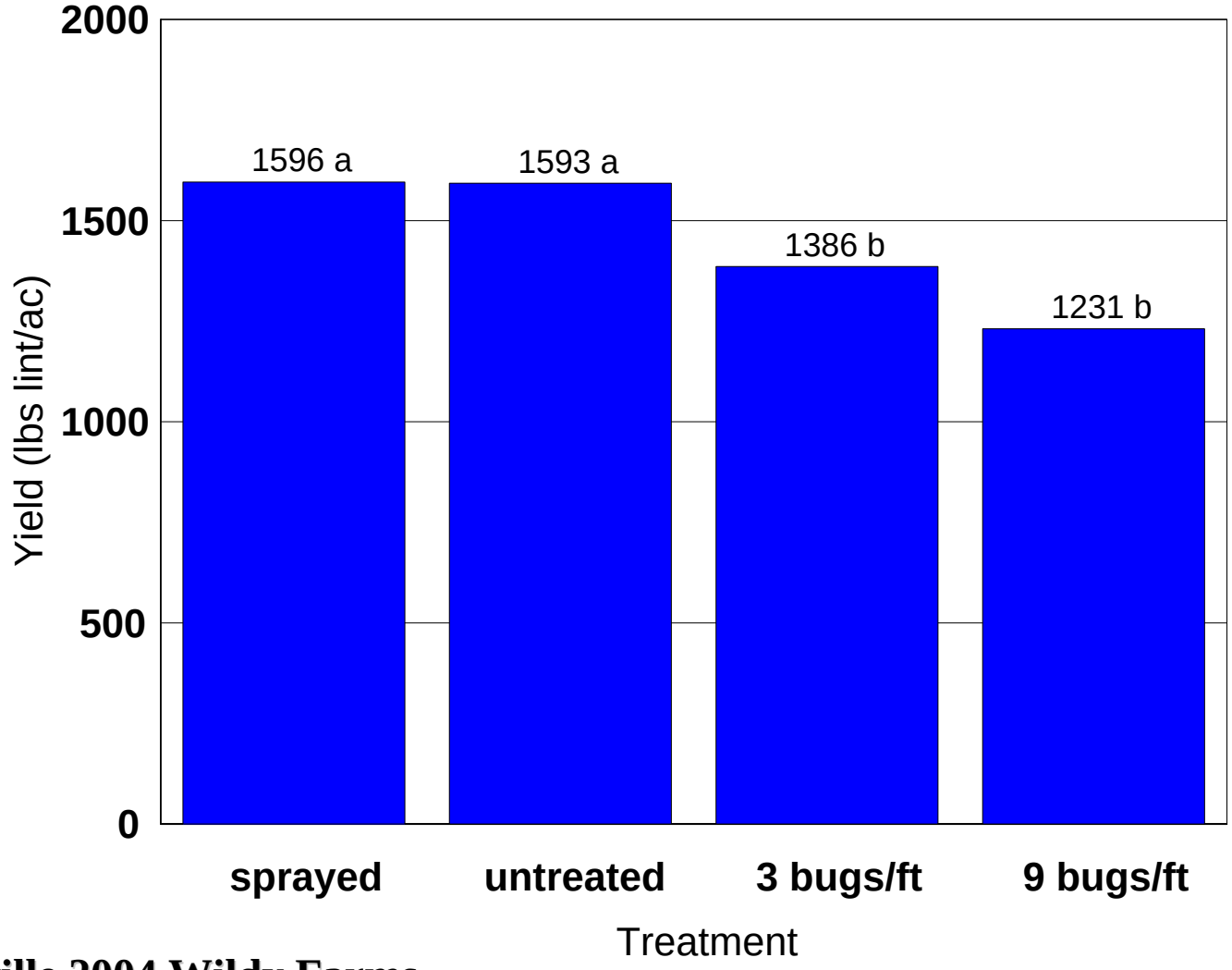
1. Sprayed 3 times (til +300 HU)
2. Untreated
3. 3 bugs/ft
4. 9 bugs/ft

Teague et al 2005

TDC - Drip Irrigated 04

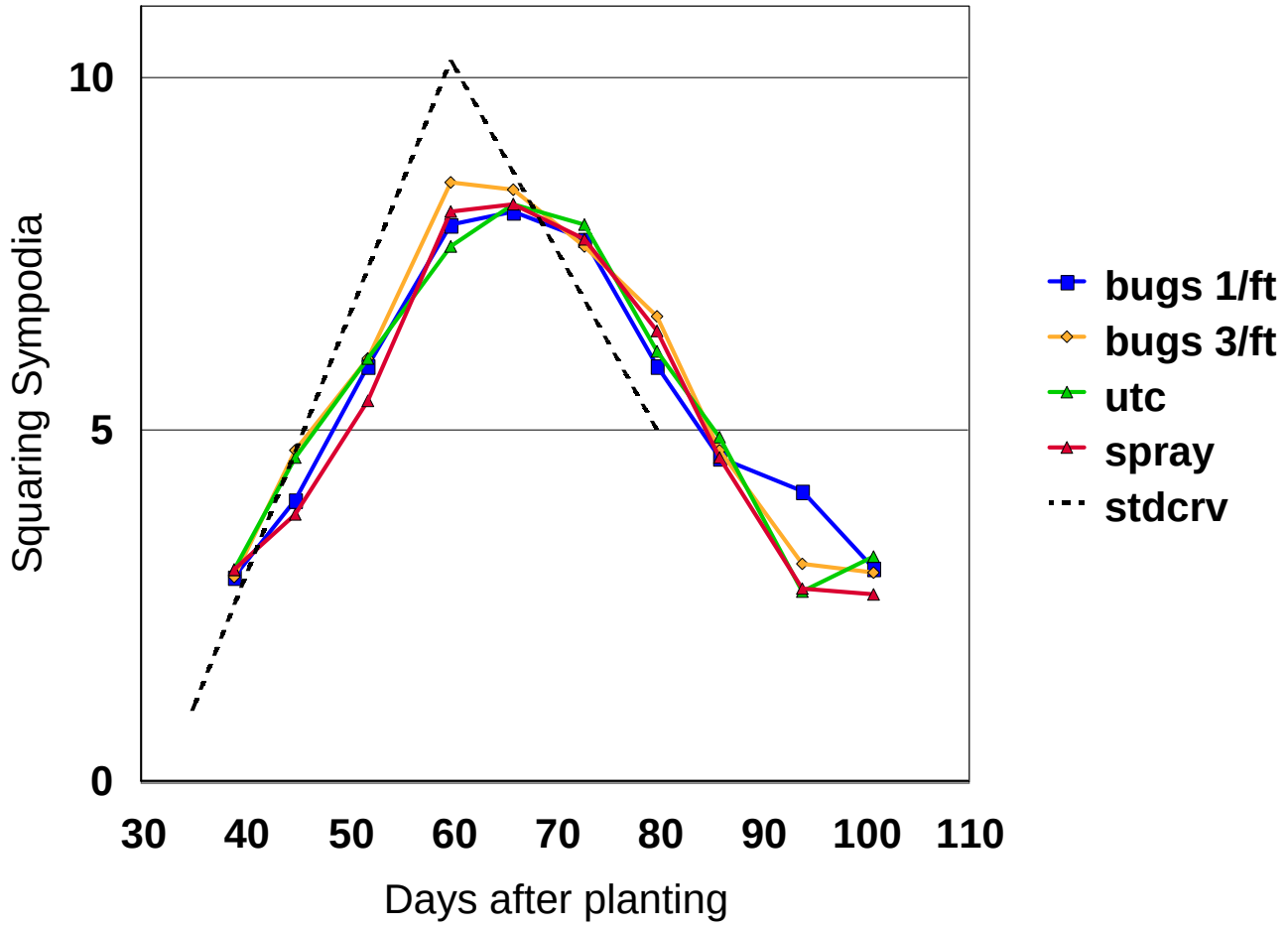


TPB at Cutout 2004



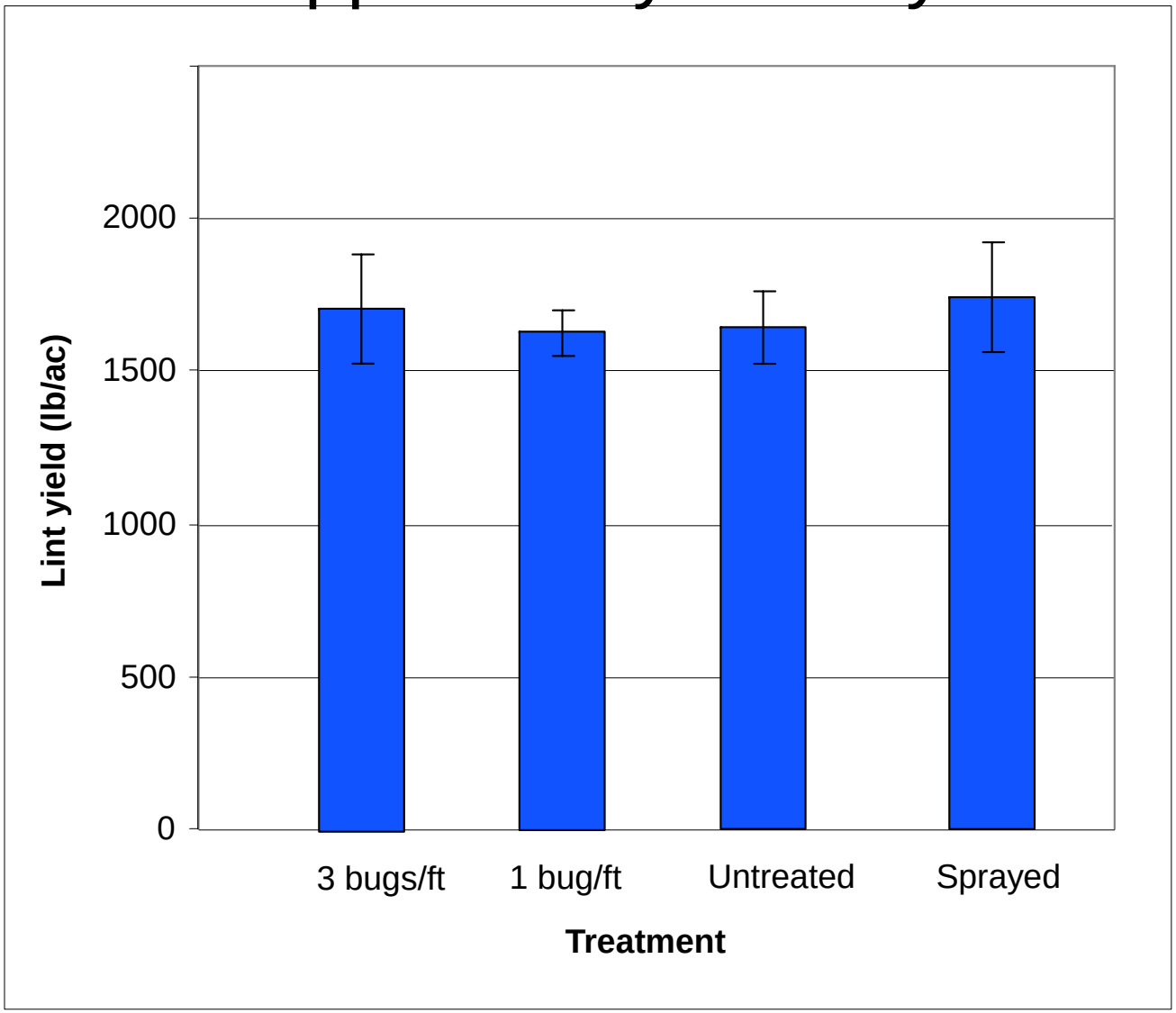
Leachville 2004 Wildy Farms
8 reps – drip irrigated

2005 – WF



infested 89 DAP

2005 TPB Control Termination
Mississippi County – Wildy Farms



2006 TPB Control Termination
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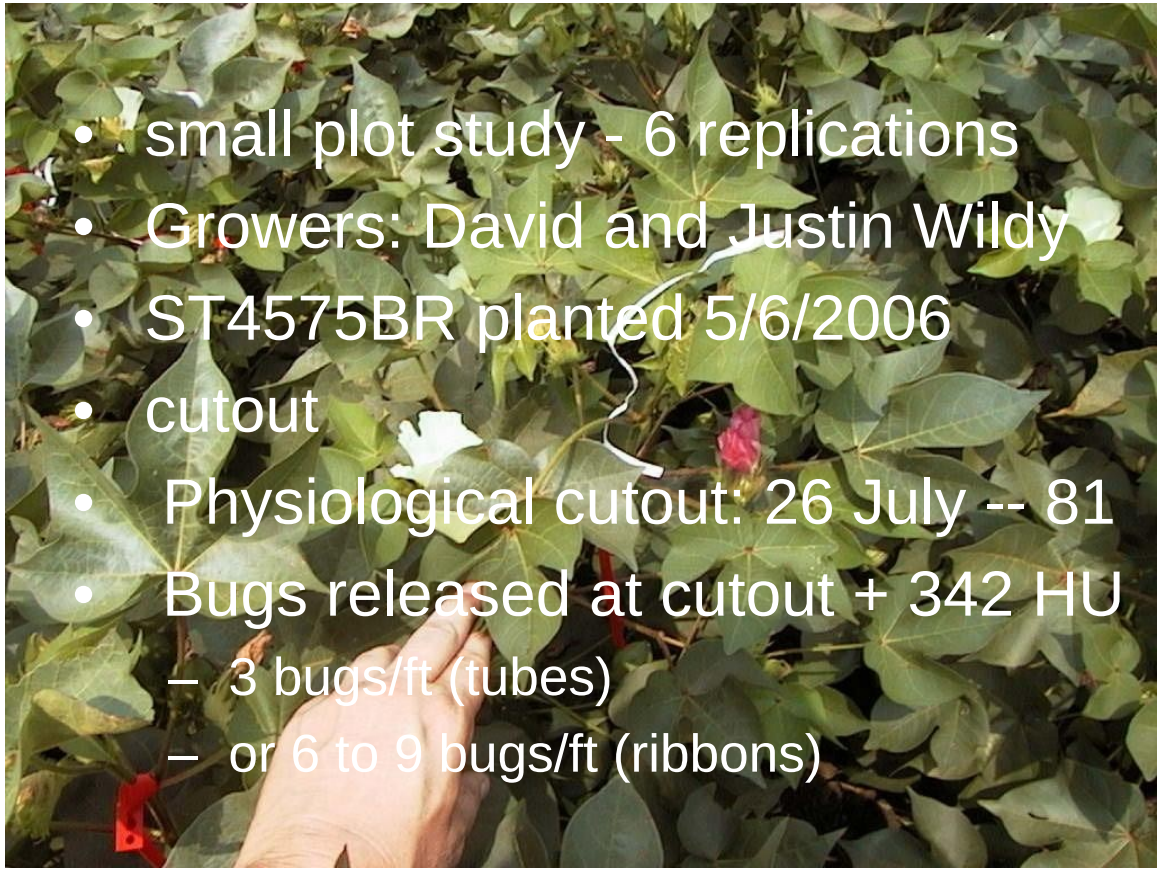
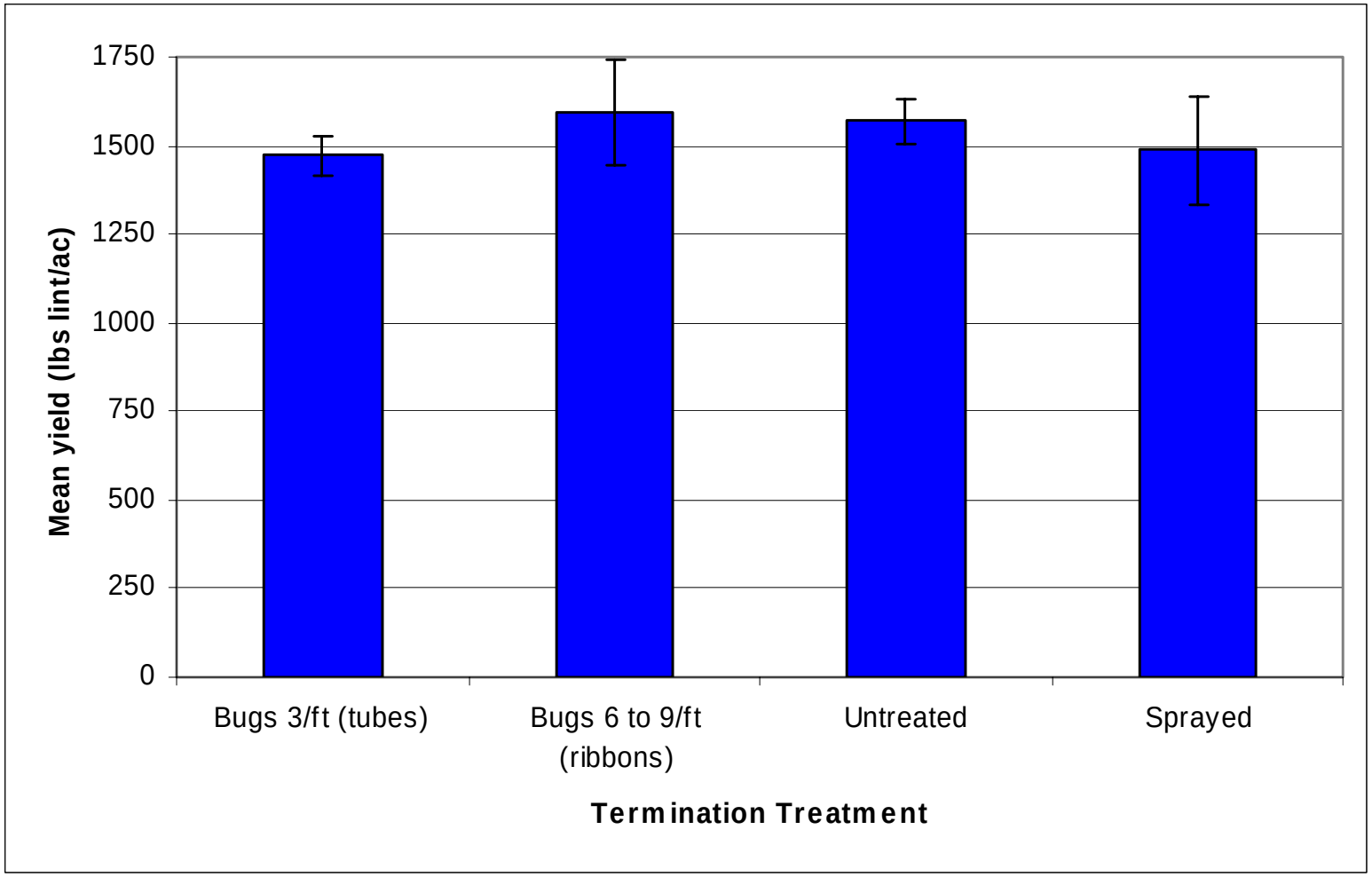


- small plot study - 6 replications
- Growers: David and Justin Wildy
- ST4575BR planted 5/6/2006
- cutout
- Physiological cutout: 26 July -- 81
- Bugs released at cutout + 342 HU
  - 3 bugs/ft (tubes)
  - or 6 to 9 bugs/ft (ribbons)

2006 Termination
Wildy Farms– Lint Yield



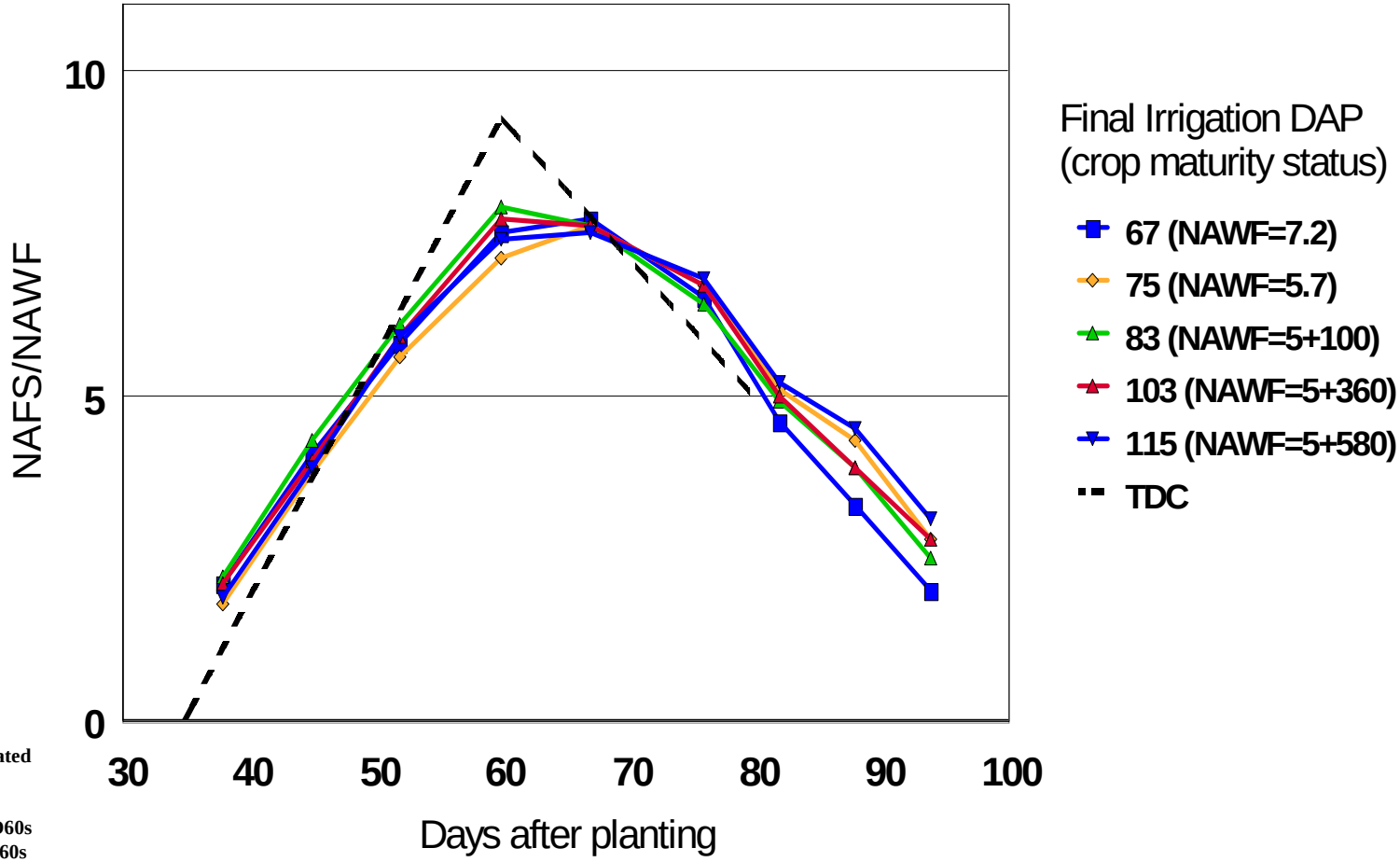
2004 Termination -- Arkansas

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 [1]	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

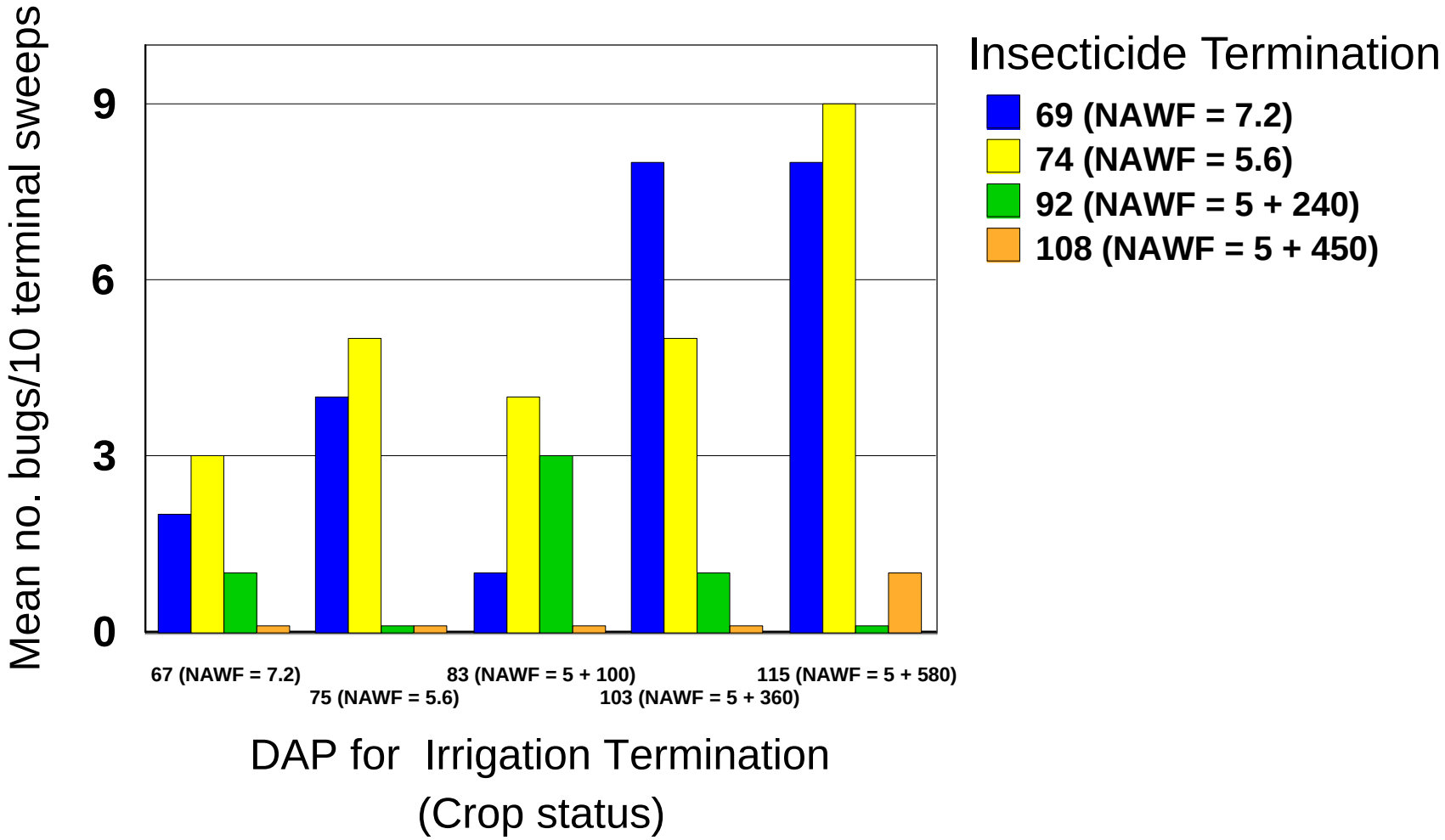


Insecticides Terminated
NAWF = 7.2
NAWF = 5.6
NAWF = 5 + 240 DD60s
NAWF = 5+ 450 DD60s

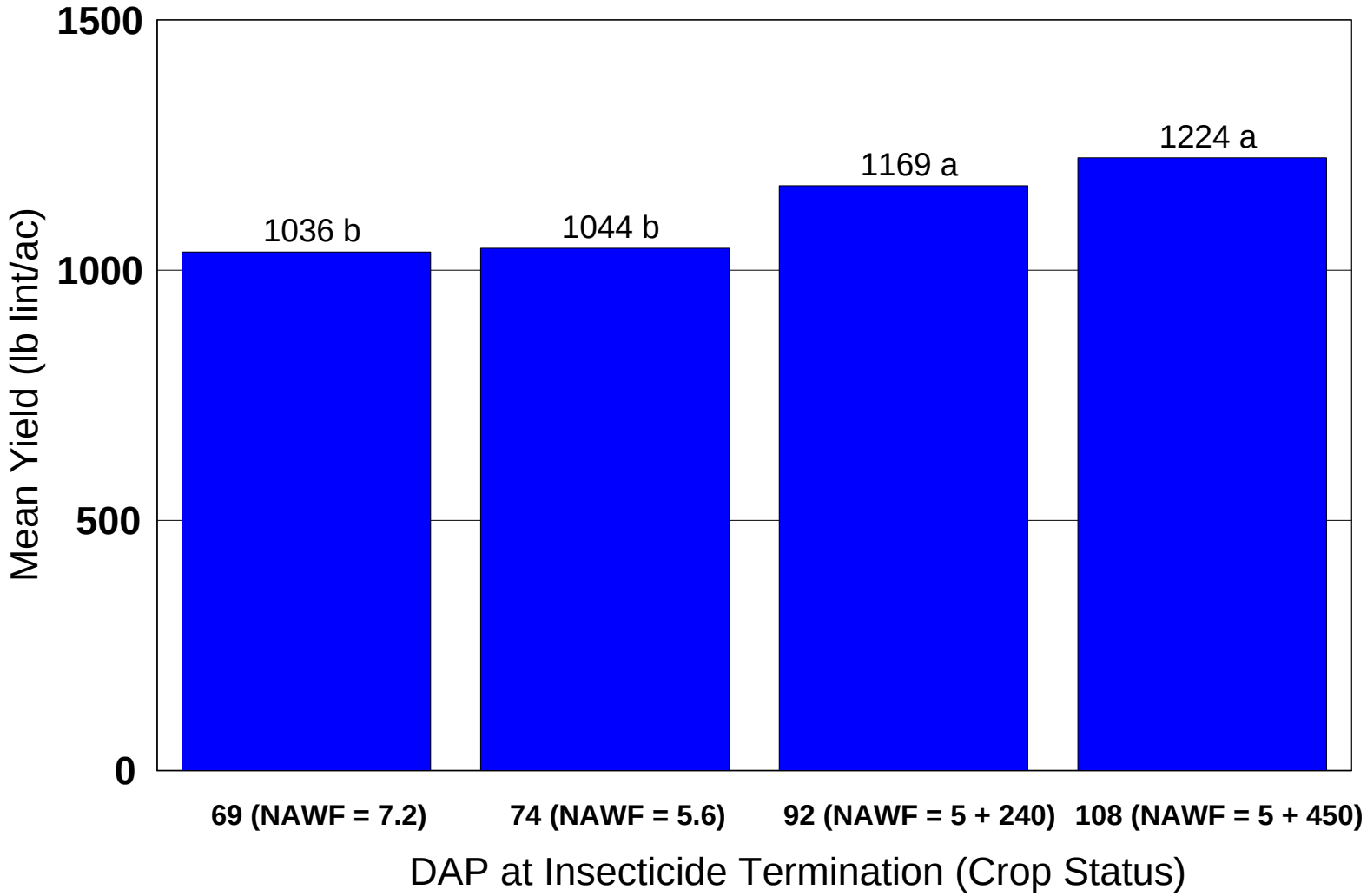
2004

Bug counts on 17 Aug (101 DAP)

NAWF = 5 + 335 DD60s



Yield - Insecticide Effects

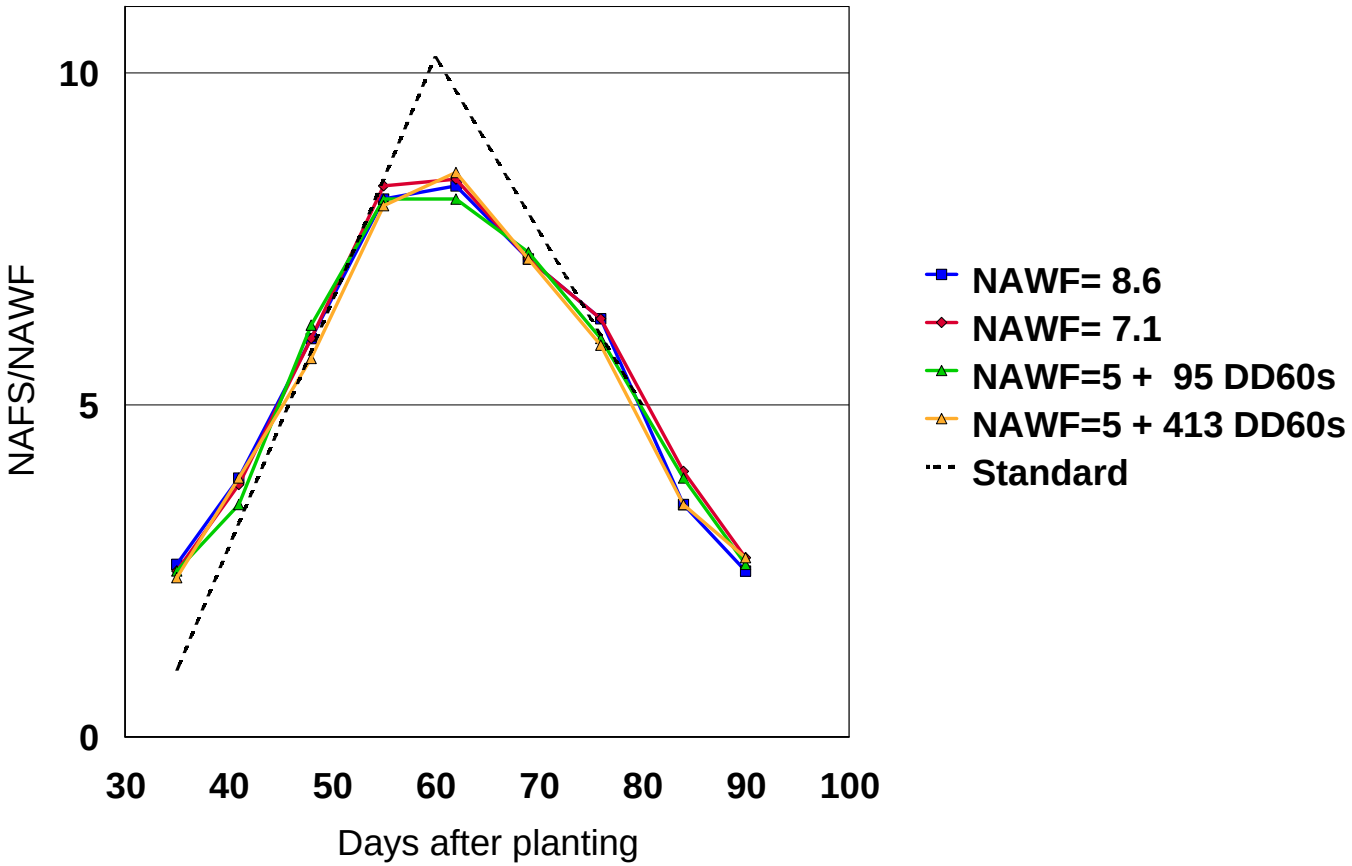


2005 Termination – Natural Population

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

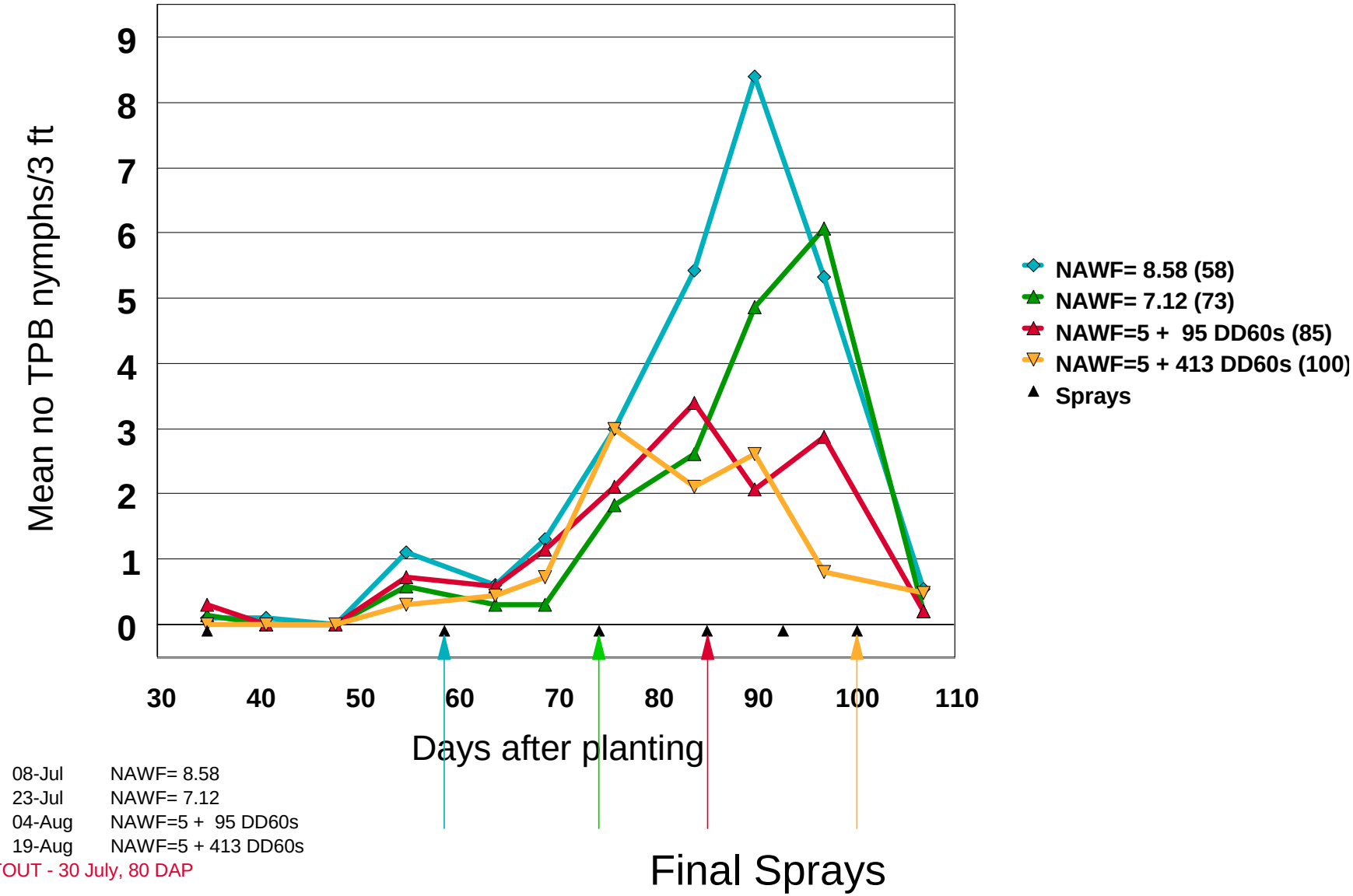
2005 Growth Curves

Insecticide Termination sub-plot effects



TPB Nymphs/3 ft

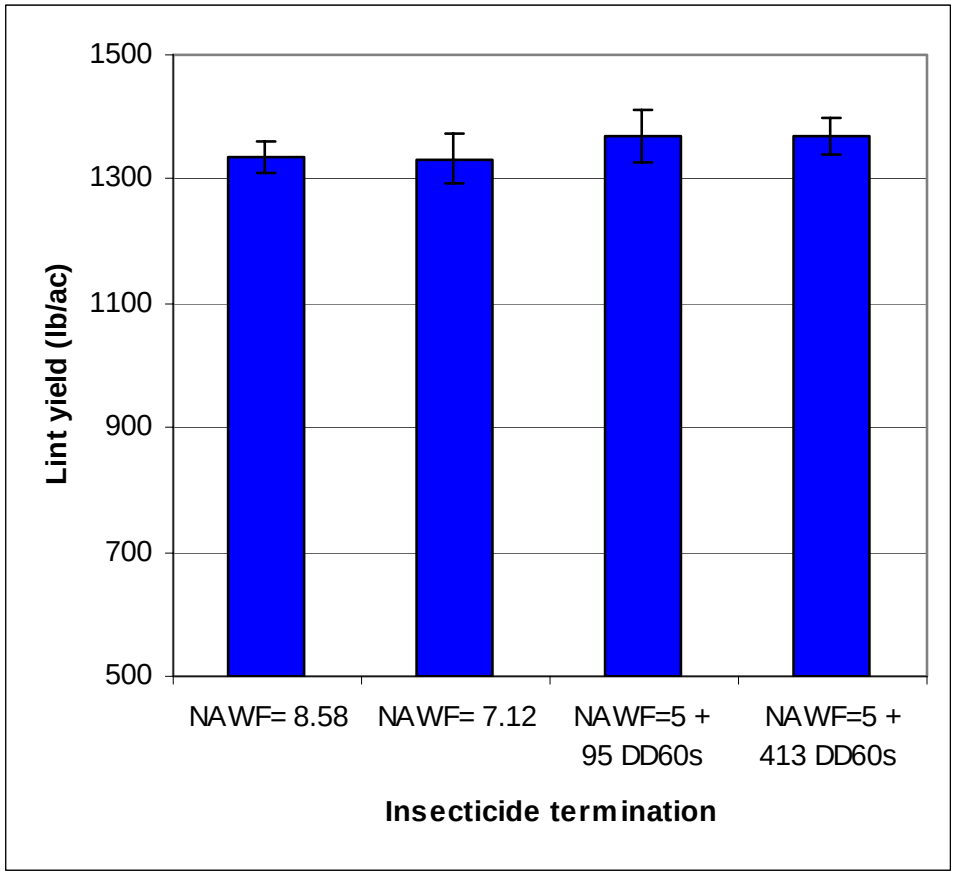
2005 Marianna



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

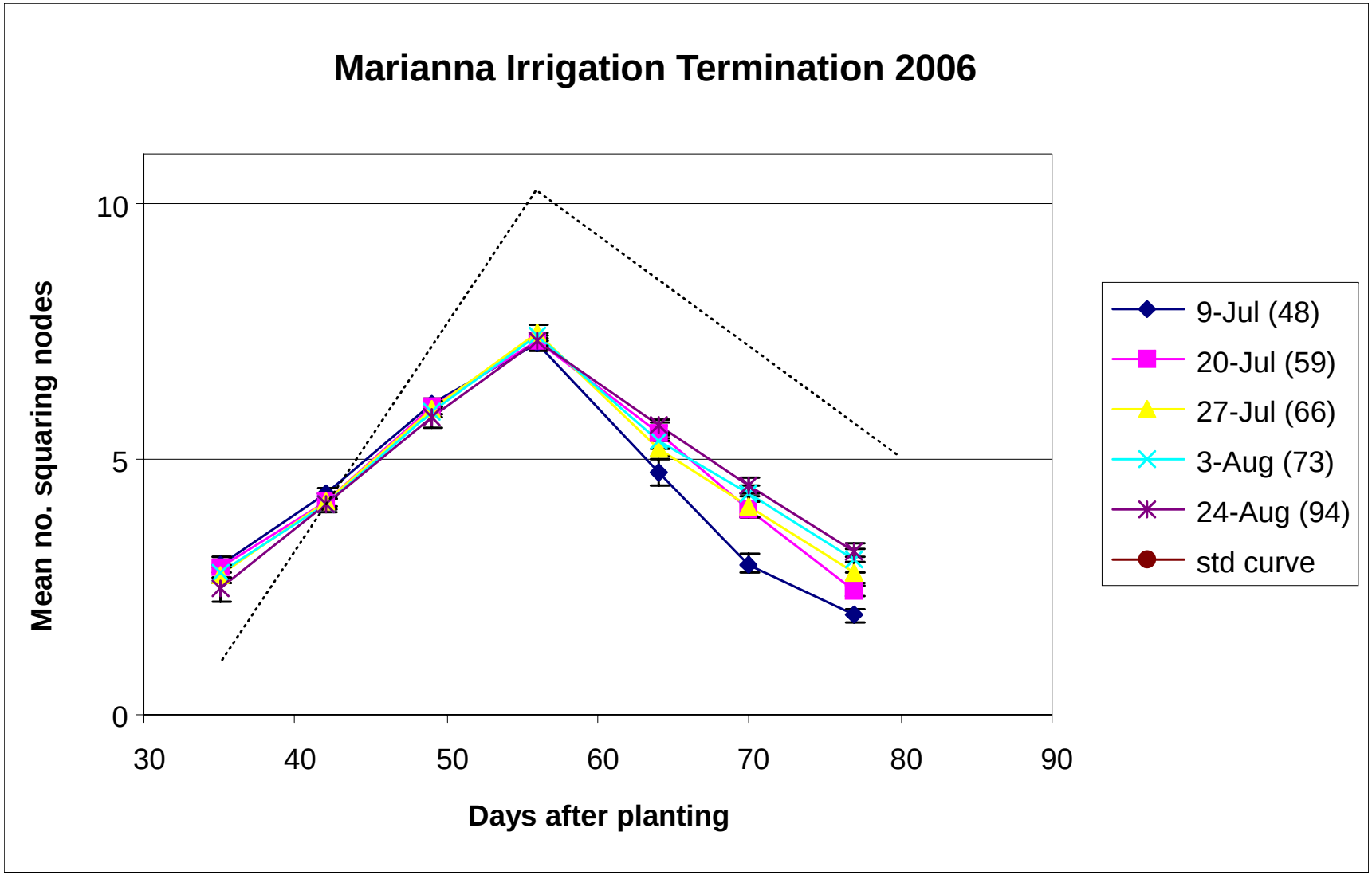


2 pre-flower applications (36 &58 dap)
0, 1, 2 or 4 sprays post flower

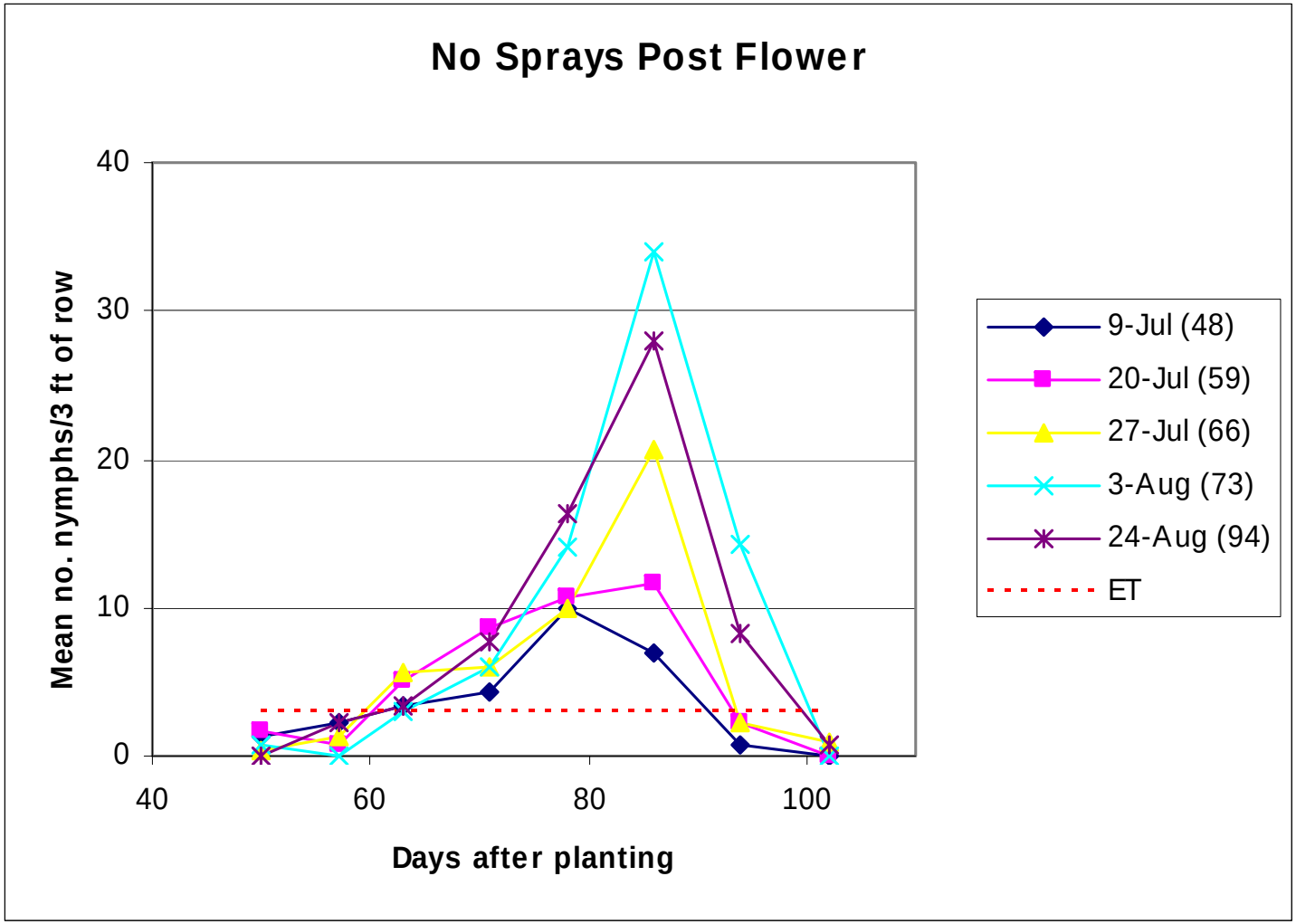
spray dates
08-Jul
23-Jul
04-Aug
19-Aug

Irrigated full season
9 replications

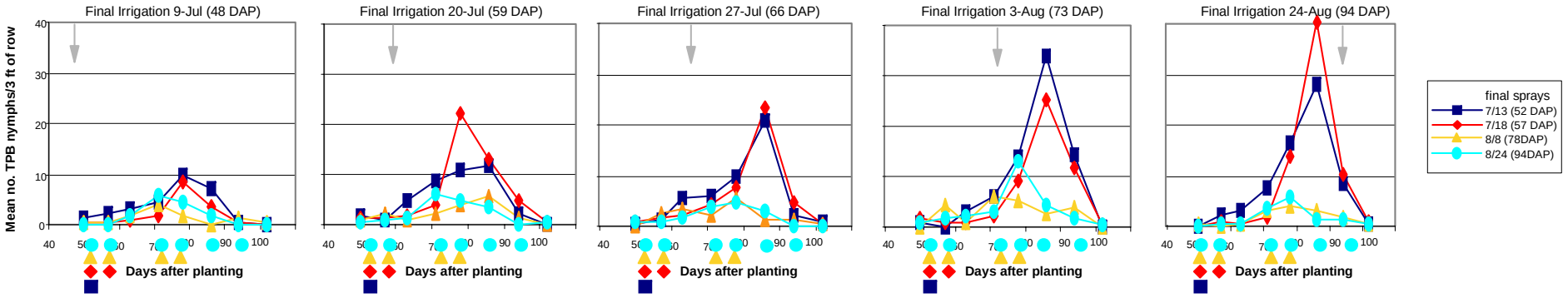
Irrigation Effects CBS 2006



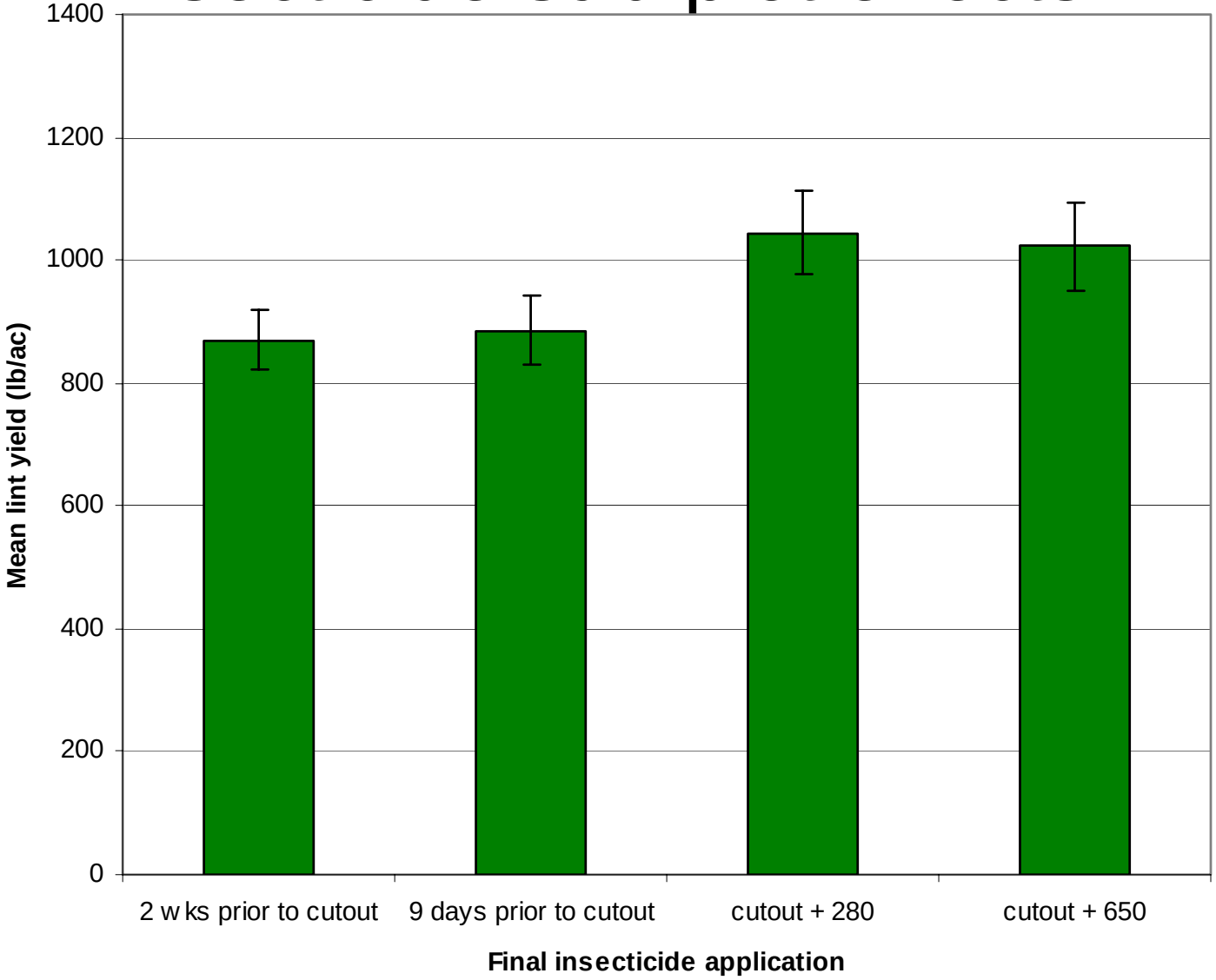
TPB Nymphs/3 ft
CBS 2006



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



Lint Yield – CBS 2006
Insecticide sub-plot effects



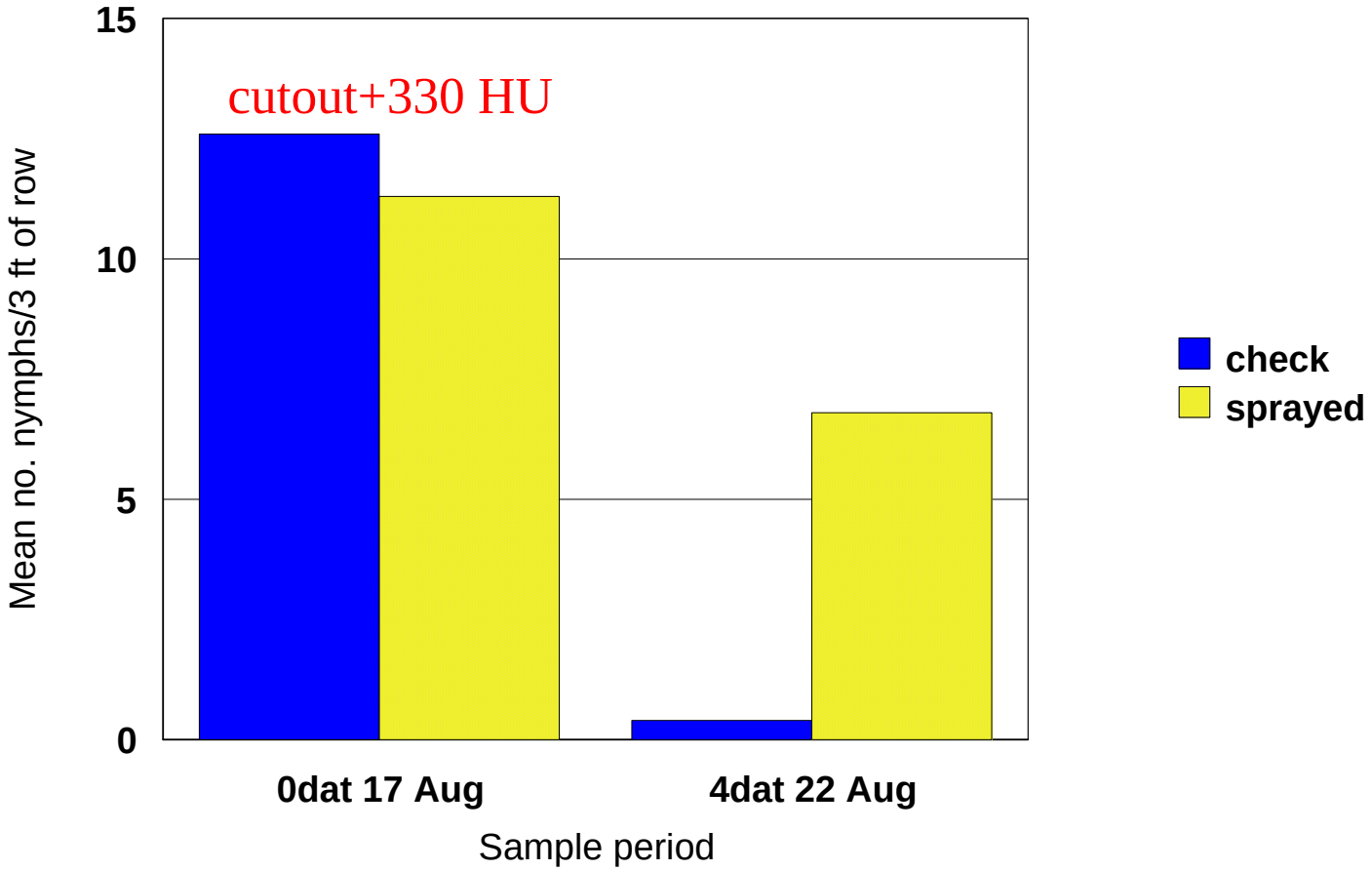
2006 MissCo TPB Validation - when to quit?

- 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

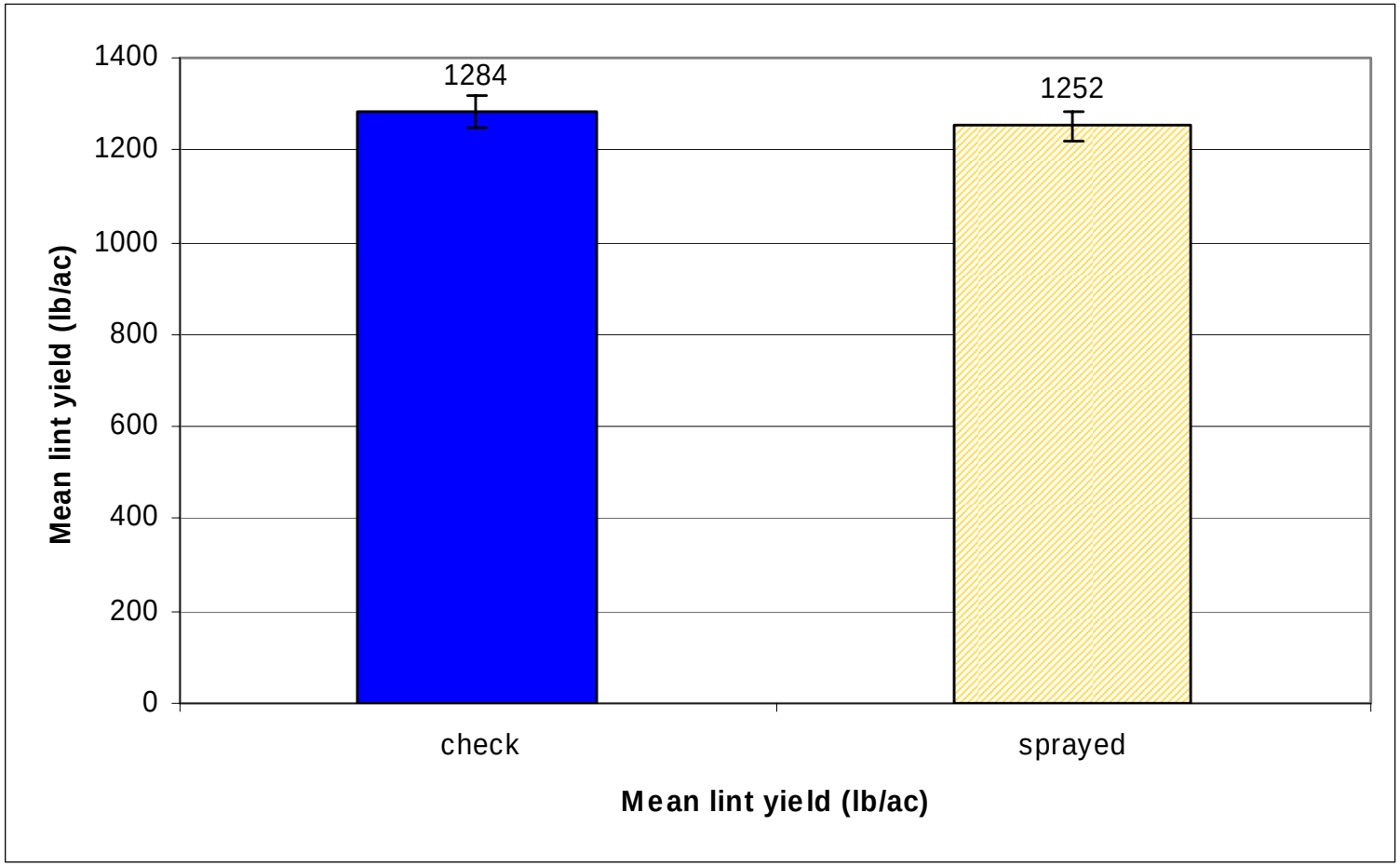
2006 COTMAN Validation

Mississippi County – Cole Hawkins



2006 Lint Yield

TPB Validation Mississippi County – Cole Hawkins



When is the crop no longer vulnerable?

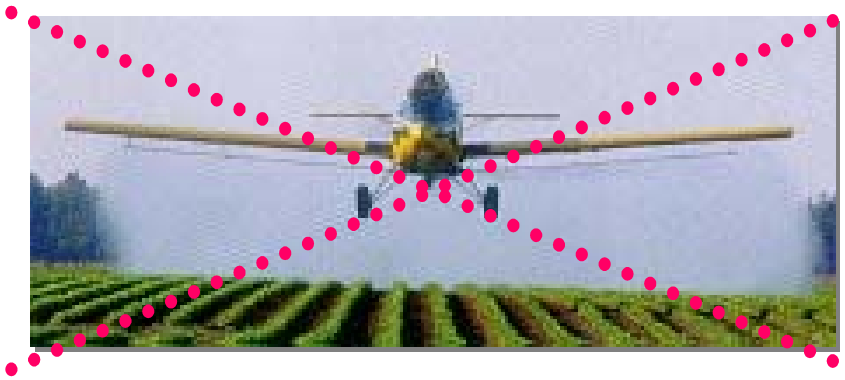
- Infestations after Cutout + 350 HU’s

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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