Recent Advances in Lygus Management

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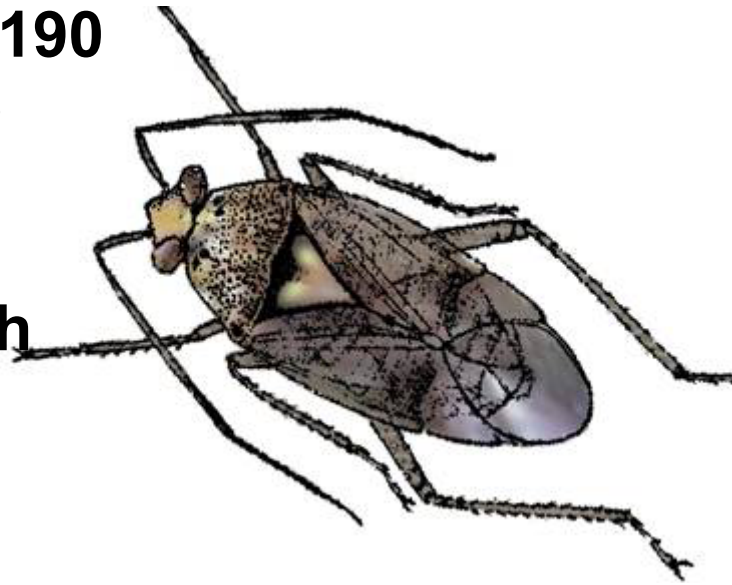

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&

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Lygus hesperus Nymphs

Lygus Reduce Fruiting Sites

Untreated

Treated

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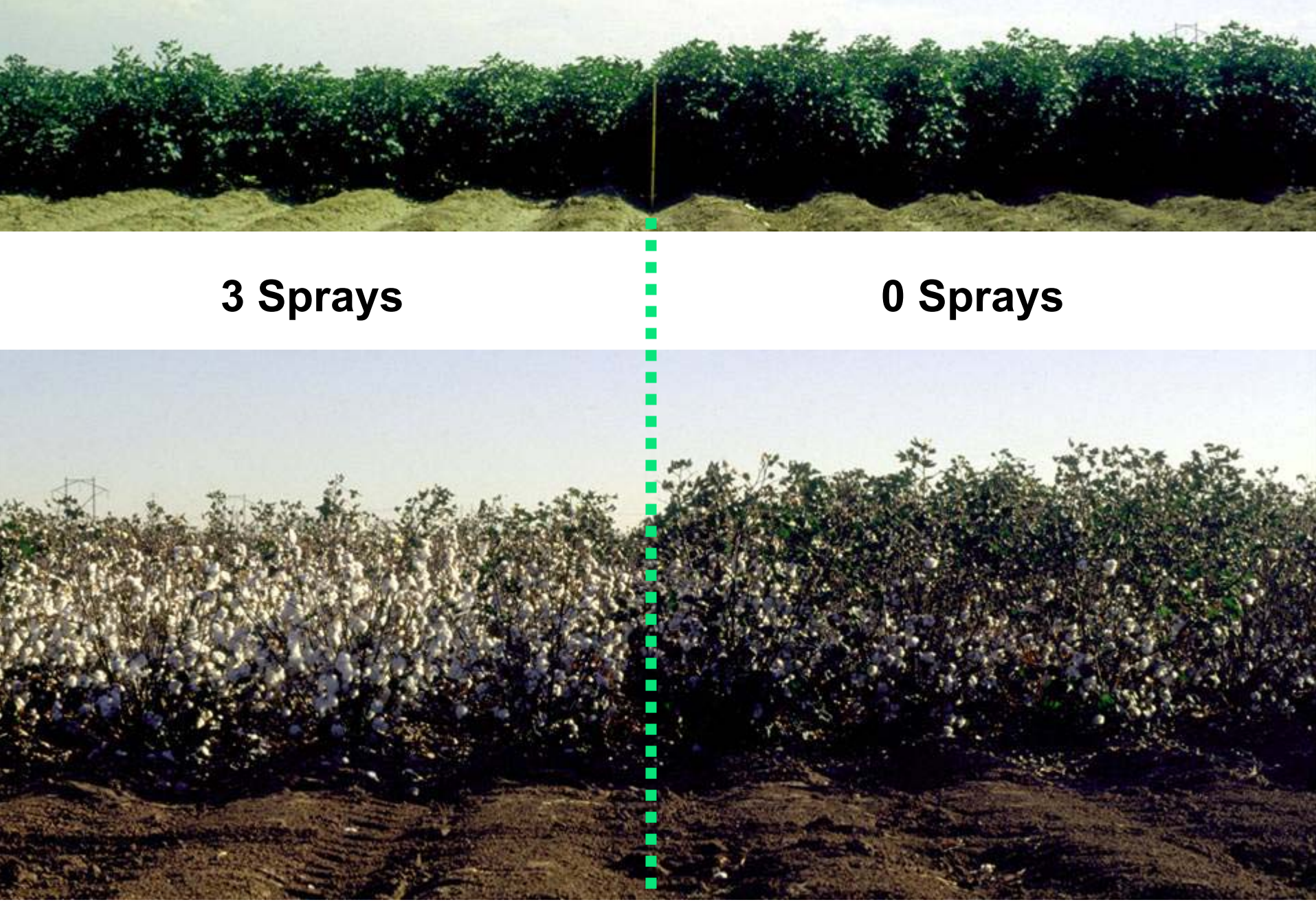

Note height difference

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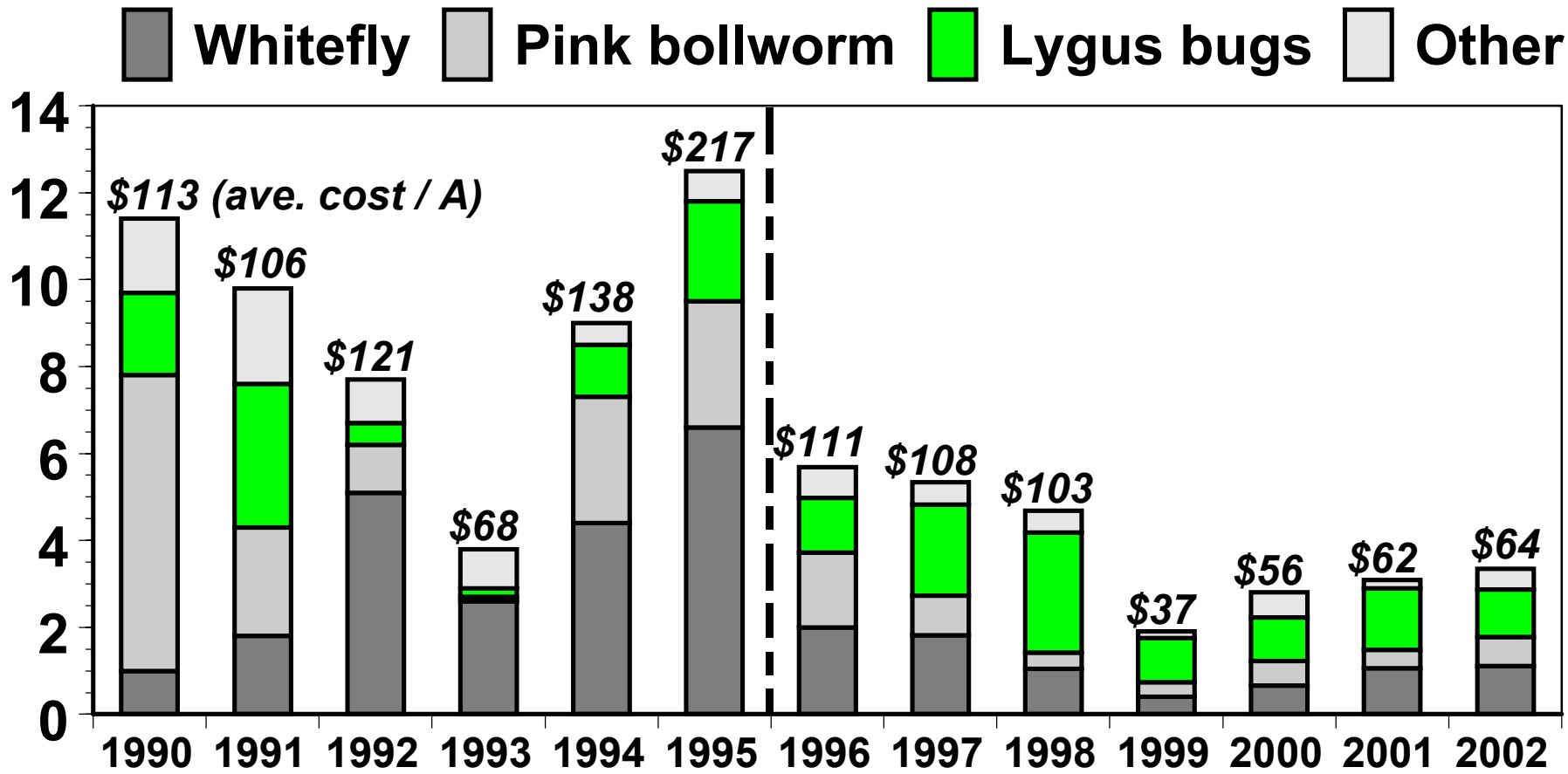
Insecticide Use in AZ Cotton

- Selective technologies have helped to stabilize & reduce usage overall (i.e., Bt cotton & whitefly IGRs in 1996)
- However, current usage reflects the importance of Lygus



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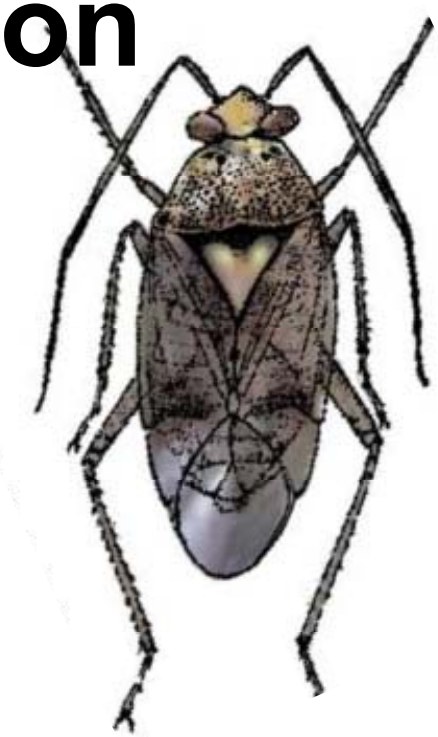
Major Threat to Cotton Production in AZ



- **Over the last 5 years…**
- **45% of all insecticide sprays have been targeted at Lygus**
- **41% of the entire insecticide budget has been invested against Lygus**
- **66% of the yield loss has been attributed to Lygus**

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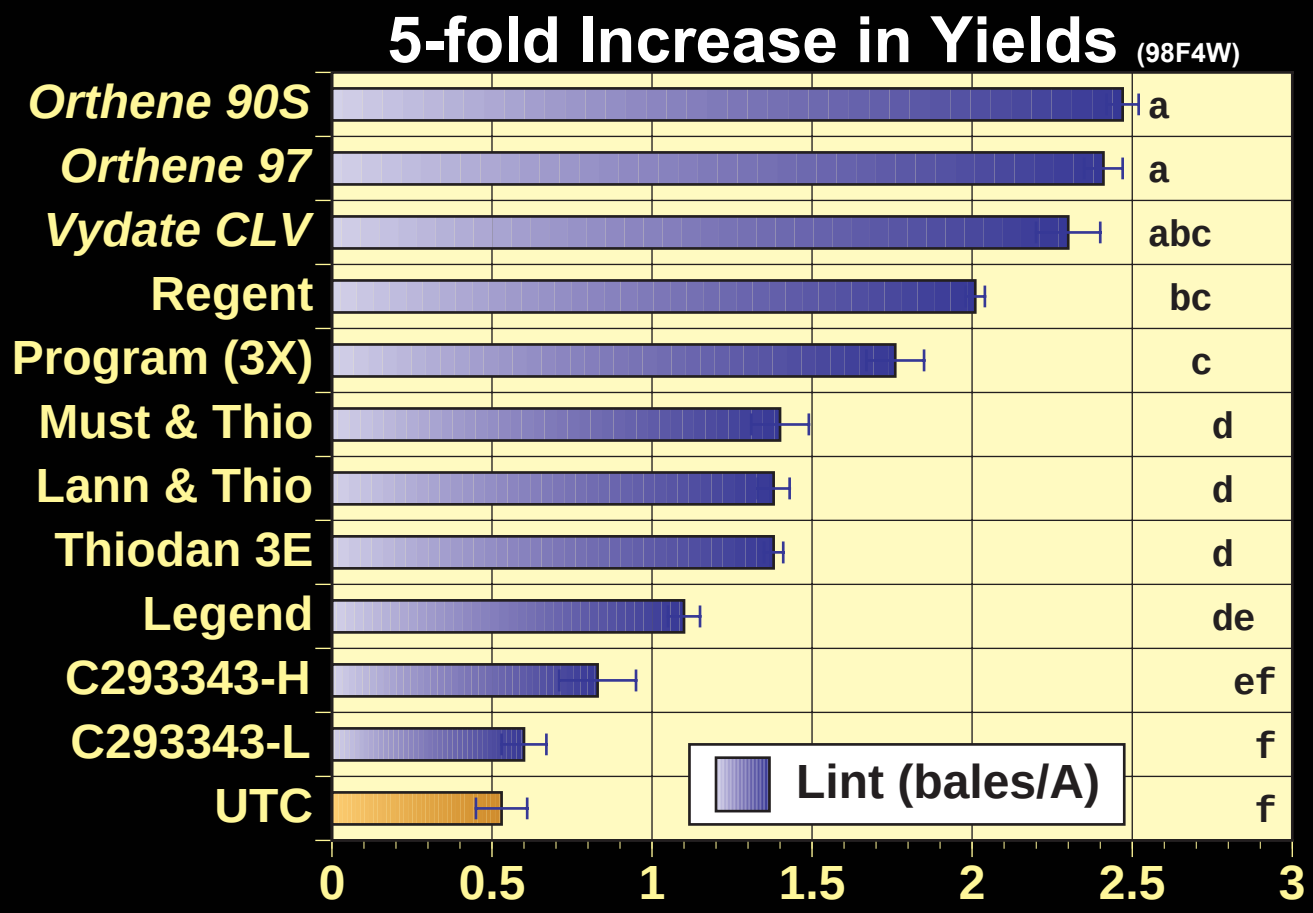
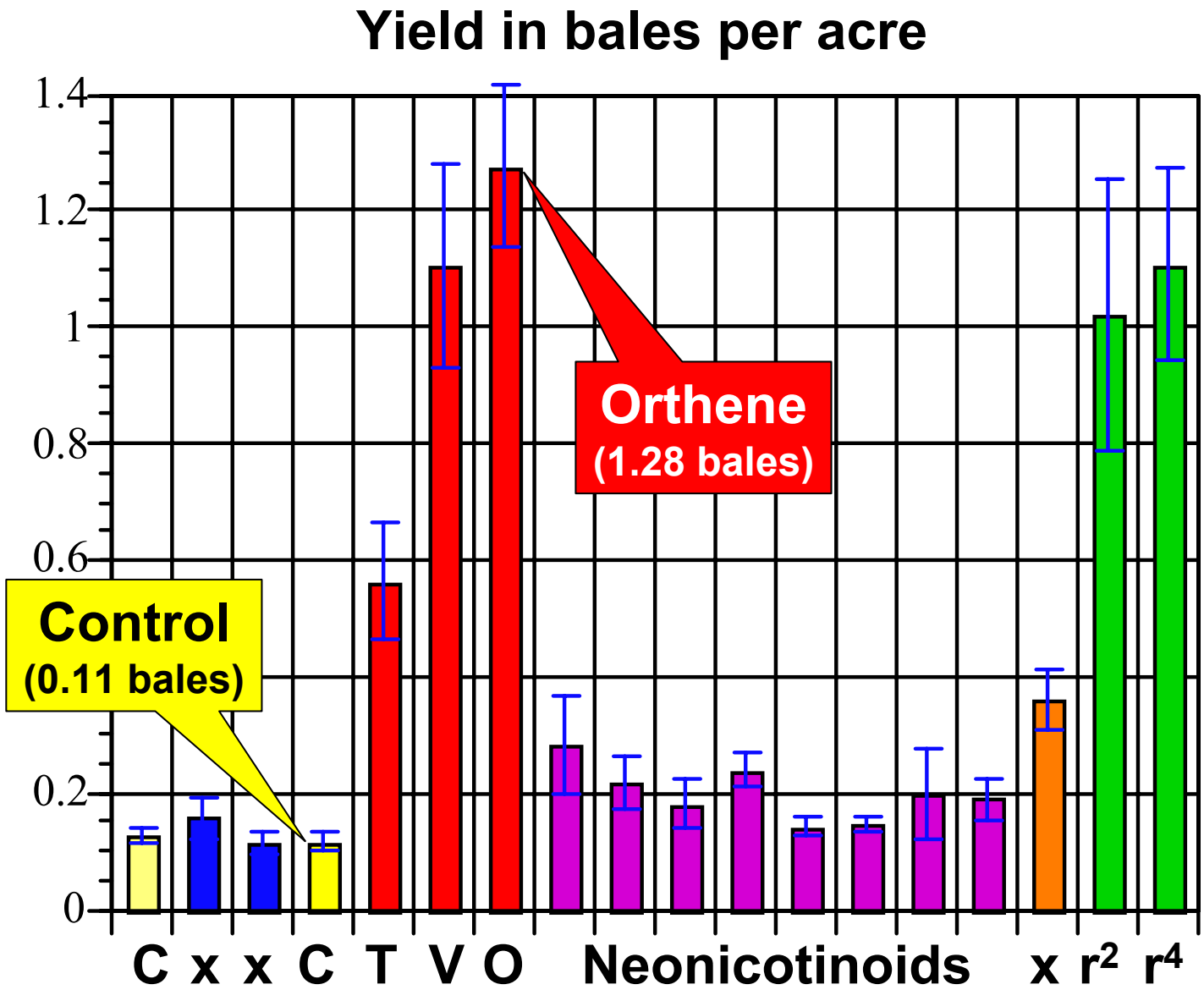
Studies Identified Effective Compounds

(5-fold increase in yield)



> 10-fold Increase in Yields (02F4L)



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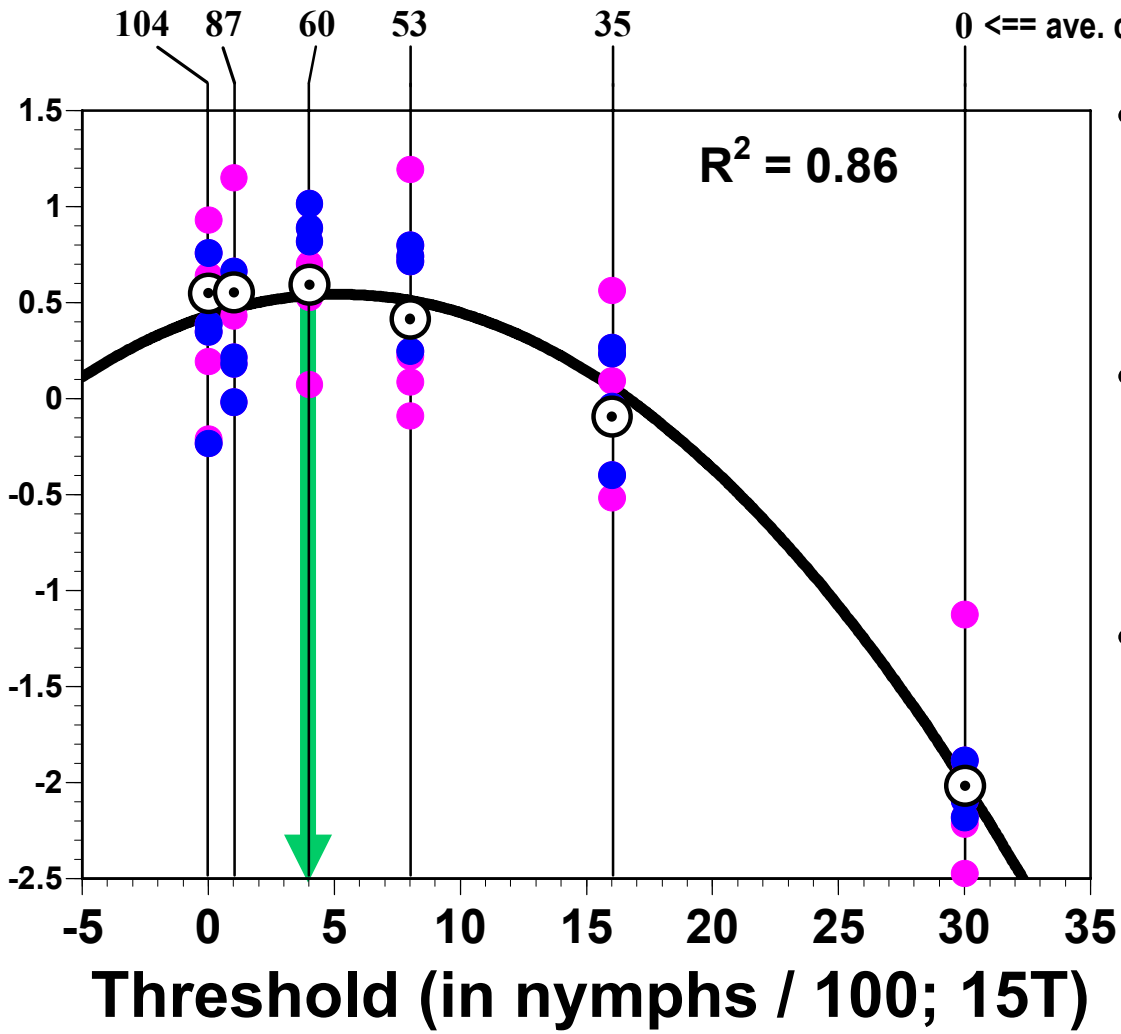
Yield & Revenue : Density



- **Maximum Yield @ 1.7 nymphs / 100**
- **Maximum Revenue @ 5.2 nymphs / 100**
- **Recommendation: 4 nymphs with at least 15 total Lygus per 100 sweeps ('15:4')**

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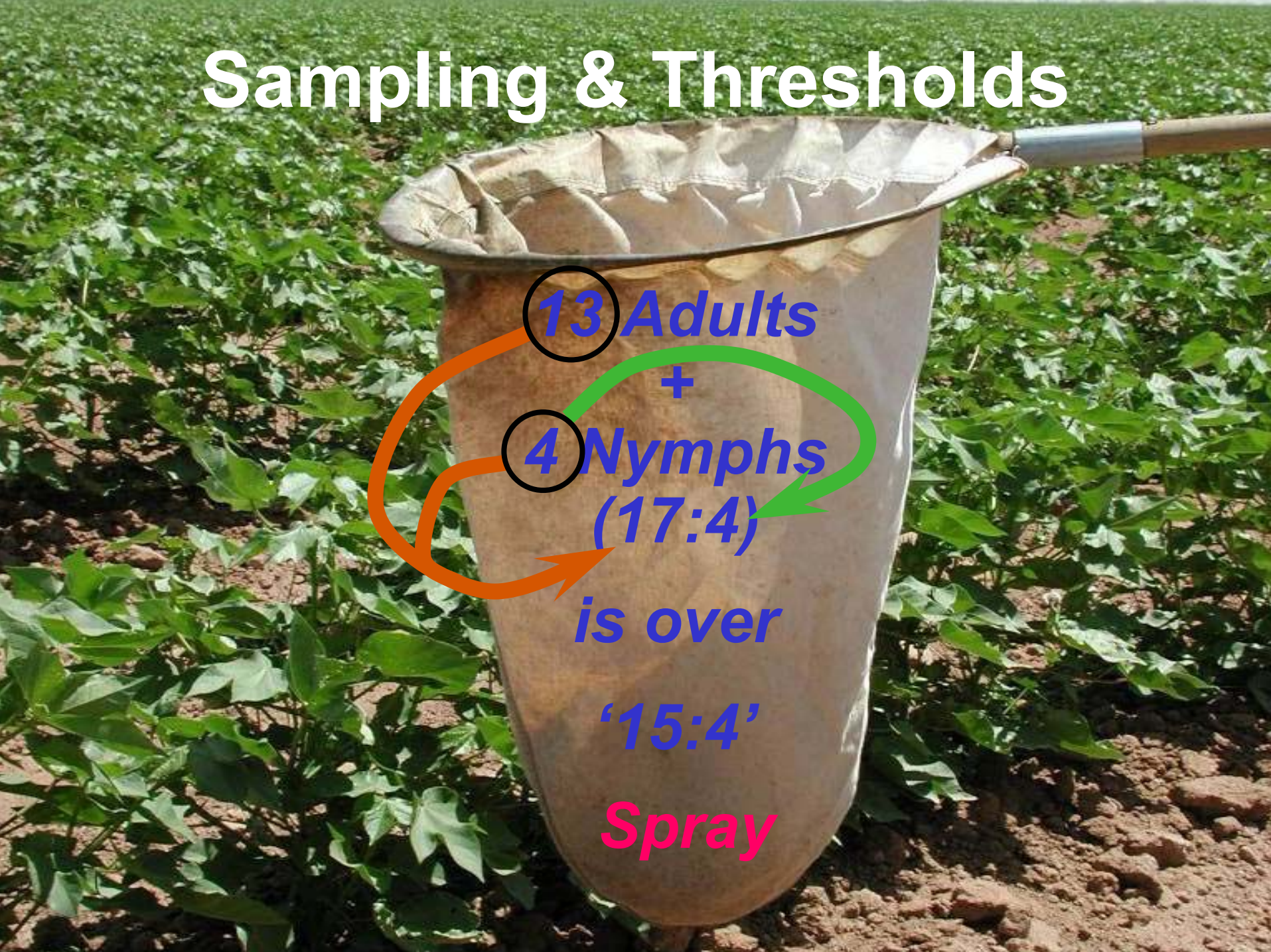
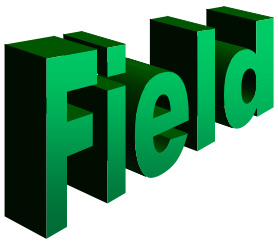
Sampling & Thresholds



Recent Questions in Lygus Management

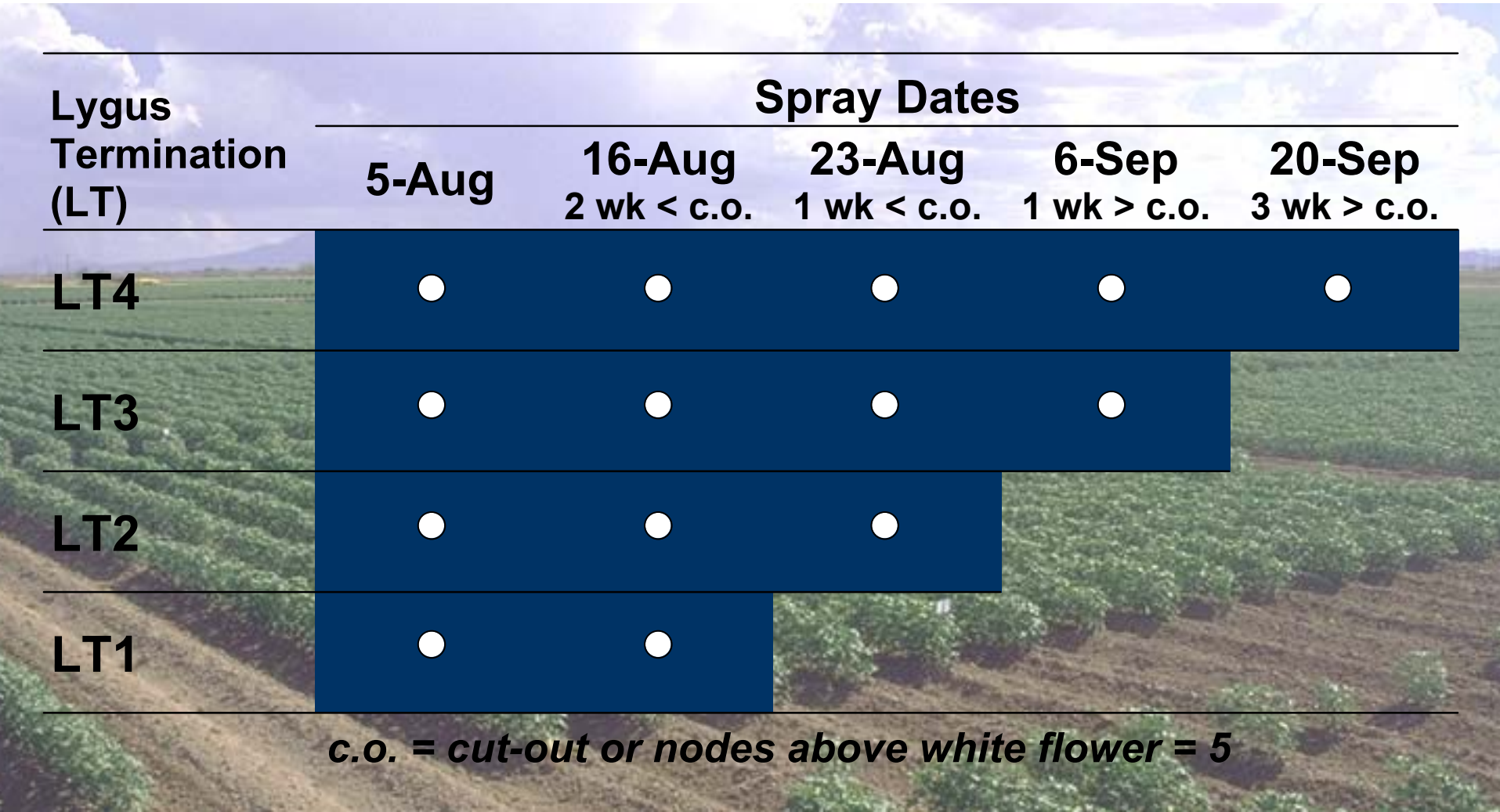


- When should managers <u>discontinue</u> any further Lygus chemical controls in cotton?
  - Late season populations can far exceed thresholds
  - Square (bud) populations decline as crop cuts-out

- Can we estimate & characterize inter-crop effects of Lygus spatially?
  - Severe and negative interactions among forage hay (alfalfa), seed alfalfa, and cotton producers in 1999-2000

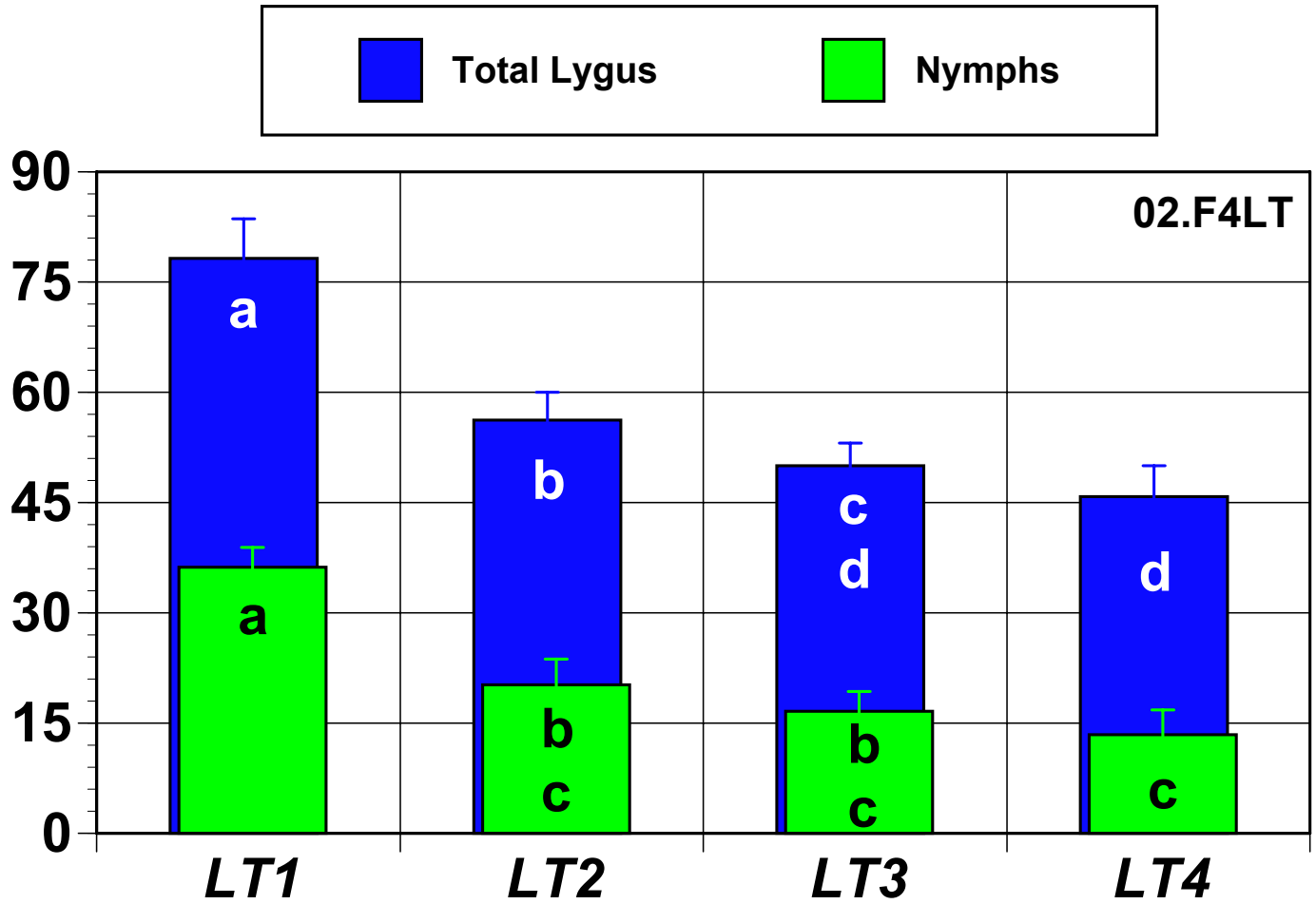
Timing Late Season Controls

(when should you stop spraying?)



c.o. = cut-out or nodes above white flower = 5

Lygus Counts > Cut-out



Lygus Chemical Termination Timing (LT)

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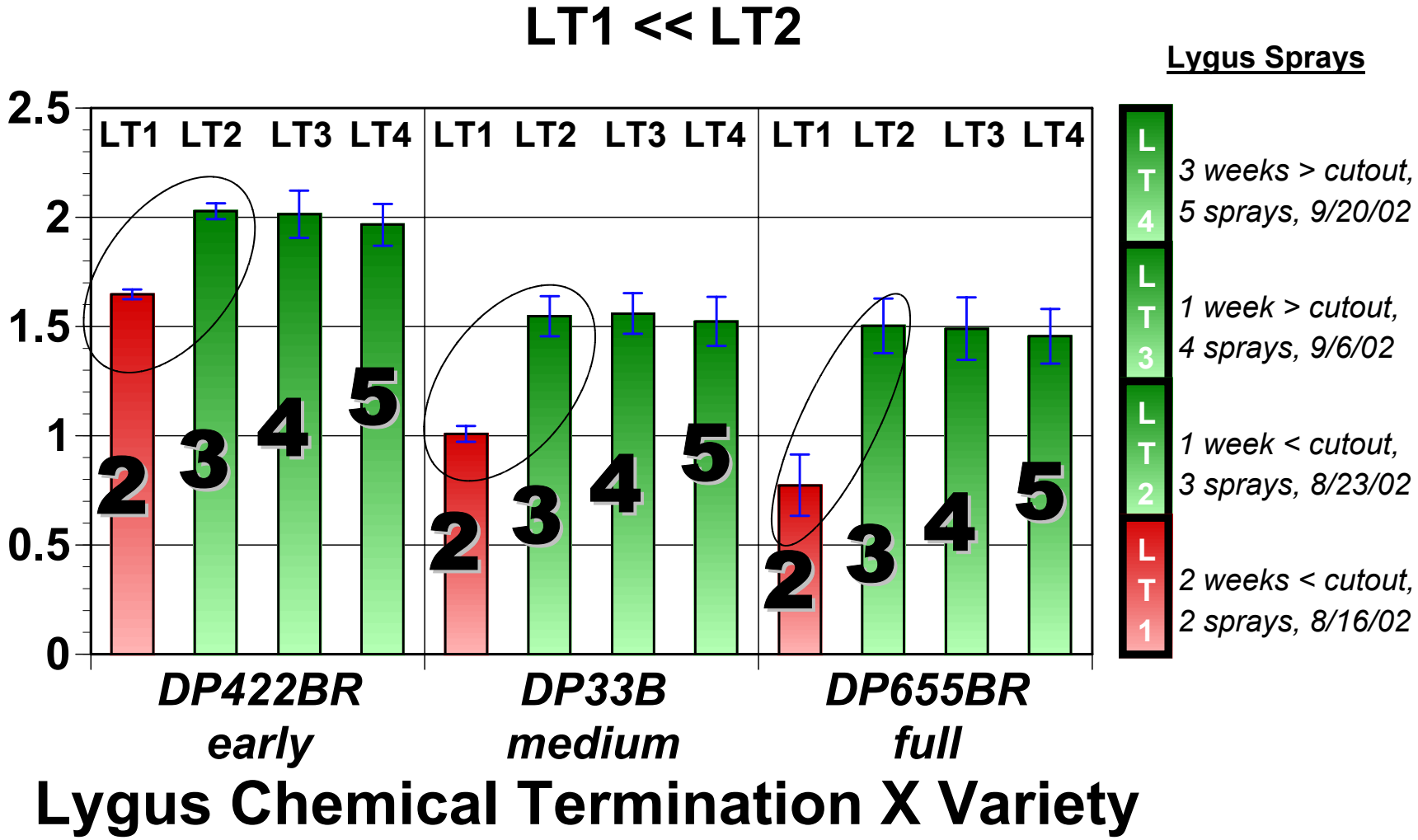
Large Yield Difference



Lygus Chemical Termination X Variety

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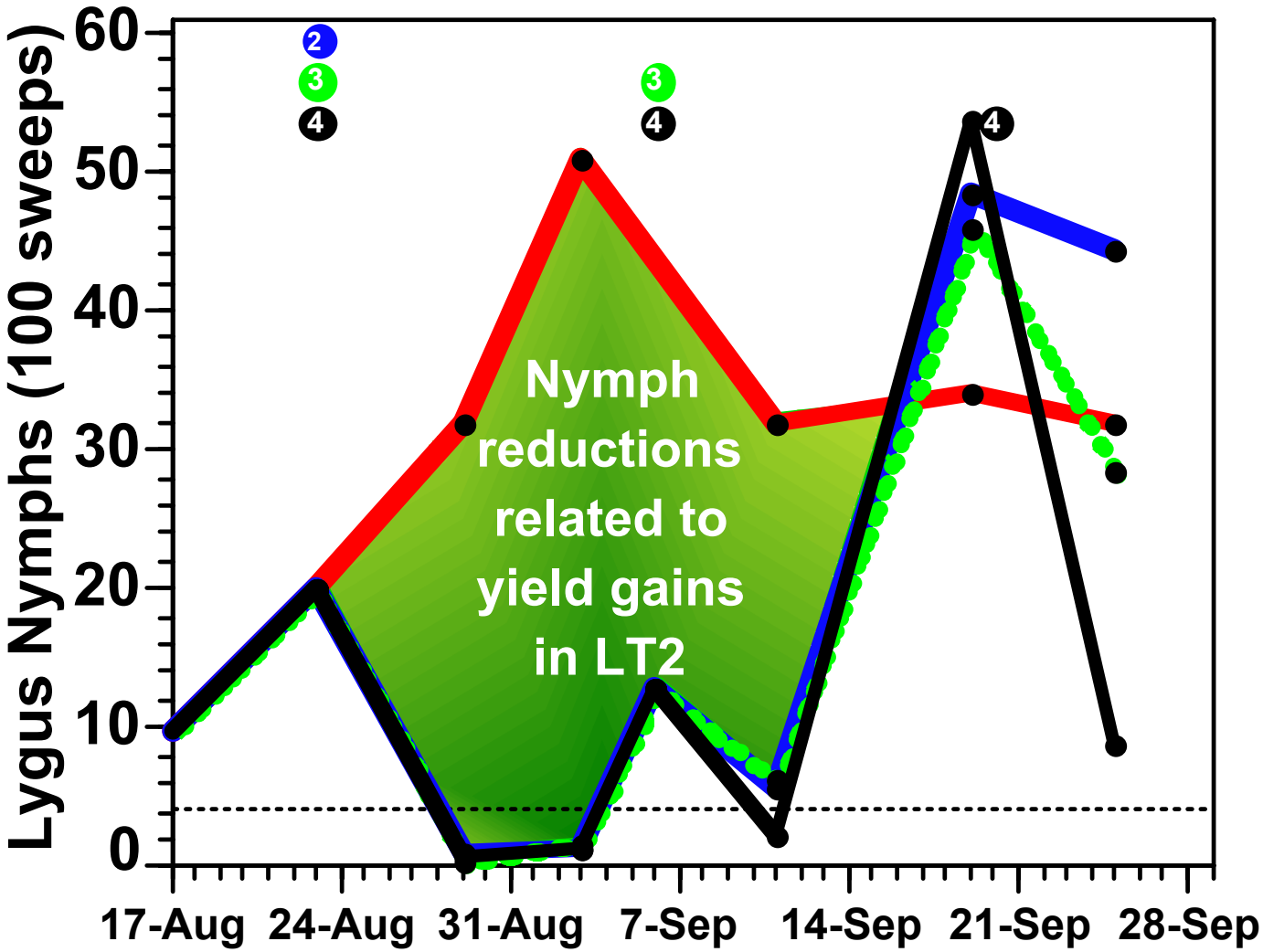
Control of Nymphs is Key!



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Cooperative Extension

Community-Wide Lygus Action Plan

No. 1

The University of Arizona • College of Agriculture

May 18, 2000

Our goal is to manage Lygus *populations over a large, local area in as many crops as possible so as to maximize each grower's ability to profitably produce their crops.*

After agreeing to the above goal, the working group settled on a number of objectives, activities, and actions that would be taken this spring. This note is to update the group on the progress that has been made so far in monitoring *Lygus* activities in the local area.

After receiving and verifying crop maps (courtesy of ACRPC), we identified strategic areas that represent the types, diversity and distribution of crops typical of the western Pinal County area. Starting in March, two trained scouts have been monitoring pre-selected fields/areas for the presence and numbers of *Lygus* bugs. Our intent is to monitor focal areas of production (for seed-alfalfa, forage alfalfa, weeds, and cotton) and the areas immediately adjacent to these fields. Once cotton is available to us for sweeping, we will monitor fields at fixed distances from each of these focal areas.

We are currently monitoring over 50 locations in about 35 fields. All sweeps are standardized on a row-type sweeping pattern (cotton-style) for a total of 25 sweeps per sample. At least 100 sweeps are made in each focal area, and all numbers are standardized on a per 100 sweeps basis. The relatively dry winter has not provided for much in the way of large stands of weeds. Further, those weeds that are present change in composition, size, and even presence over time. Thus, the "weeds" numbers do not necessarily track the same number of sites each week. Similarly, no sweeping is conducted in sprayed fields (while posted), nor in cut or recently-watered fields.

Interpretation of this highly summarized data must be guarded. For now, they depict generalized trends of *Lygus* presence and abundance. If the patterns begin to deviate significantly among fields, it will be necessary to examine individual field responses.

General Observations to Date

Lygus are present in most of the areas surveyed. Most of the weed species examined have not harbored large numbers of *Lygus*. One exception, Alkali Heliotrope (*Heliotropium curassavicum* var. *oculatum*), was found to be an excellent reproductive host for *Lygus*. This weed has white flowers and grows along some ditch banks, though it has not been abundant in our area. Lesquerella, an experimental crop, was found this past week to harbor large numbers of *Lygus* adults and nymphs (> 150 / 100 sweeps). *Lygus* numbers have steadily increased in seed alfalfa and have or will likely reach densities that require control.

Figure 1: Alkali heliotrope (Heliotropium curassavicum var. oculatum).

Extension Program

- **Initiated in 2000 in response to extreme and negative interactions among producers of different crops**
- **Communication / Awareness**
- **Education**
- **Systematic Survey / Research**

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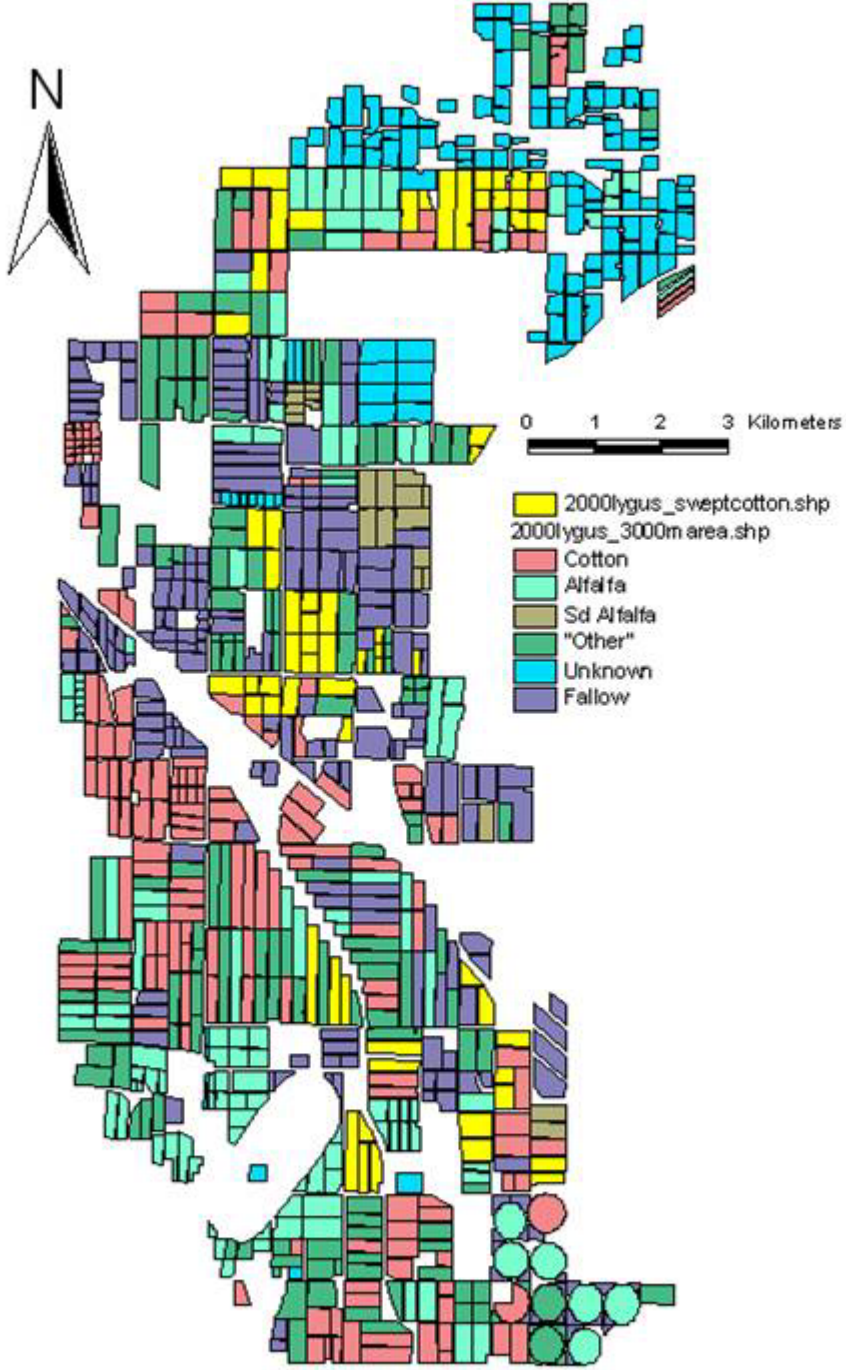
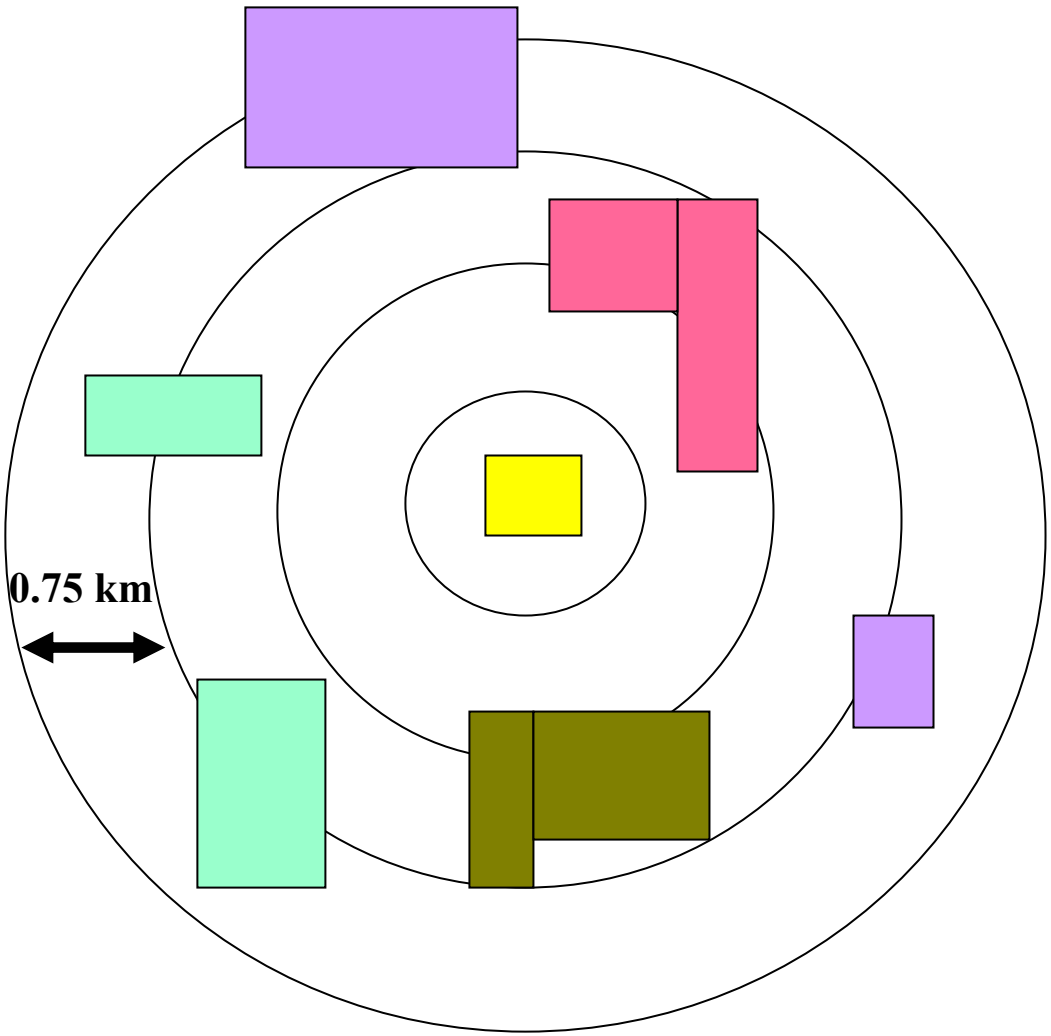
Spatial Study

- Two townships, spring & early summer hosts (April - July)
- Cotton, alfalfa, seed alfalfa, fallow, weeds, and small grains; georeferenced
- Sweeps (15 in. diam.) from each potential host weekly
- Examine source / sink relationships among crops



Focal Cotton Fields (50)



- Focal cotton field
- Seed alfalfa
- Forage alfalfa
- Cotton
- Fallow

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Ring Analyses of Area & Distance Effects on Lygus

- **Around focal cotton fields, estimate area of different crops within each 0.75 km concentric ring**
  - **Area of unidentified & unknown crops similar for each ring (ca. 21%)**
- **Each crop's area within a ring is multiplied by the mean density of Lygus; Estimate of source potential**
- **Estimate the association between Lygus density in focal fields and the source potential of each crop type**

Mean Lygus Density (adults & nymphs)

Crop Type	N	Lygus Density (log D + 1)*
Seed Alfalfa	9	1.50a
Forage Alfalfa	34	1.45a
Fallow	3	1.44a
Cotton	72	0.69b

* Values fb same letter not significantly different (P > 0.05)

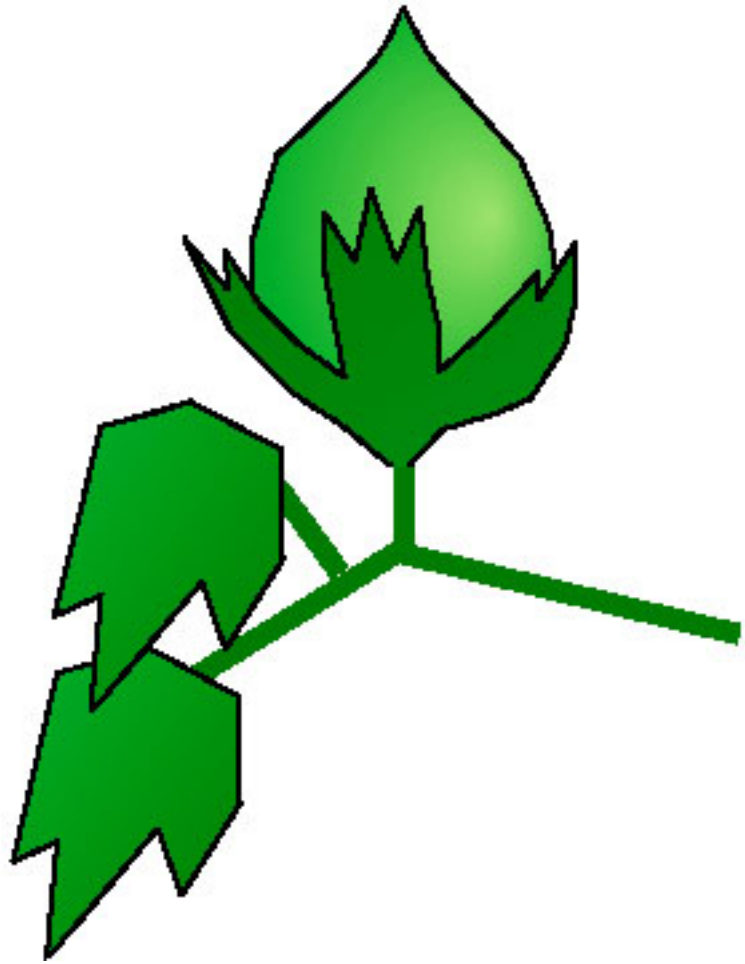
Source : Sink Effects

Ring	Crop Type	Coefficient from Multiple Regression $(x\ 10^{-6})^2$
1) 0.75 km	Seed Alfalfa	1.1**
	Forage Alfalfa	0.01
	Fallow	0.008
	Cotton	-0.58*
2) 0.75 - 1.5 km	Seed Alfalfa	0.7*
	Forage Alfalfa	0.2
	Fallow	0.04
	Cotton	0.1

no significant associations in rings 3 & 4; * P = 0.06; ** P < 0.001

Lygus Associations

- **Seed alfalfa fields are sources of Lygus for cotton fields. This effect does not extend beyond 1.5 km.**
- **Cotton fields are sinks for Lygus. This effect disappears beyond 0.75 km.**
- **Strategic placement of crops could help alleviate Lygus problems.**



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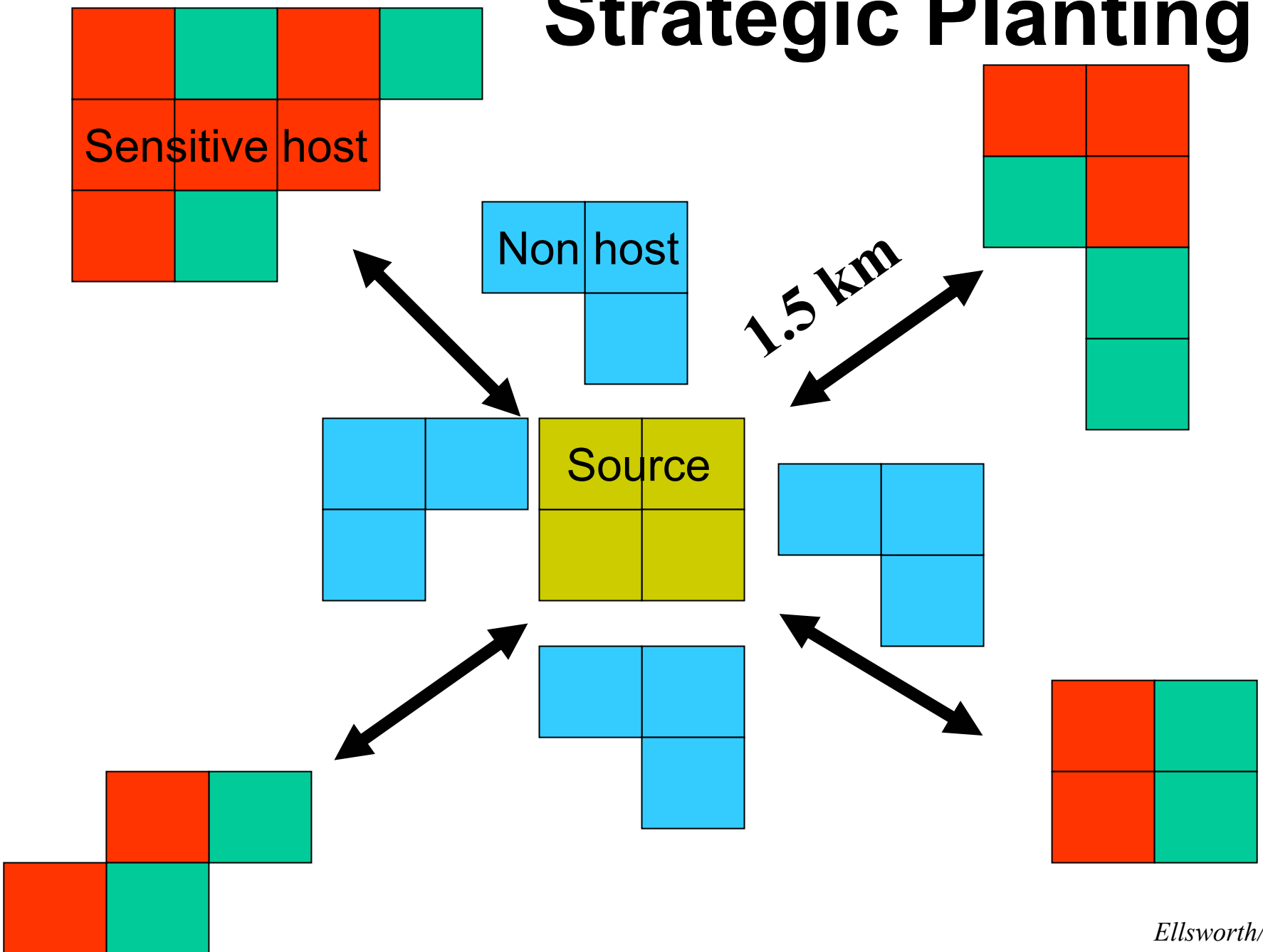
Strategic Planting



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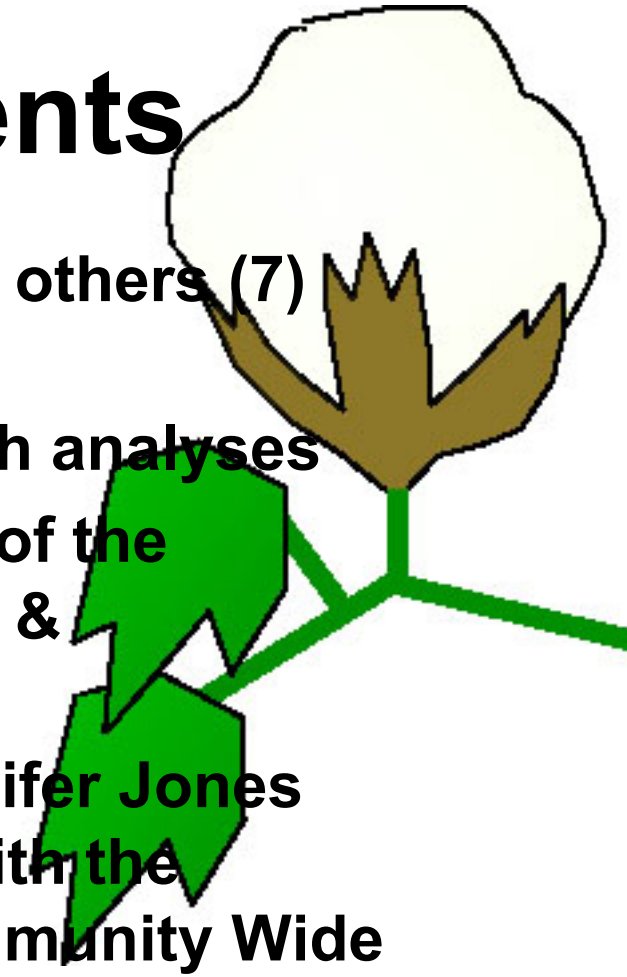
Acknowledgments

- Virginia Barkley who supervised and others (7) who conducted the sampling
- Christa Ellers-Kirk for assistance with analyses
- Larry Antilla, Jerry Kerr and the rest of the ACRPC staff who provide crop maps & coordinates
- Steve Husman, Dave Langston, Jennifer Jones and cooperating growers involved with the implementation of the Maricopa Community Wide Lygus Action Plan
- ACGA and Cotton Incorporated who supported (pce) the Lygus termination studies



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Information

- All University of Arizona crop production & crop protection information is available on our web site,
- Arizona Crop Information Site (ACIS), at
- *http://ag.arizona.edu/crops*