UNIVERSITY OF MINNESOTA
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Institute of Ag Professionals

Proceedings of the

2015 Crop Pest Management Shortcourse &

Minnesota Crop Production Retailers Association Trade Show

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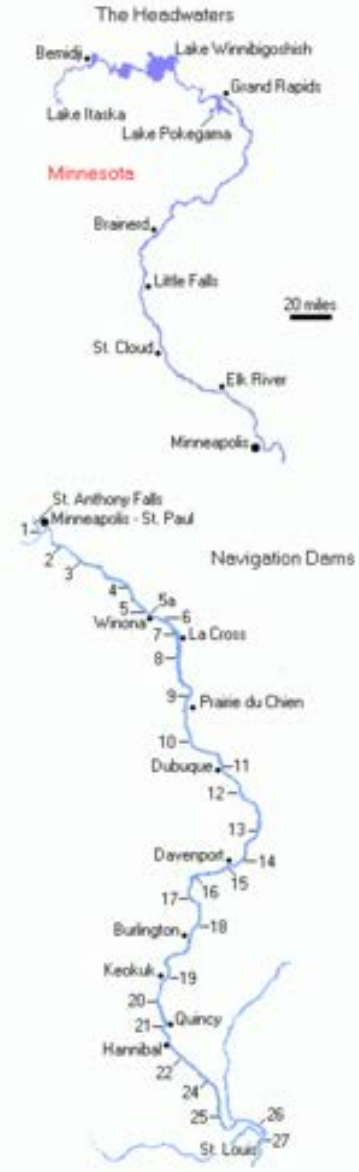
Insecticide Resistance:
A Southern Perspective Y'all

Jeff Gore – MSU, DREC, Stoneville

We Are Here

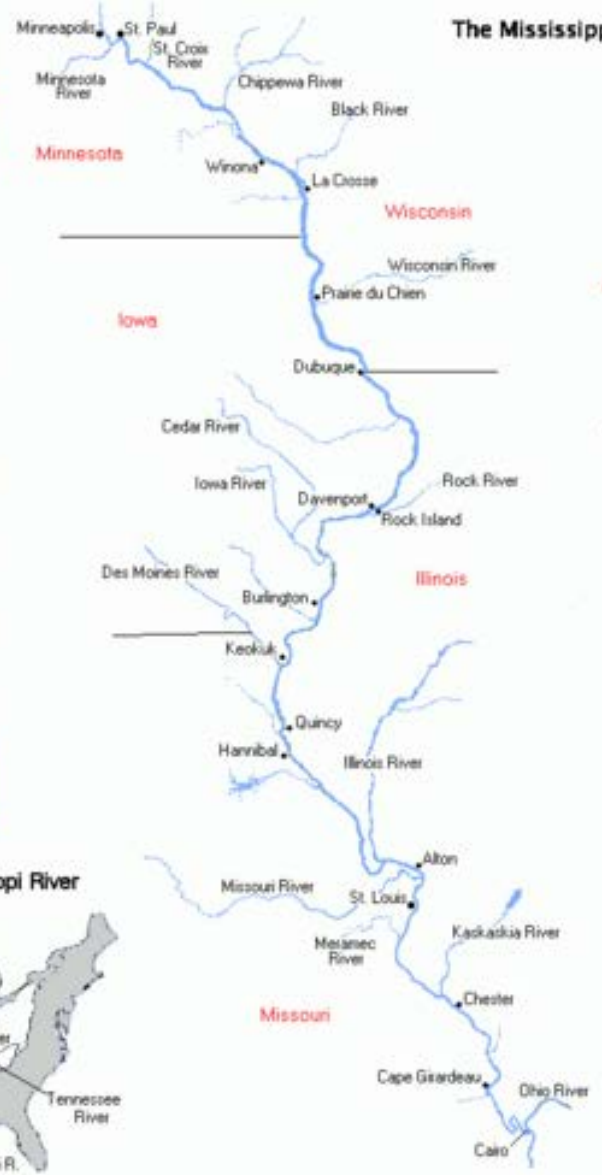
Minnesota
Wisconsin
Iowa
Illinois
Kentucky
Missouri
Tennessee
Arkansas
Louisiana
Mississippi

The Mississippi River
Minneapolis
St. Paul
Croix River
Minnesota River
Chippewa River
Black River
Minnesota
Winona
La Crosse
Wisconsin
Wisconsin River
Prairie du Chien
Iowa
Dubuque
Cedar River
Iowa River
Davenport
Rock River
Rock Island
Des Moines River
Illinois
Keokuk
Quincy
Hannibal
Illinois River
Alton
Missouri River
St. Louis
Meramec River
Kaskaskia River
Chester
Missouri
Cape Girardeau
Ohio River
Cairo
Cape Girardeau
Ohio River
Missouri
Cairo
St. Francis River
Tennessee
Arkansas
Memphis
White River
Arkansas River
Greenville
Mississippi
Yazoo River
Big Black River
Louisiana
Vicksburg
Natchez
Louisiana
Baton Rouge
New Orleans
0 100 miles
0 200 km
Gulf of Mexico

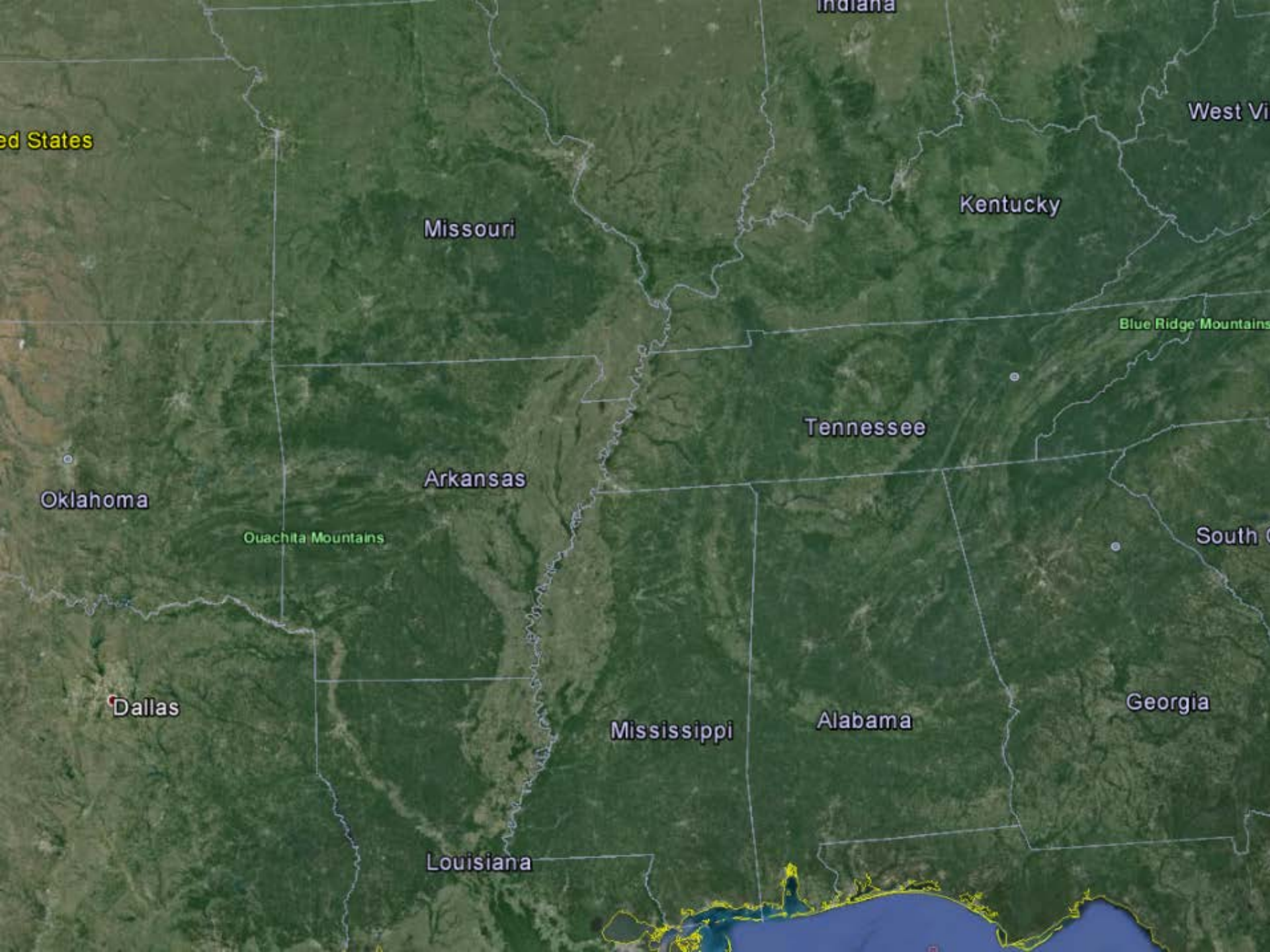

The Headwaters
Bemidji
Lake Winnibigoshish
Grand Rapids
Lake Itaska
Lake Pokegama
Minnesota
Brainerd
Little Falls
20 miles
St. Cloud
Elk River
Minneapolis
St. Anthony Falls
Minneapolis - St. Paul
Navigation Dams
Winona
La Cross
Prairie du Chien
Dubuque
Davenport
Burlington
Keokuk
Quincy
Hannibal
St. Louis

Sub-basins of the Mississippi River
Missouri River
Upper Miss. River
Ohio River
Arkansas River
Tennessee River
Lower Mississippi R.

The Mississippi River



Sub-basins of the Mississippi River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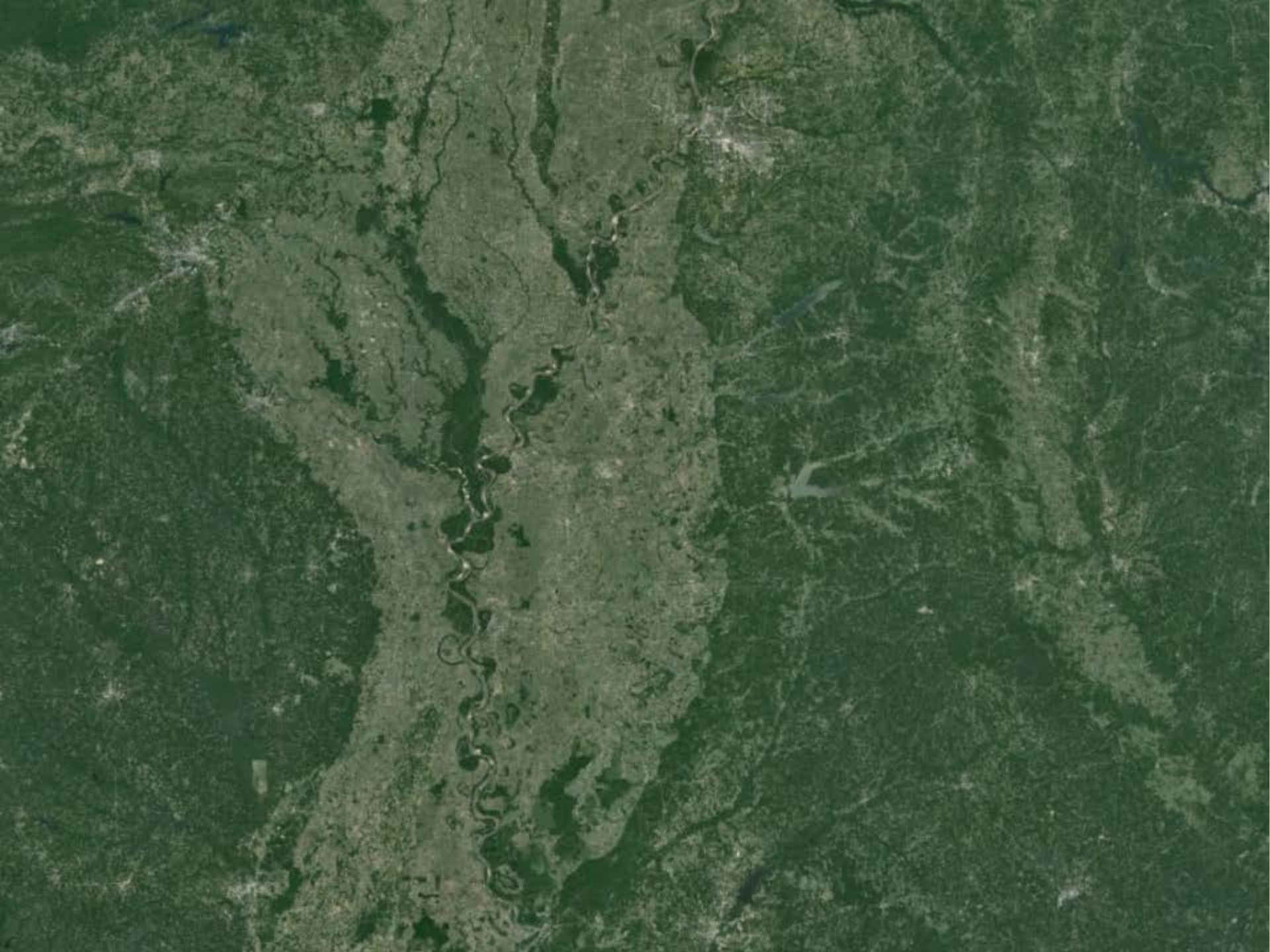
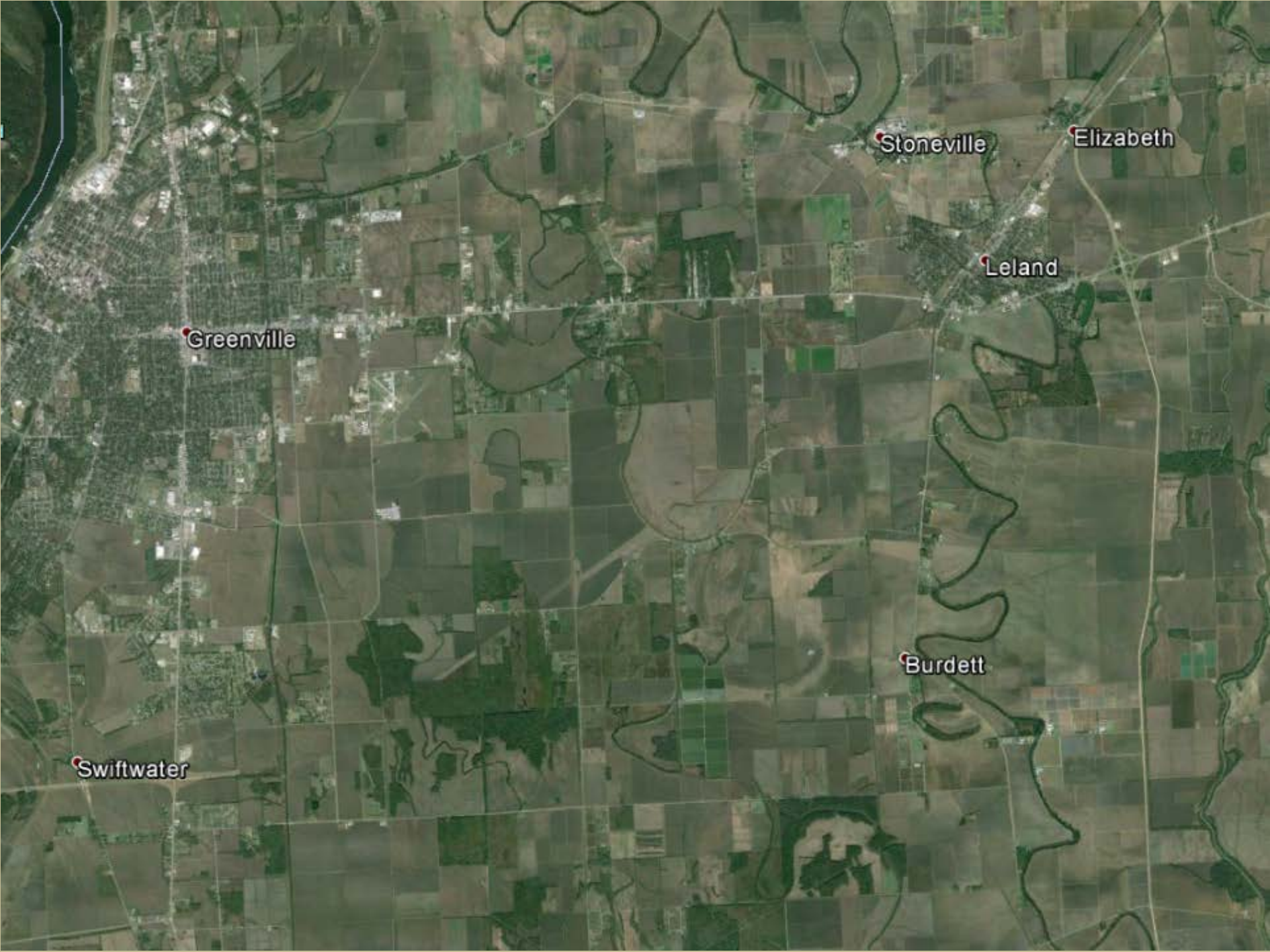
West Vi
ed States
Kentucky
Missouri
Blue Ridge Mountains
Tennessee
Arkansas
Oklahoma
Ouachita Mountains
South
Dallas
Georgia
Mississippi
Alabama
Louisiana




Stoneville
Elizabeth
Leland
Greenville
Burdett
Swiftwater

Mid-South = Wild West ?

- 55 + inches of annual rainfall
- Growers can switch crops yearly to capitalize on commodity prices
- Creates unique opportunity for pest outbreaks
- Temperate climate

Crops in the Mid-South

- Cotton
- Soybean
- Corn
- Grain Sorghum
- Rice
- Peanut
- Sweet Potato
- Limited Vegetables

Factors That Influence Pest Populations

- Landscape Diversity
  - Cultivated Crops
  - Wild Hosts
  - Proximity to each other
- Planting Date and Tillage Practices
- Pest Management Practices Across the Landscape
  - What you do in one will influence the other
    - Resistance
    - Traits

Soybean Looper Damage 2010

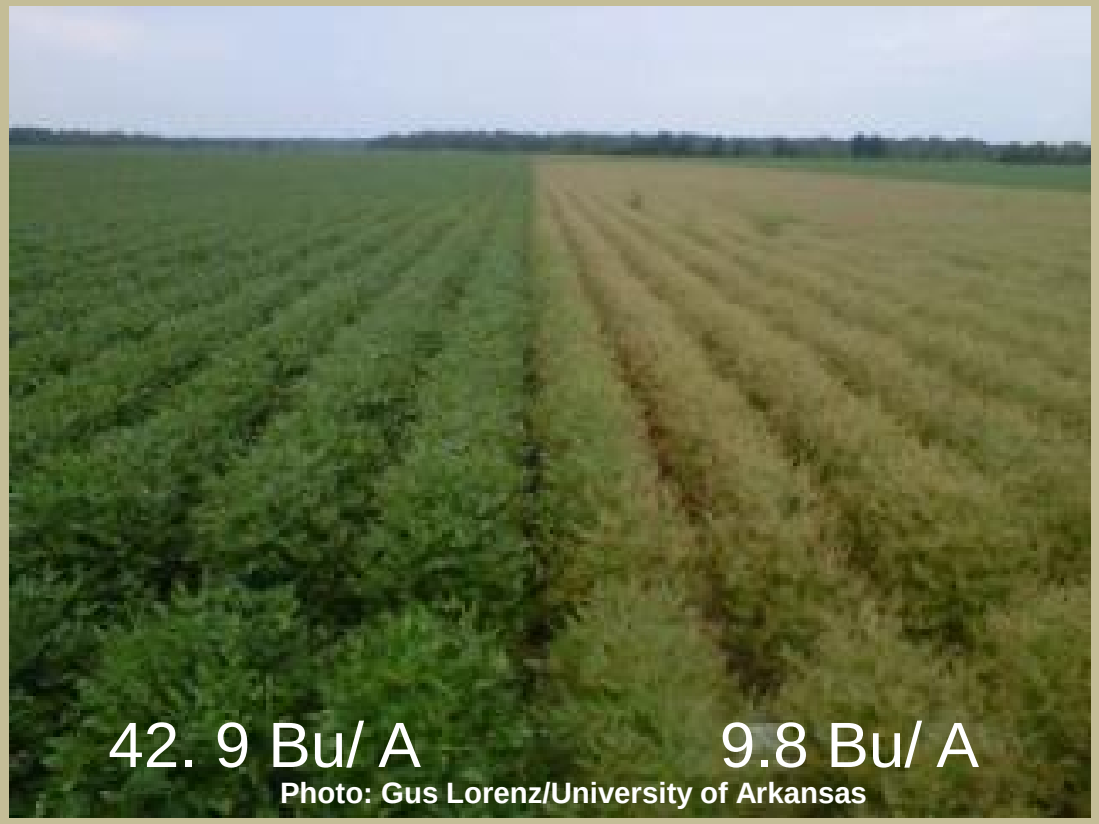


Photo: Gus Lorenz/University of Arkansas

- **Grower challenged consultants recommendation to treat**
- **Beans were early R5**
- **Left the strip out to show that worms wouldn't hurt his yield…**

Bt Cotton

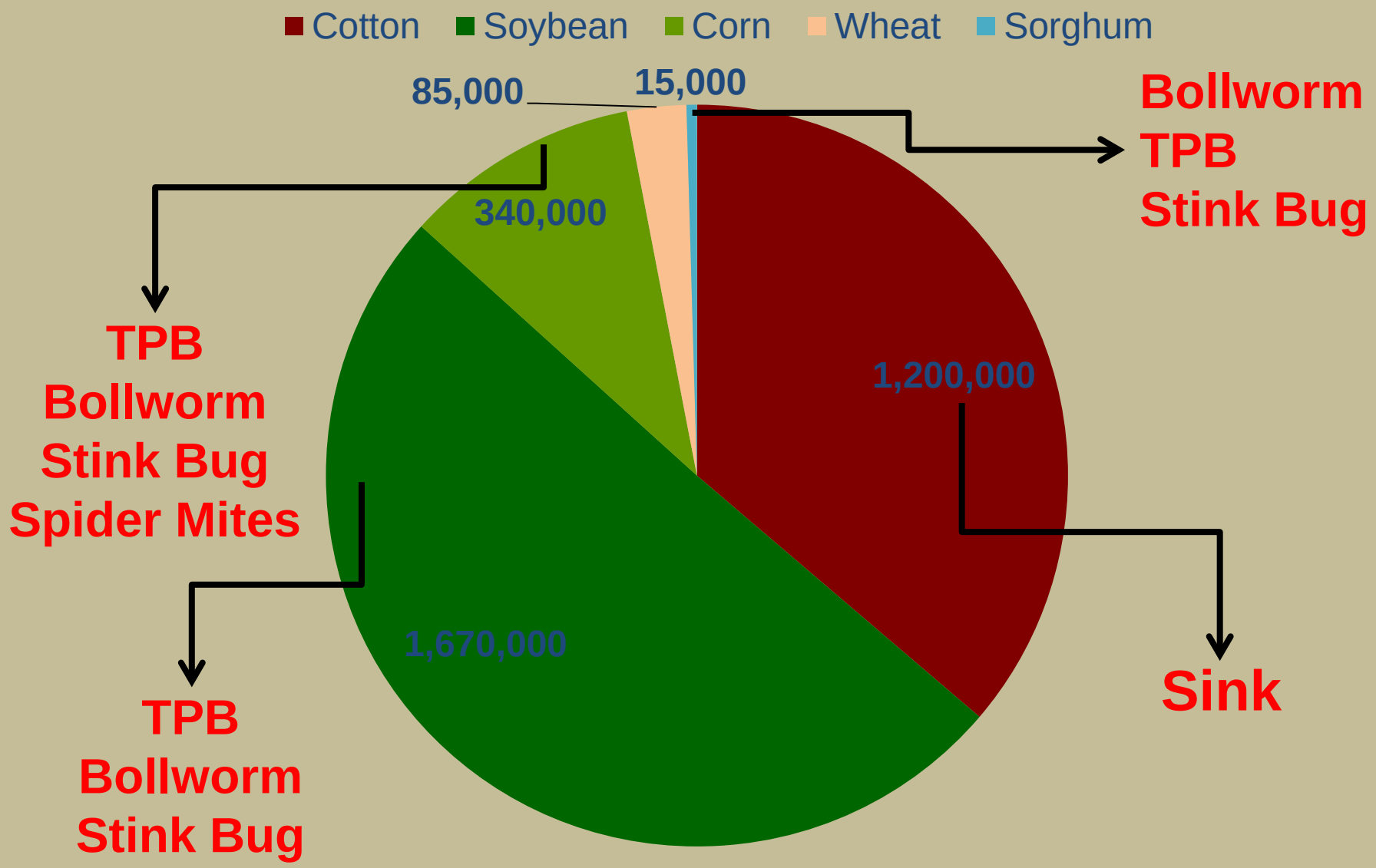
STATE
MAFES
STATE
EXTENSION

Insect Resistance in the Mid-South

- **Aphids:** OP's, Neonics, Pyrethroids
- **Tarnished Plant Bug:** OP's, Carbamates, Pyrethroids
- **Bollworms:** Pyrethroids, OP's, Carbamates
- **Tobacco Budworms:** Pyrethroids, OP's, Carbamates
- **Spider Mites:** OP's, Carbamates, Pyrethroids, Avermectins
- **Soybean Loopers:** Pyrethroids, OP's, Carbamates, Diamides?
- **Bean Leaf Beetles:** Pyrethroids
- **Thrips:** Neonicotinoid
- **FAW:** Cry 1F

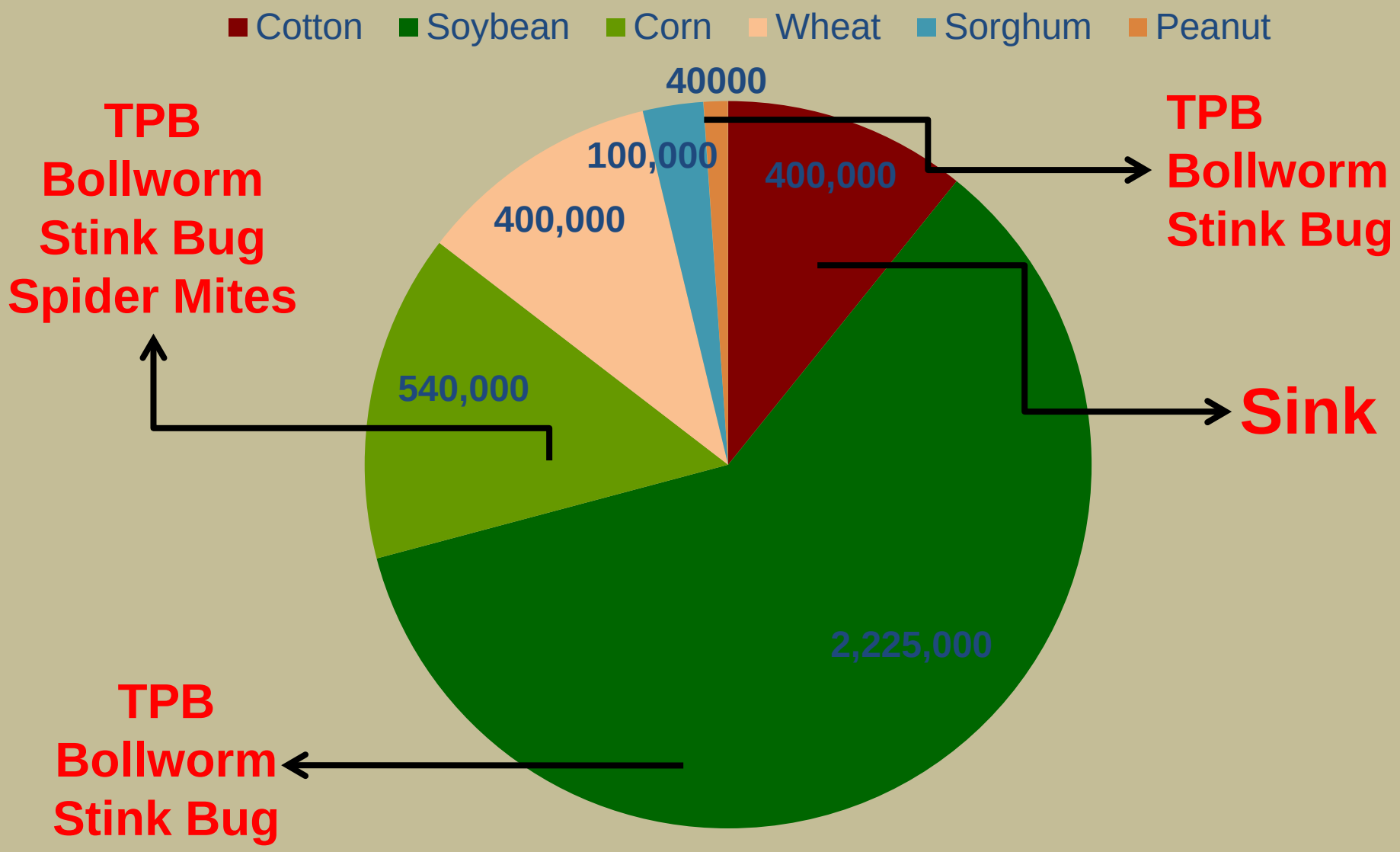
2006 Source:Sink = 1.6:1

(2.0m vs 1.2m)

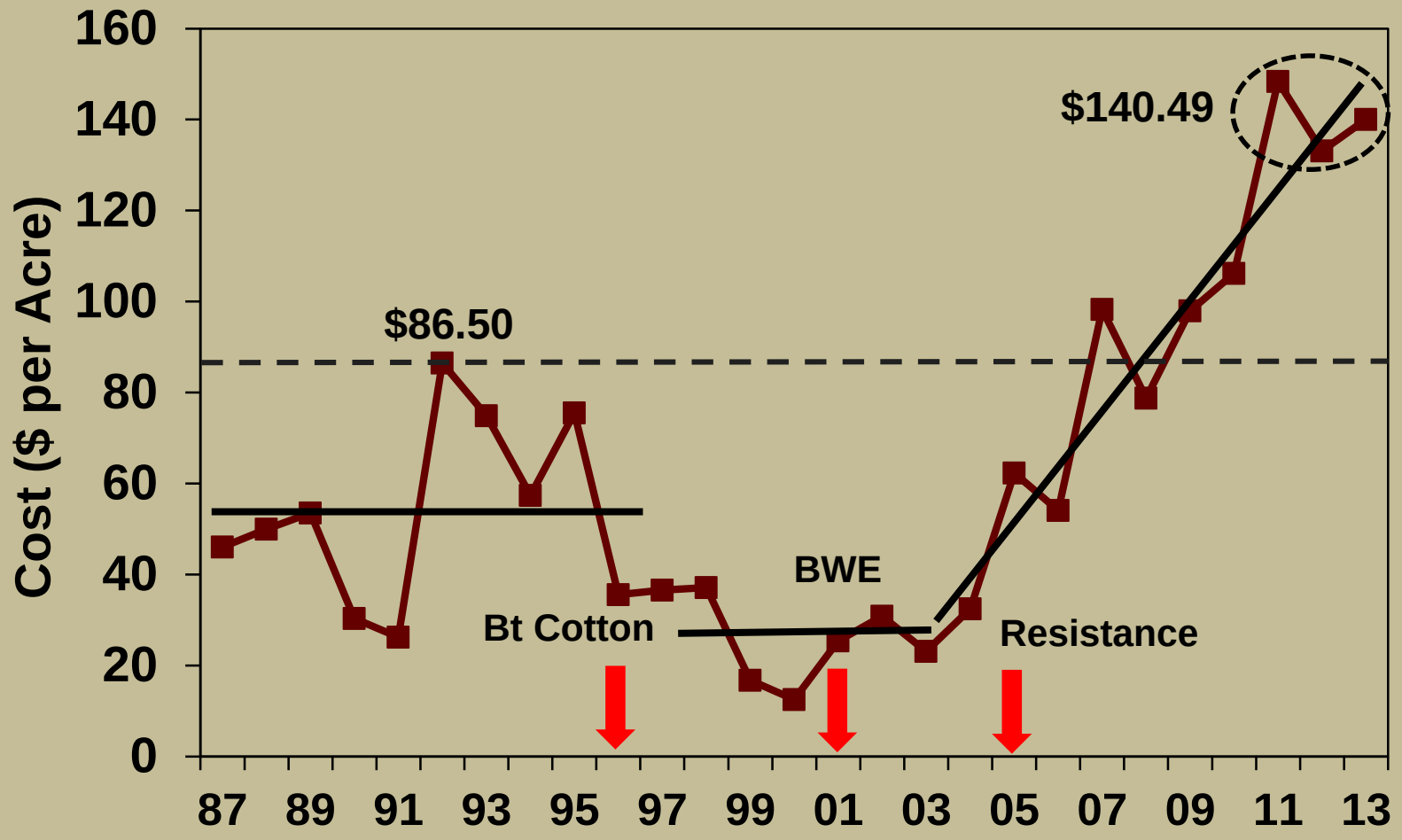


2014 Source:Sink = 7.3:1

(2.9m vs 400k)



Foliar Insect Control: MS Delta



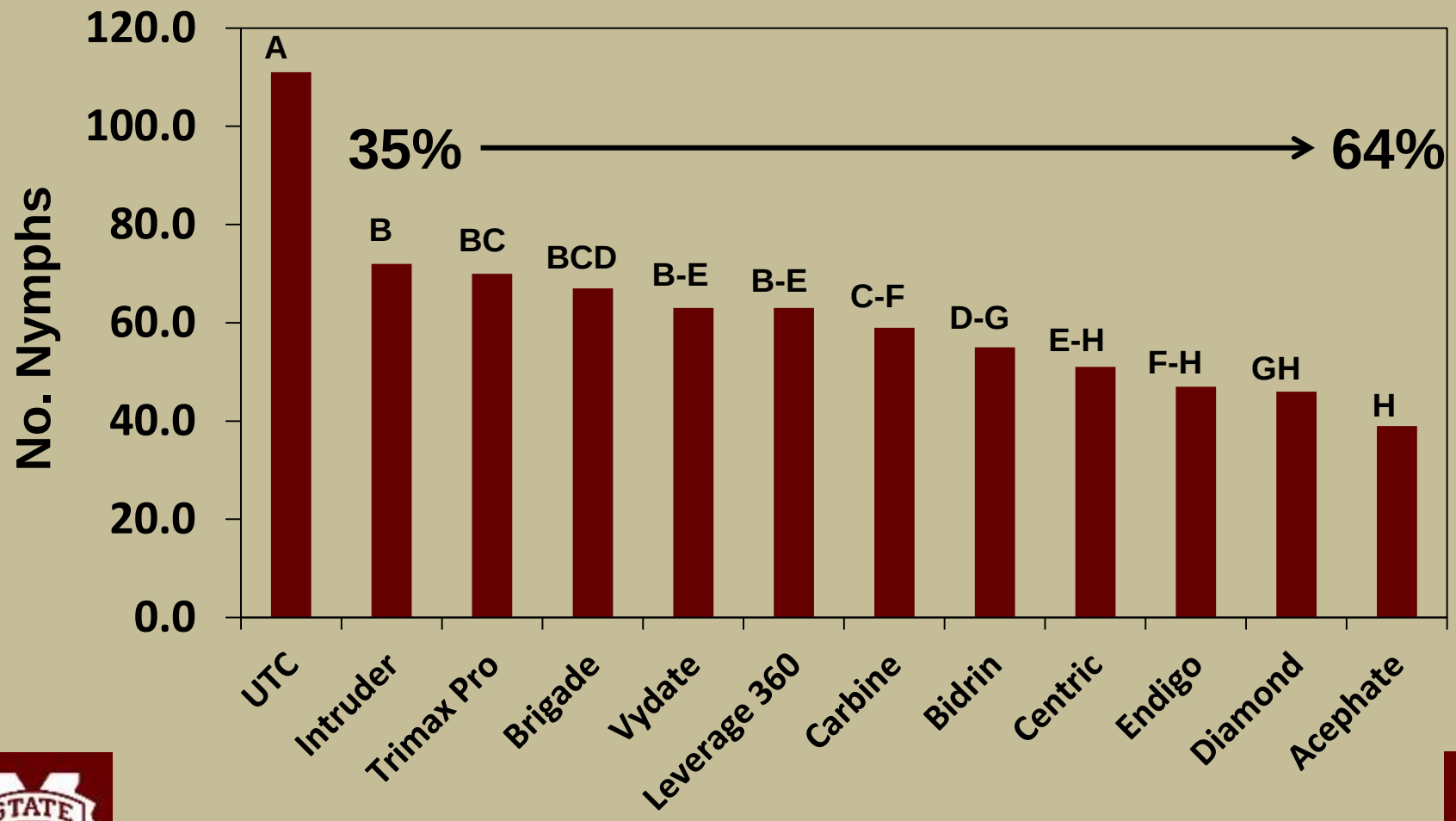
Tarnished Plant Bug

- Resistance is widespread
  - Organophosphates
  - Carbamates
  - Pyrethroids
- Neonicotinoids important

  BUT!!!!
- Multiple sprays needed

Regional TPB Trial

All Locations - Season Total



Cotton Pest Management

“Spray and Pray”

Tarnished Plant Bug

“This is a problem that we can’t fix with money”

Bruce Pittman, Independent Consultant

IPM

MAFES

EXTENSION

IPM

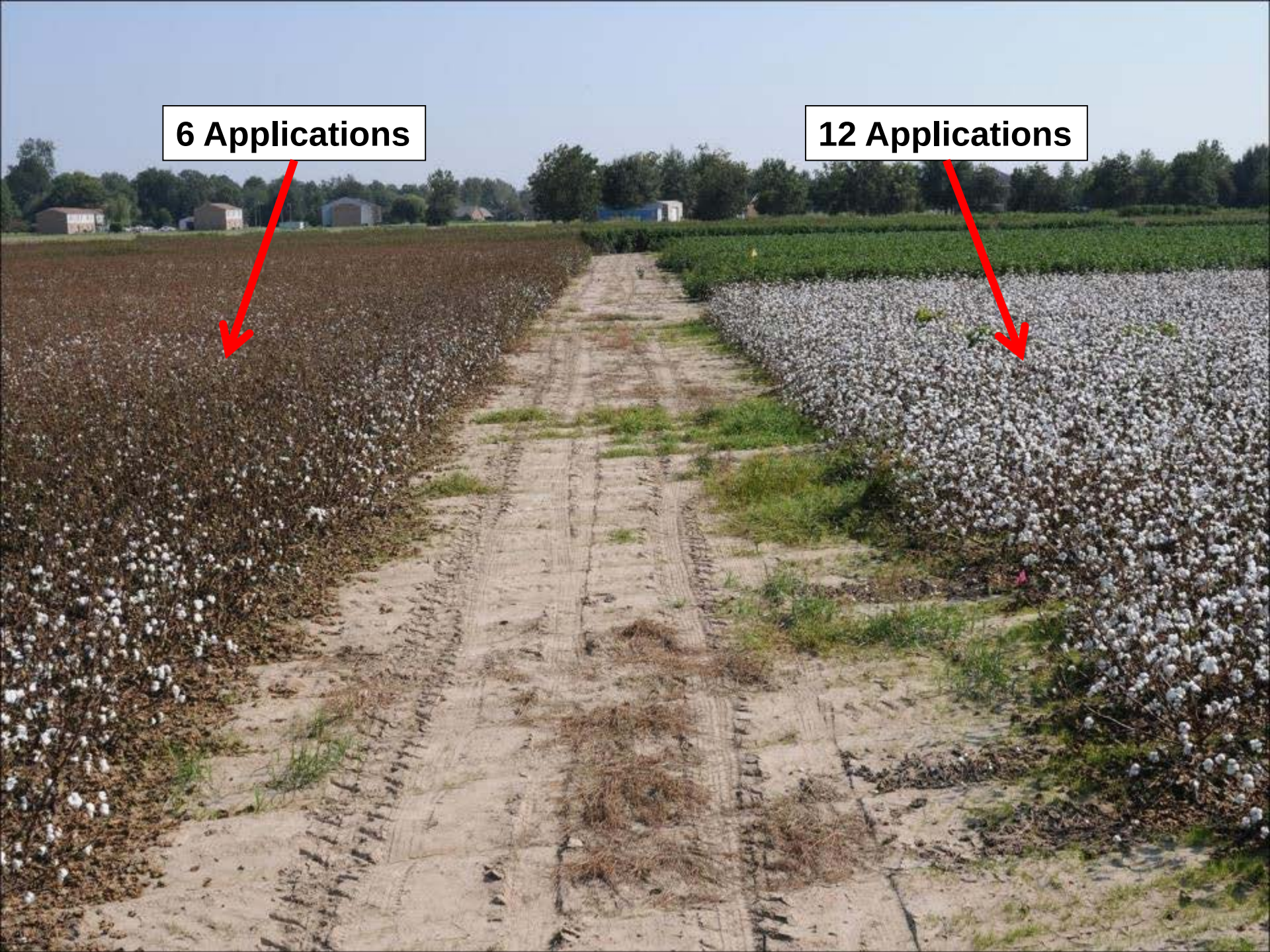
STATE MAFES

STATE EXTENSION

IPM

STATE MAFES

STATE EXTENSION

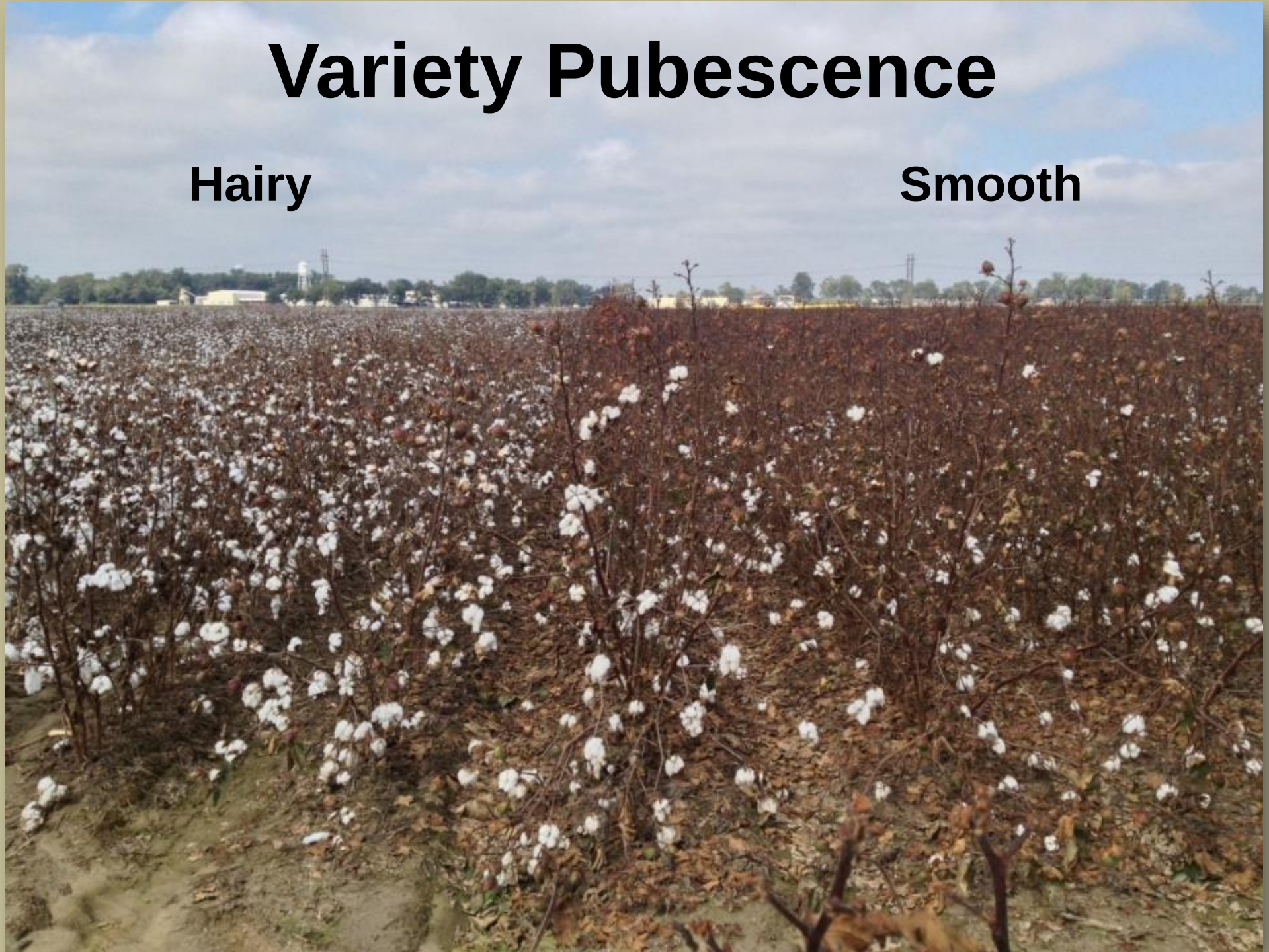

6 Applications
12 Applications

Tarnished Plant Bug Control has to be an Integrated Program Approach

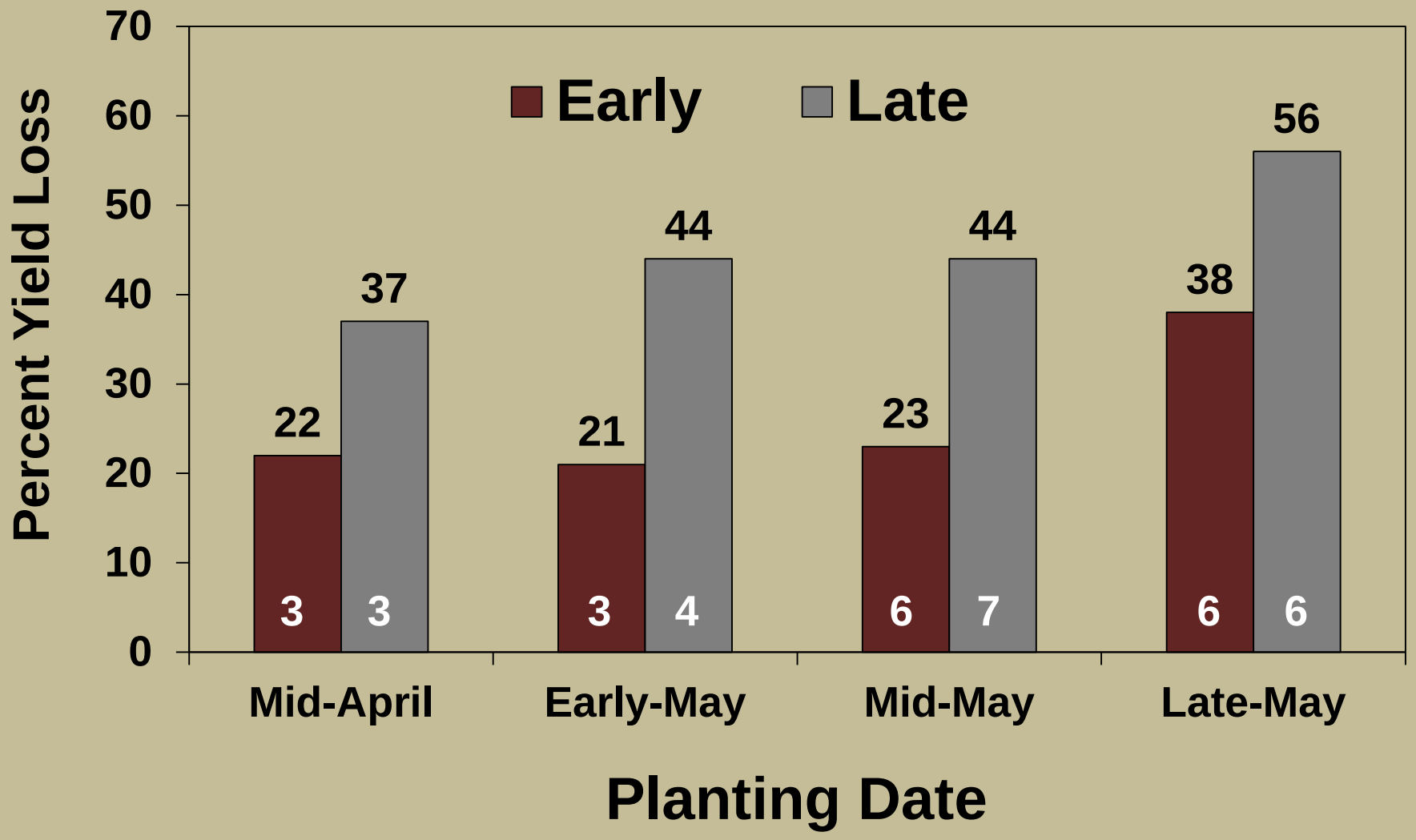
- Improved Sampling Techniques and Thresholds
- Blocking Cotton Away from Corn
- Manage for Earliness
- Early Diamond Applications
- Mixtures, Mixtures, and Mixtures
- Shortened Intervals in Heavy Pressure Areas
- Cultural Control (planting date, early maturing)
- New Chemistry (Transform WG)

MSEWG
Mid-South Entomologist Working Group

Variety Pubescence



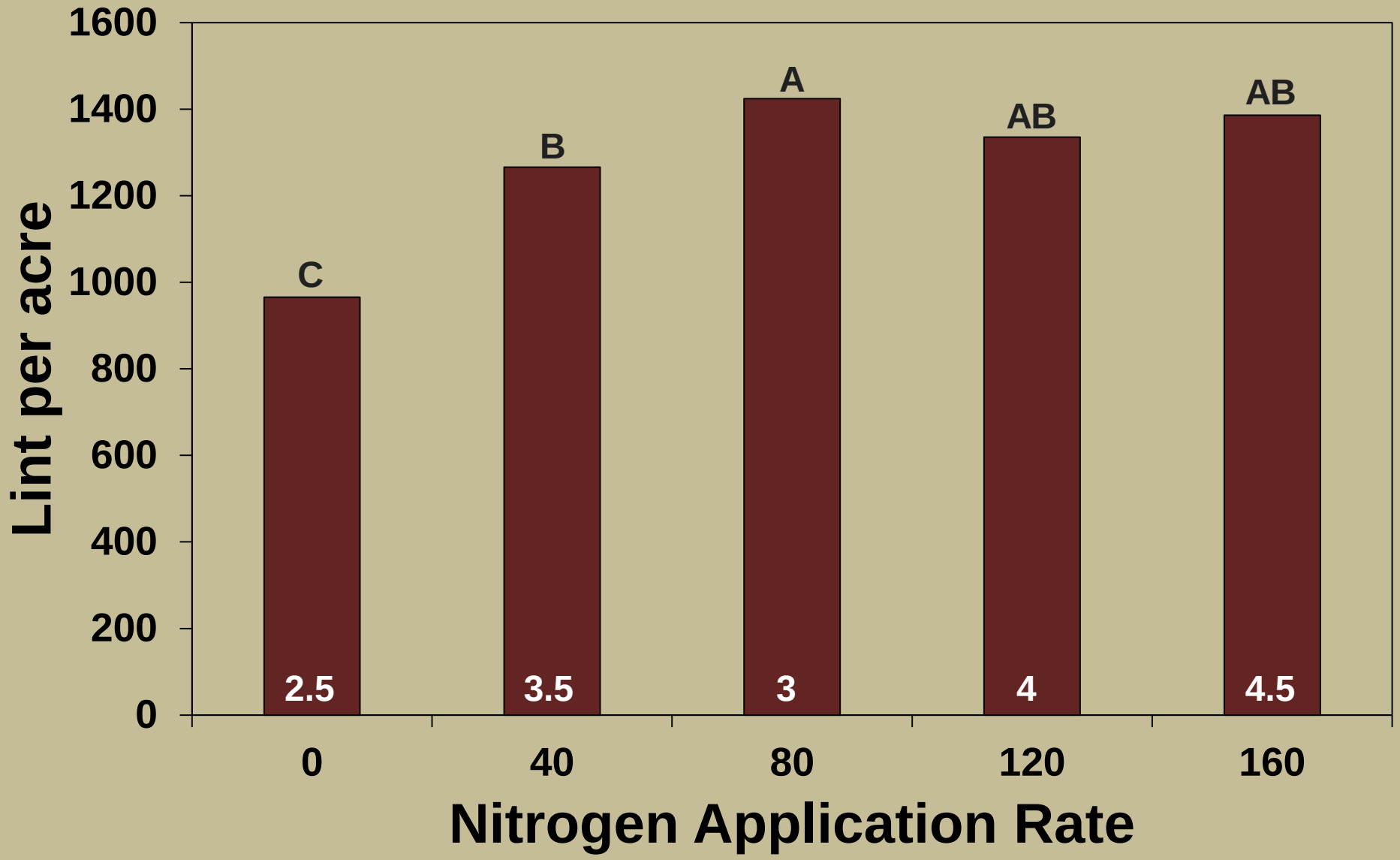
Impact of Planting Date and Varietal Maturity



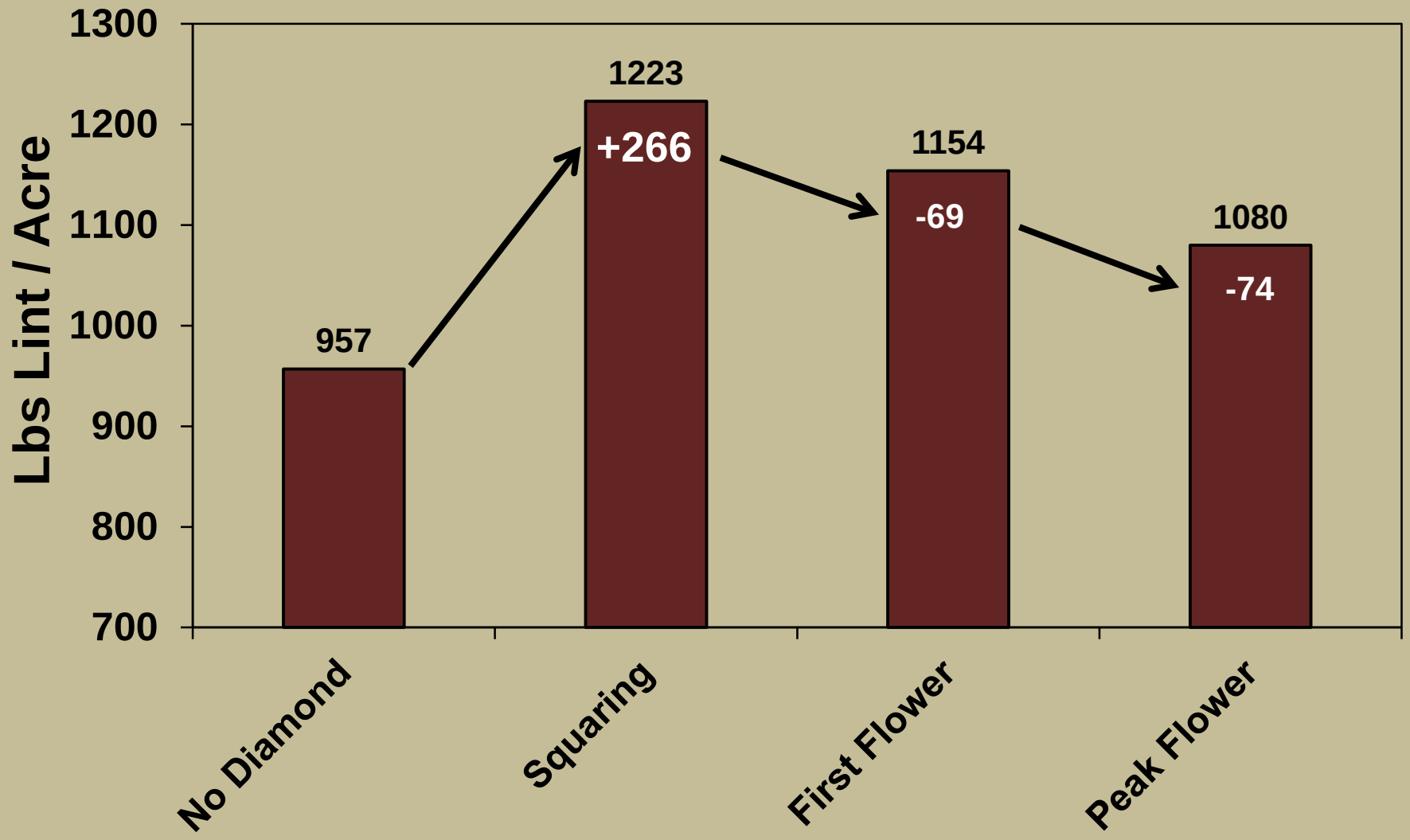
Other Factors that Impact Earliness

- Seeding Rate
- Thrips Management
- Disease Management
- Weed Management
- Fertility and PGR’s

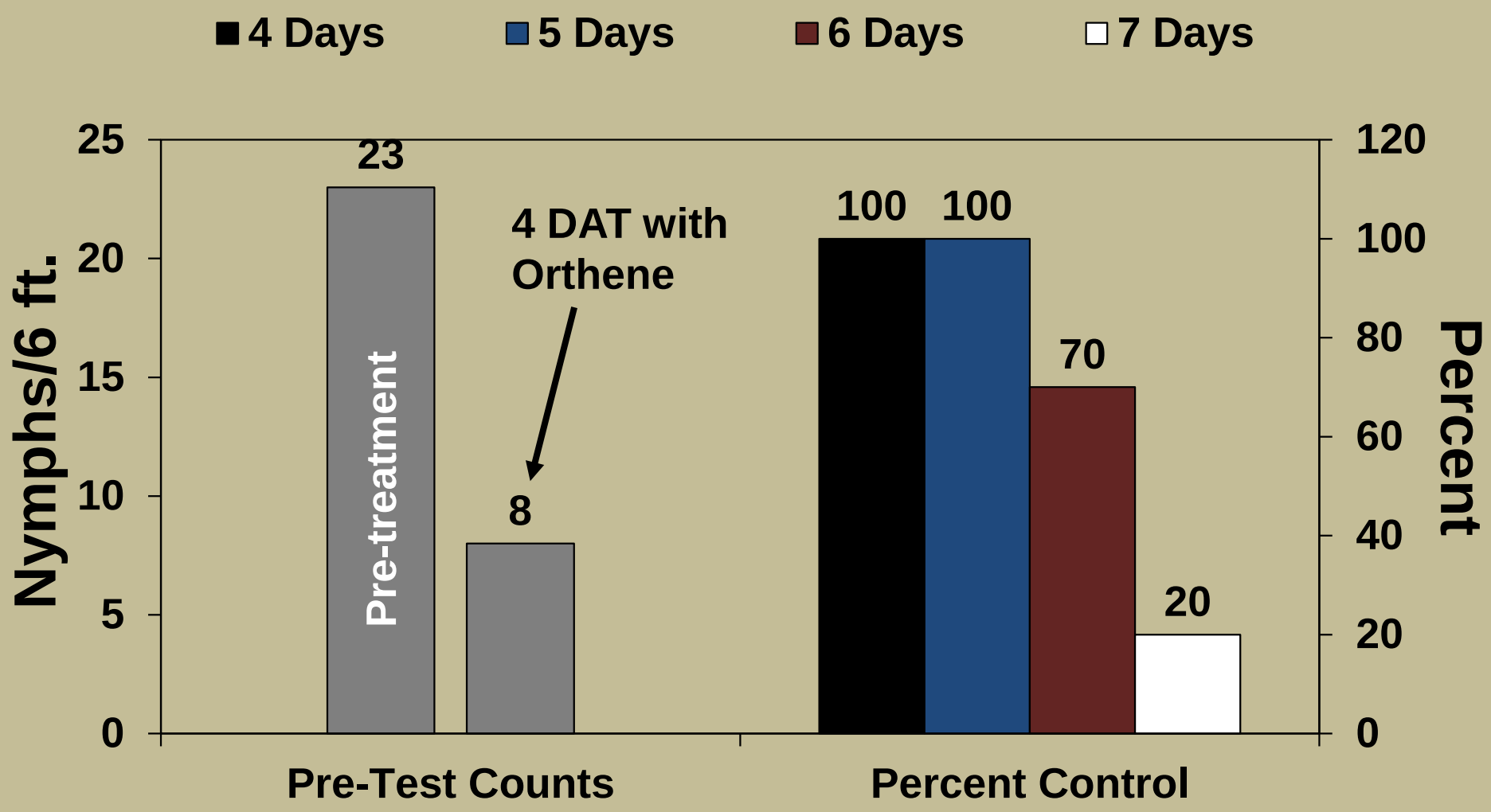
Impact of N Rate



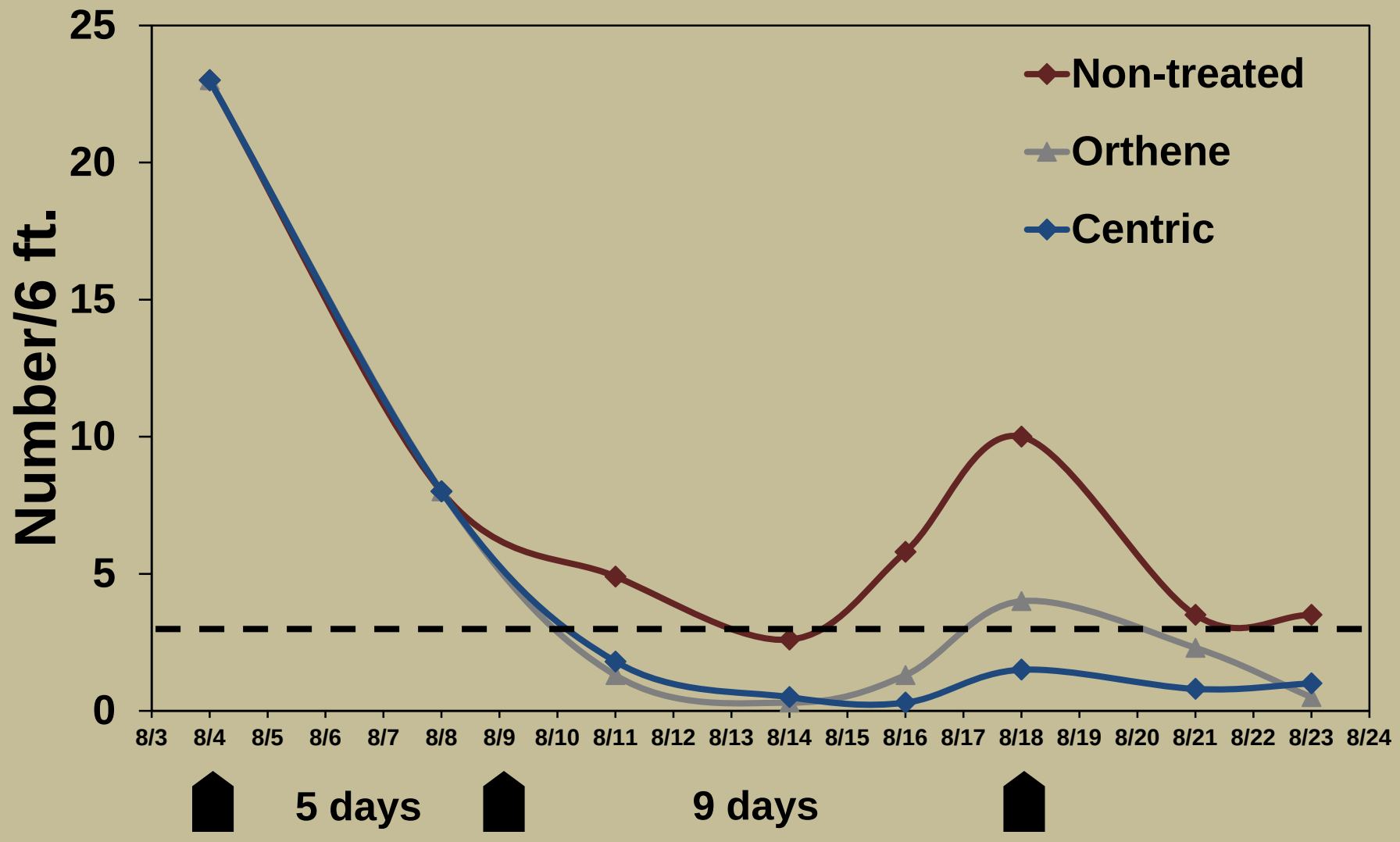
Diamond Application Timing



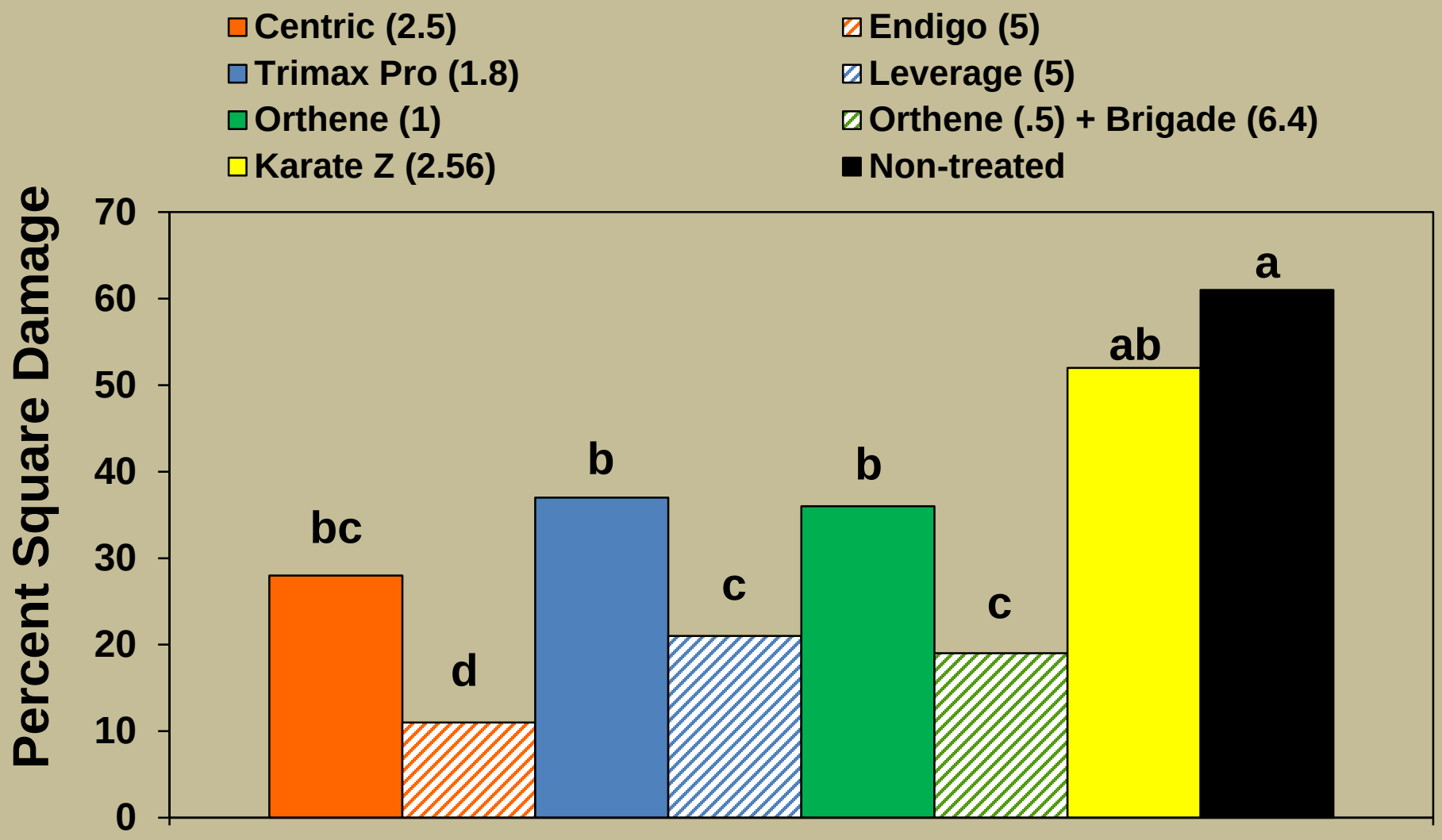
Insecticide Application Intervals



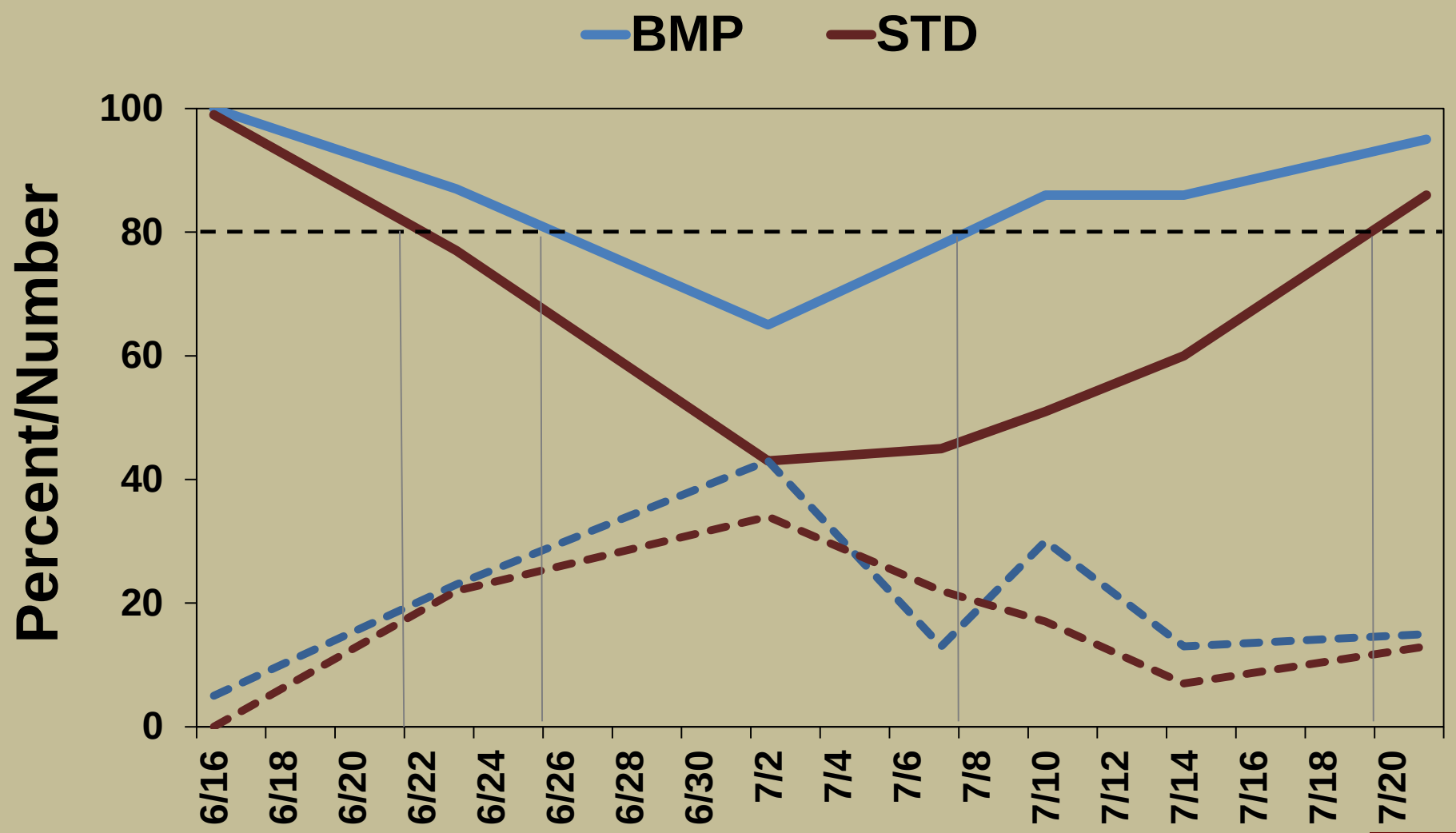
Insecticide Rotations



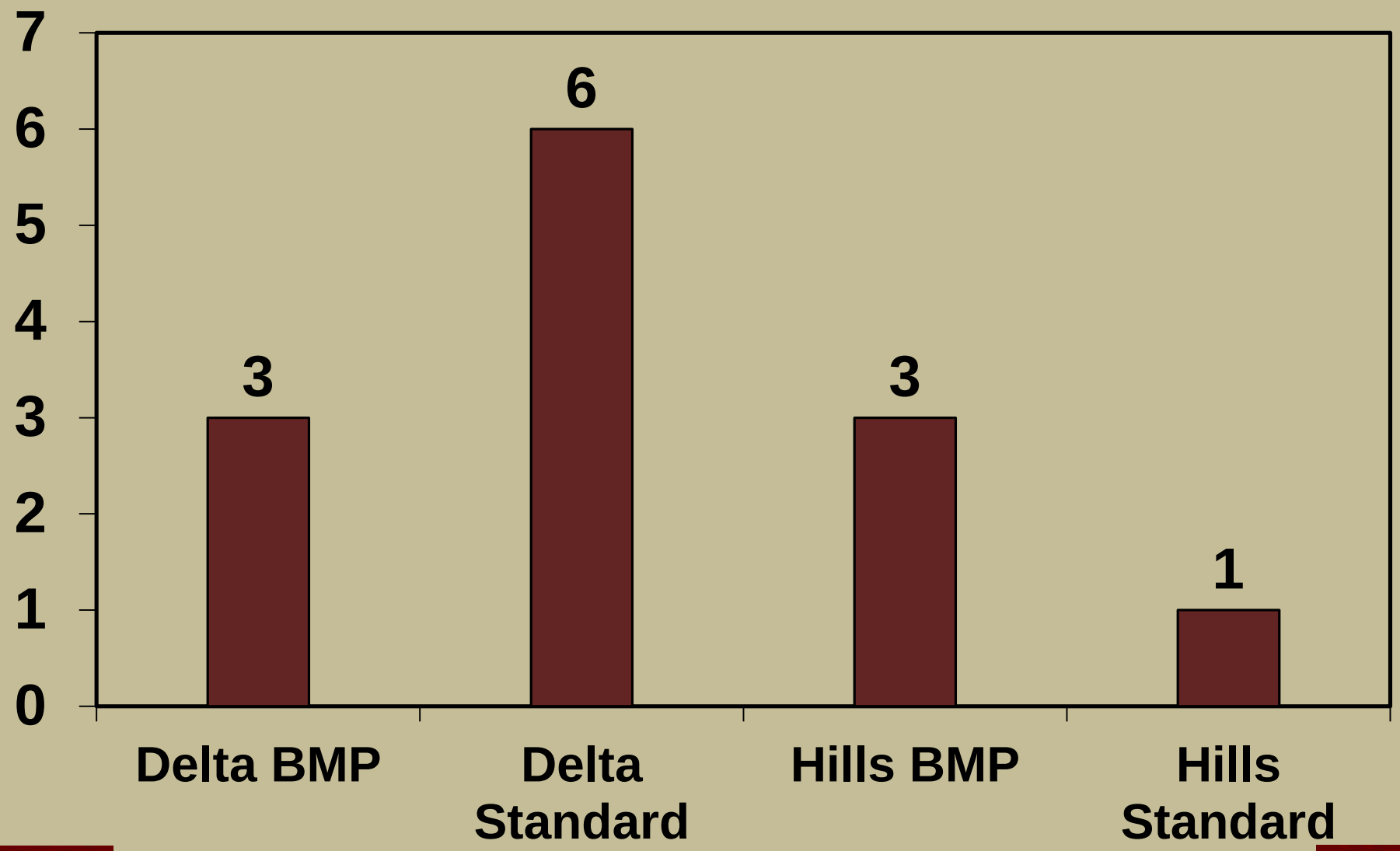
Neonicotinoids and Tank Mixes



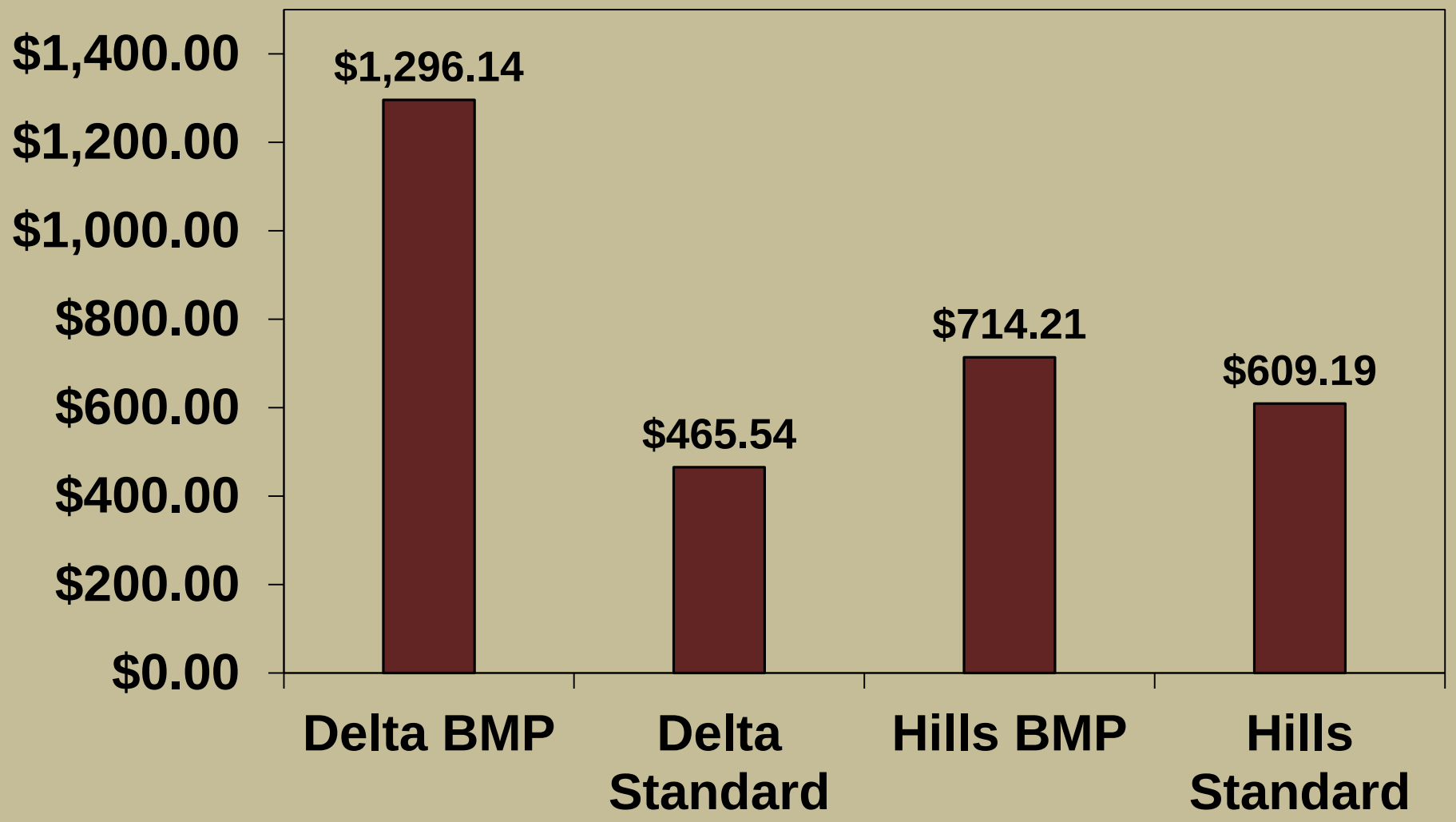
Square Retention and TPB Numbers



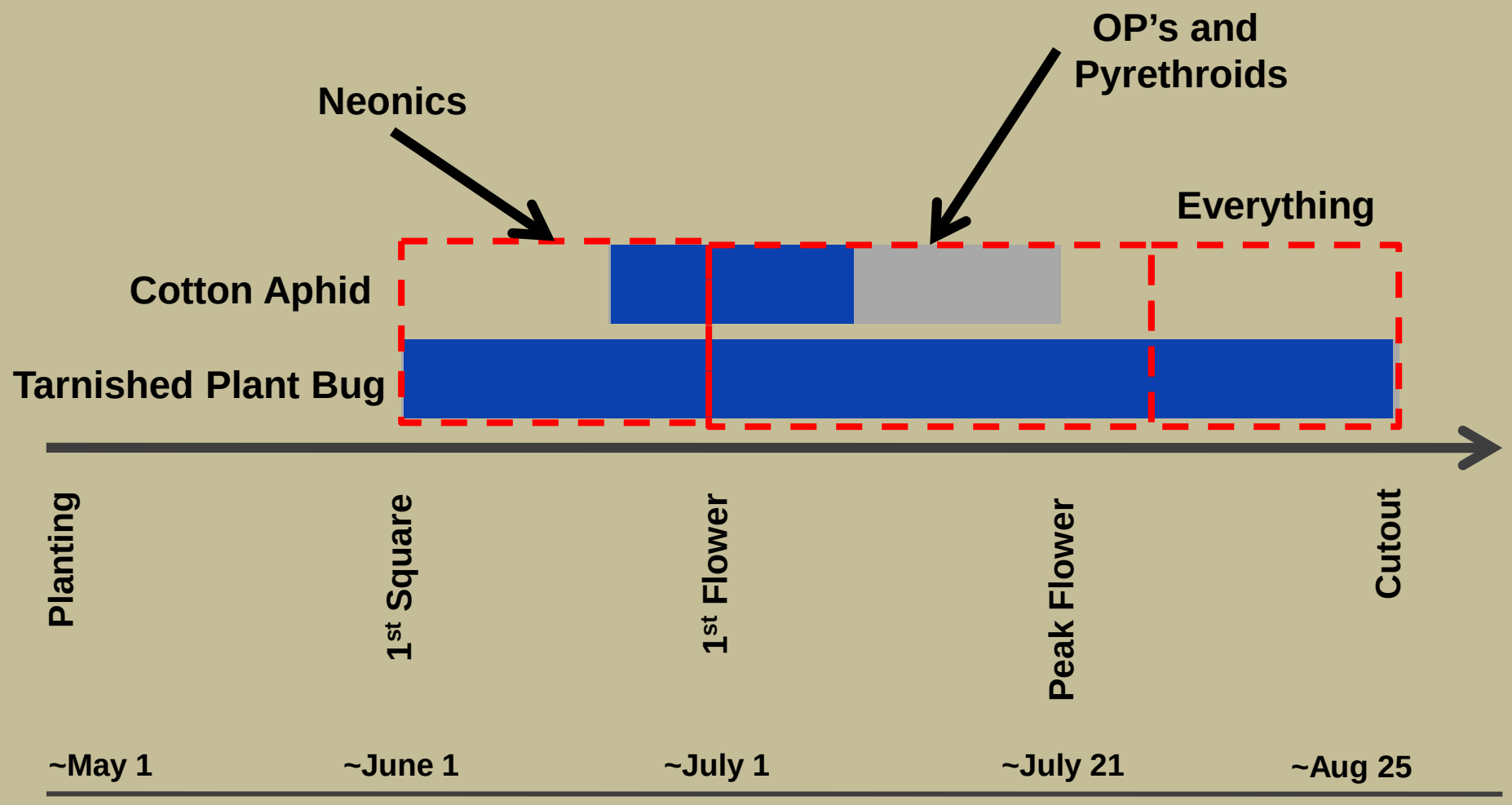
Total Number of Applications



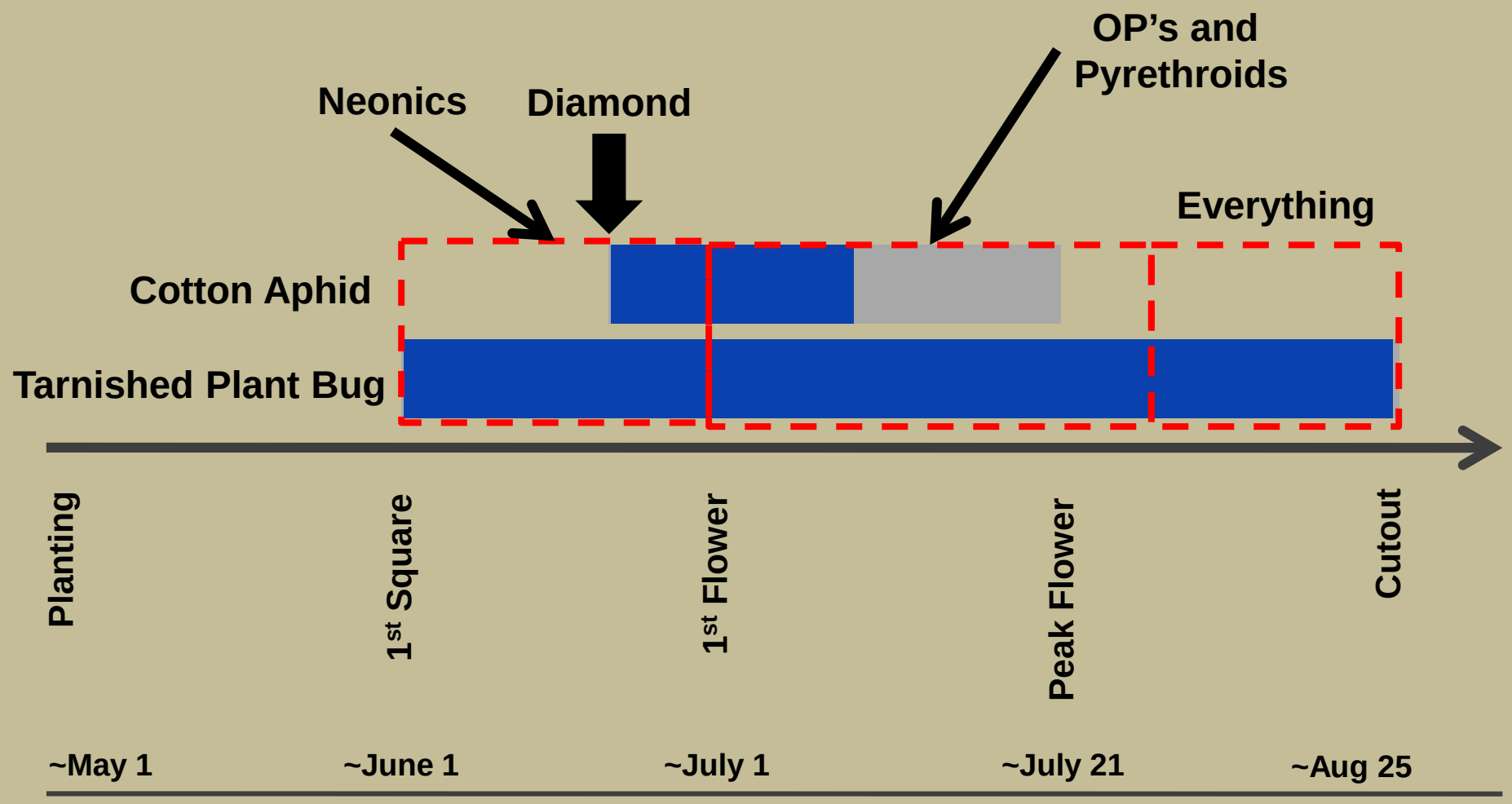
Income


$1,400.00
$1,200.00
$1,000.00
$800.00
$600.00
$400.00
$200.00
$0.00
$1,296.14
$465.54
$714.21
$609.19
Delta BMP
Delta Standard
Hills BMP
Hills Standard

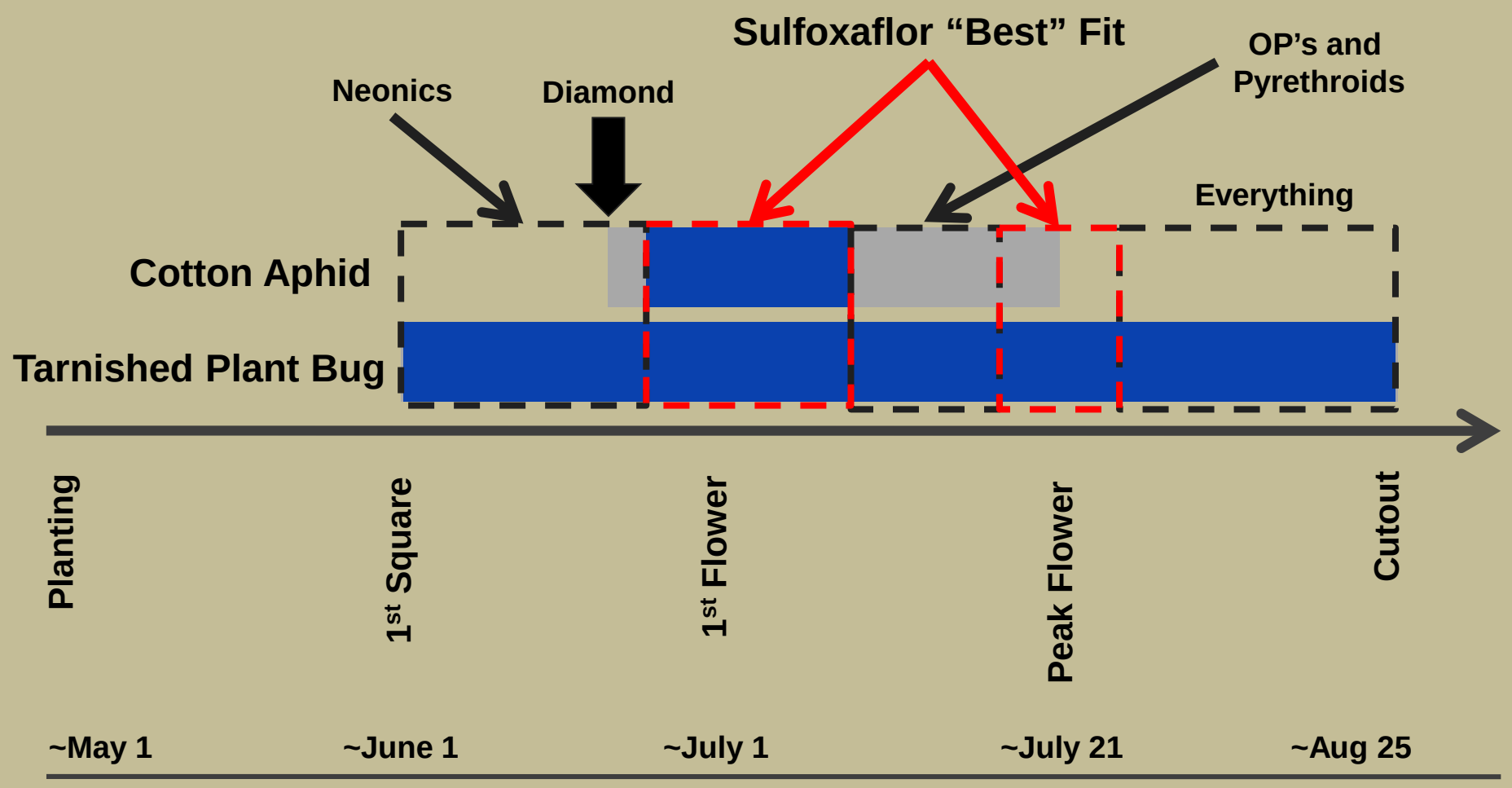
Insecticide Application Timings



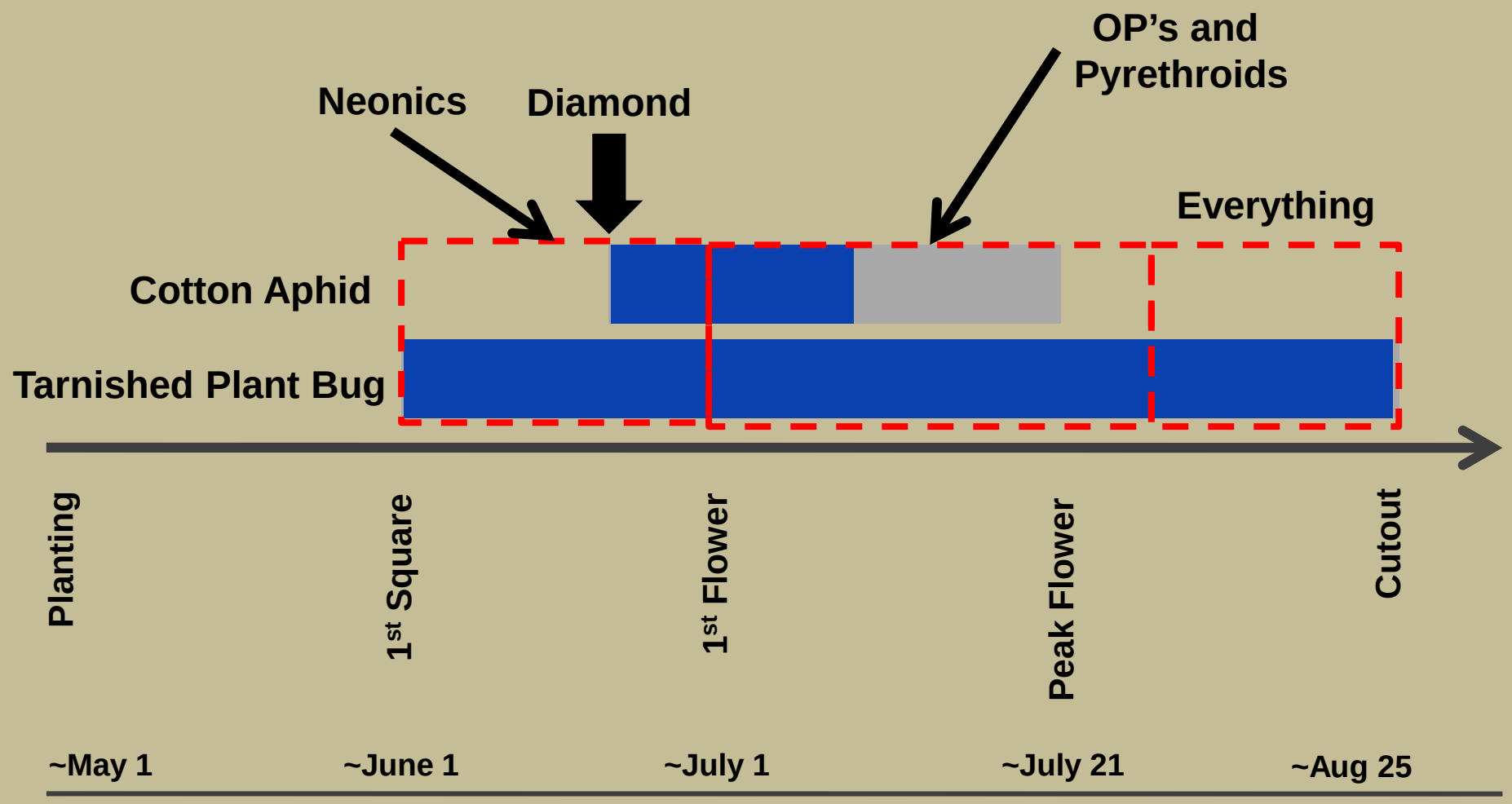
Insecticide Application Timings



Insecticide Application Timings



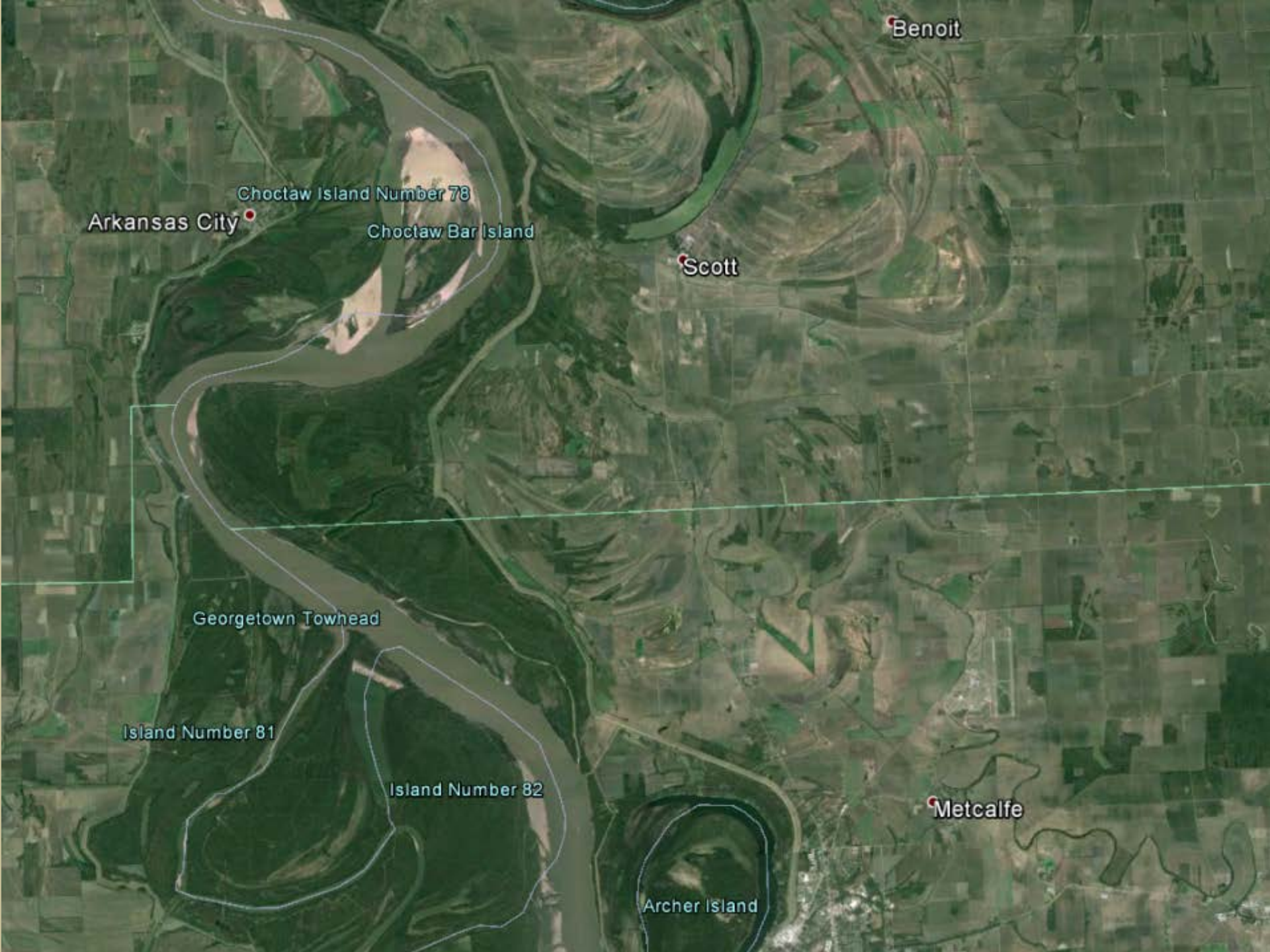
Insecticide Application Timings



Summary

- Has to be integrated approach
- We MUST have insecticides in Mid-South

- Have to continue to educate growers on consequences of resistance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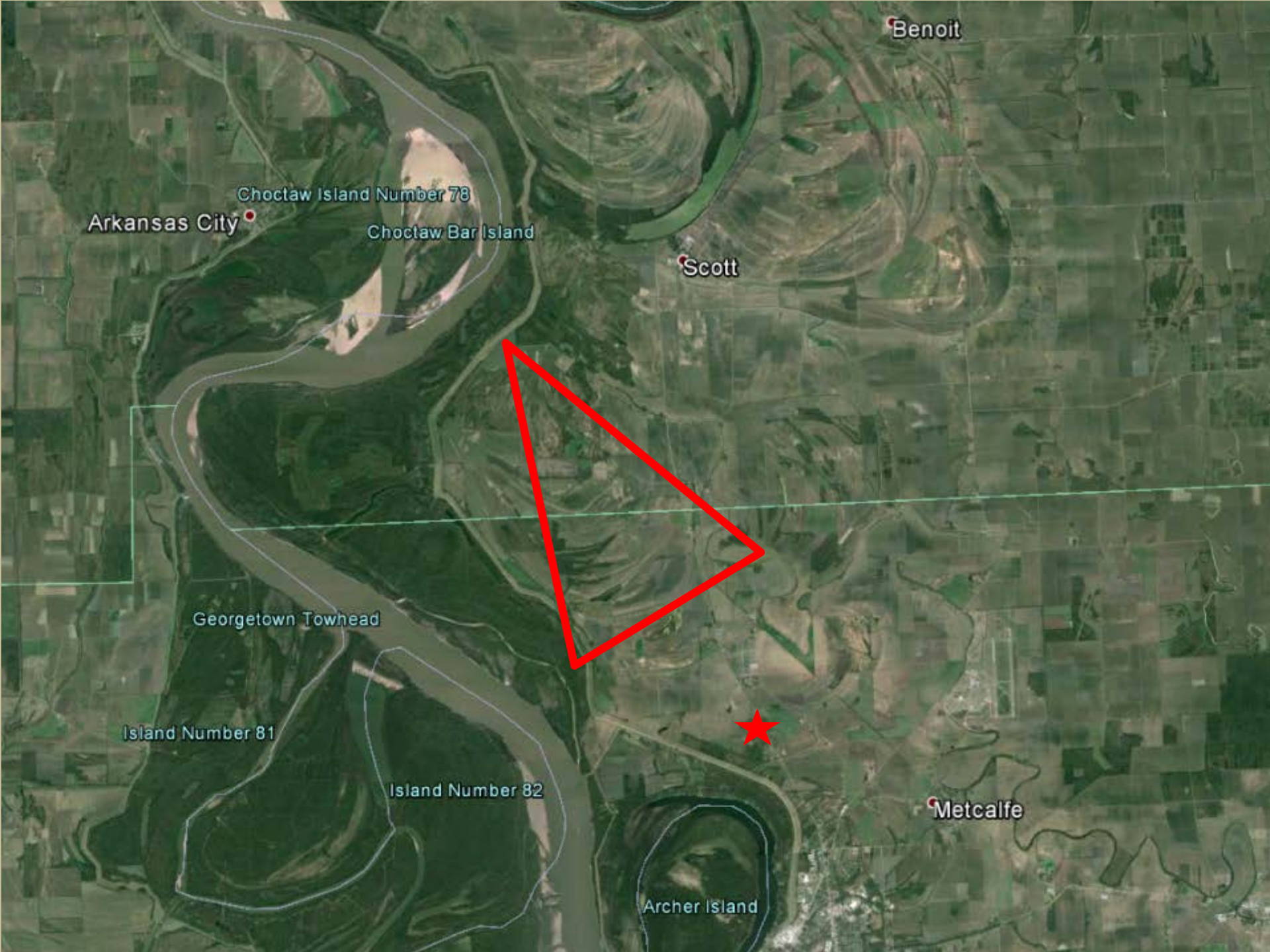
Arkansas City
Choctaw Bar Island
Scott
Georgetown Towhead
Island Number 81
Island Number 82
Metcalfe
Archer Island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Minnesota
Wisconsin
Iowa
Illinois
Kentucky
Missouri
Tennessee
Arkansas
Louisiana
Mississippi

Flood

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