

Impact of *Lygus lineolaris* Management on Biodiversity in Cotton IPM

Jeff Gore, Mississippi State University, Stoneville, MS

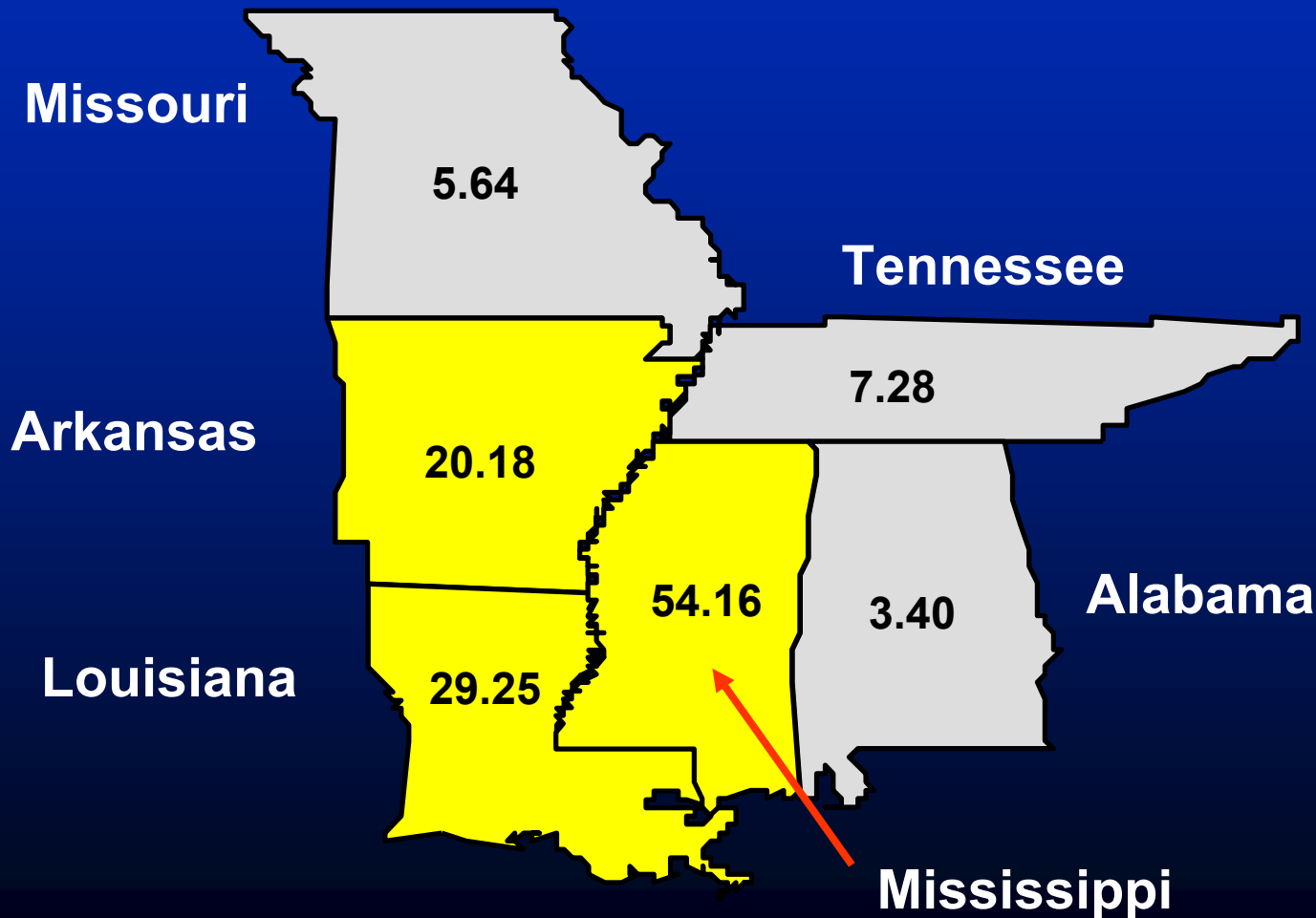


Don Cook
Angus Catchot
Fred Musser
Roger Leonard
Gus Lorenz
Scott Stewart



Mid-South Cotton States

Lygus spp. Control Costs - 2009



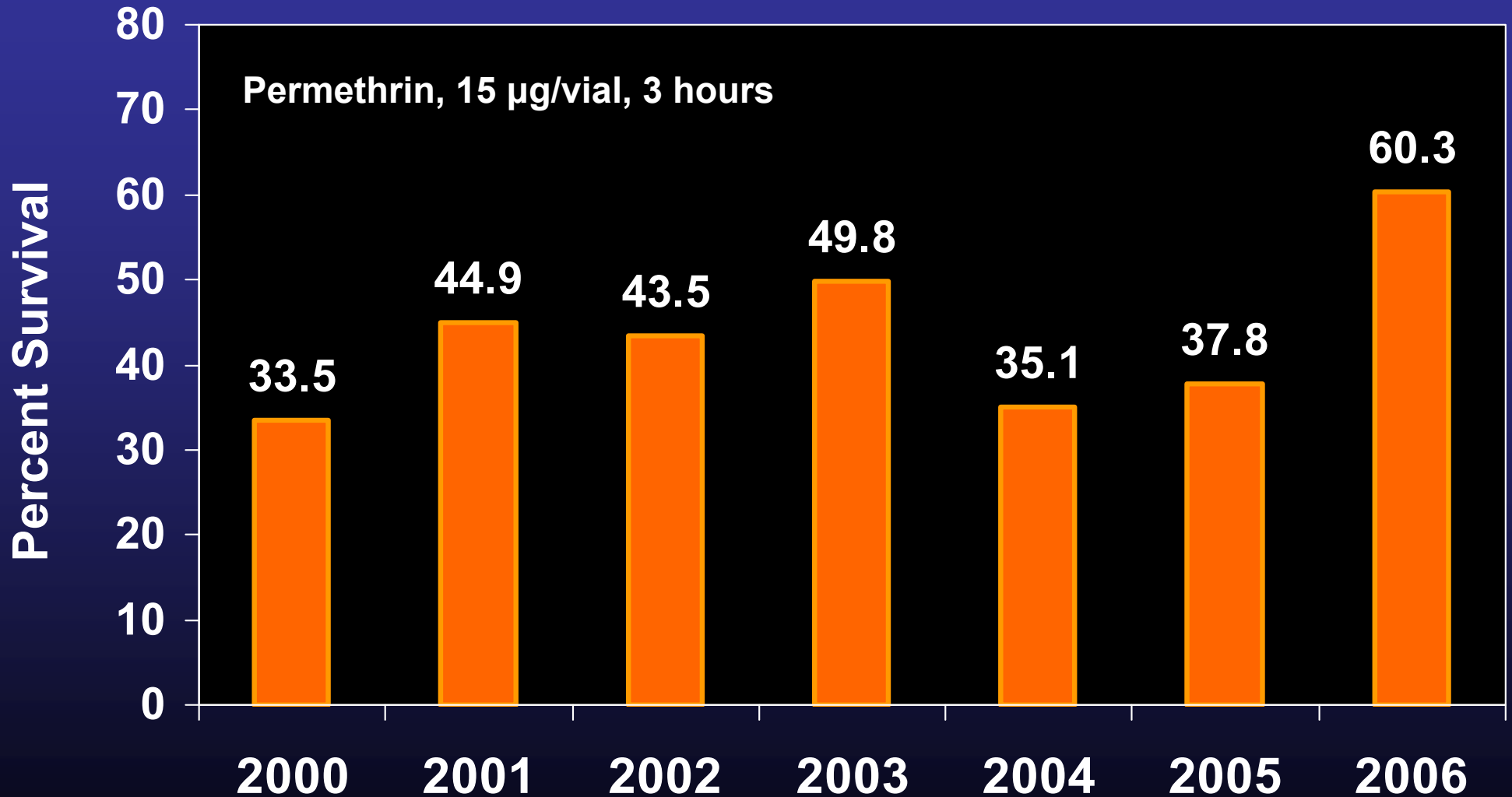
6 Applications

12 Applications



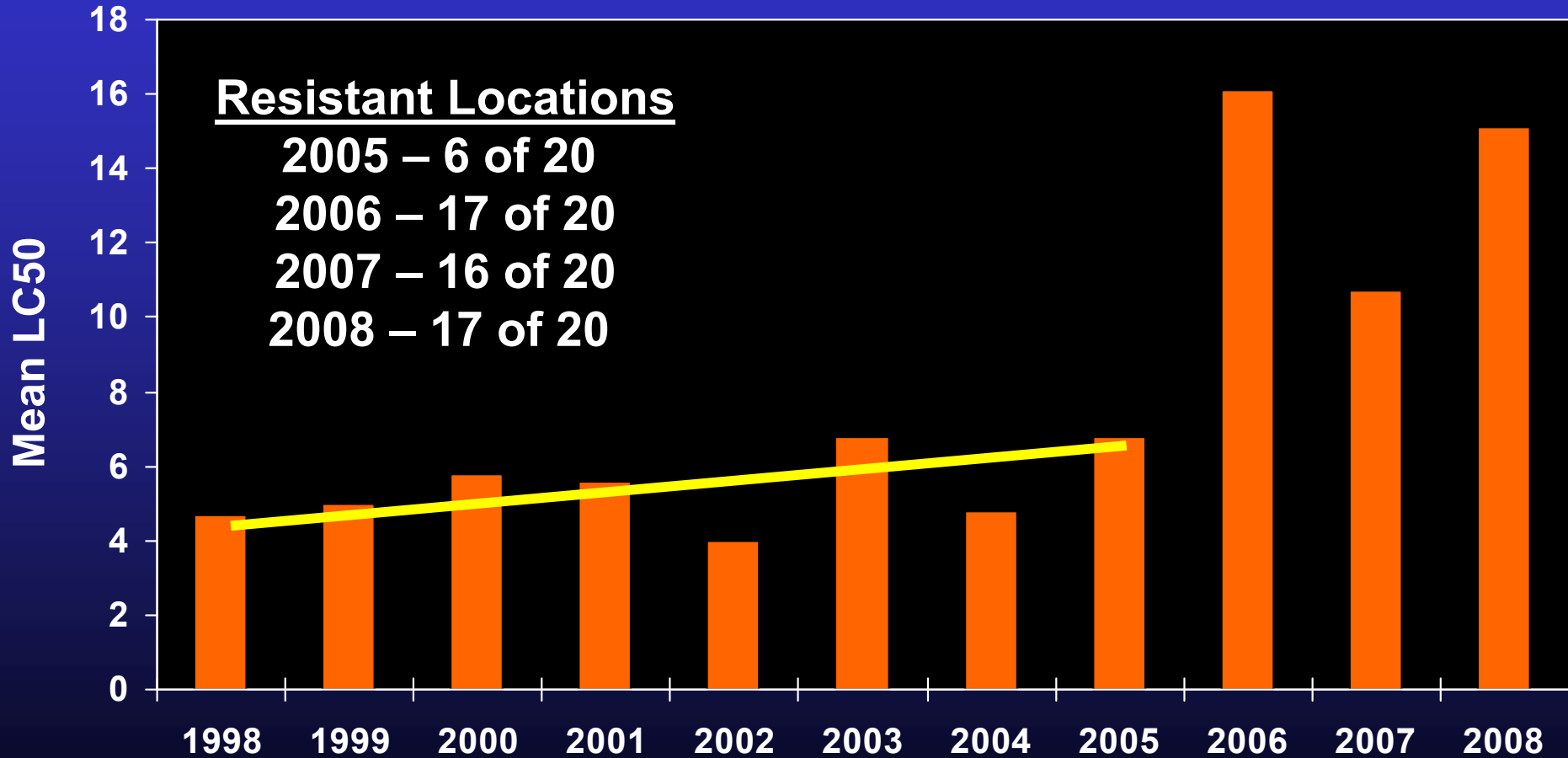
Pyrethroid Discriminating Dose Bioassay

Gordon Snodgrass, USDA-ARS, Stoneville



Acephate Resistance Survey

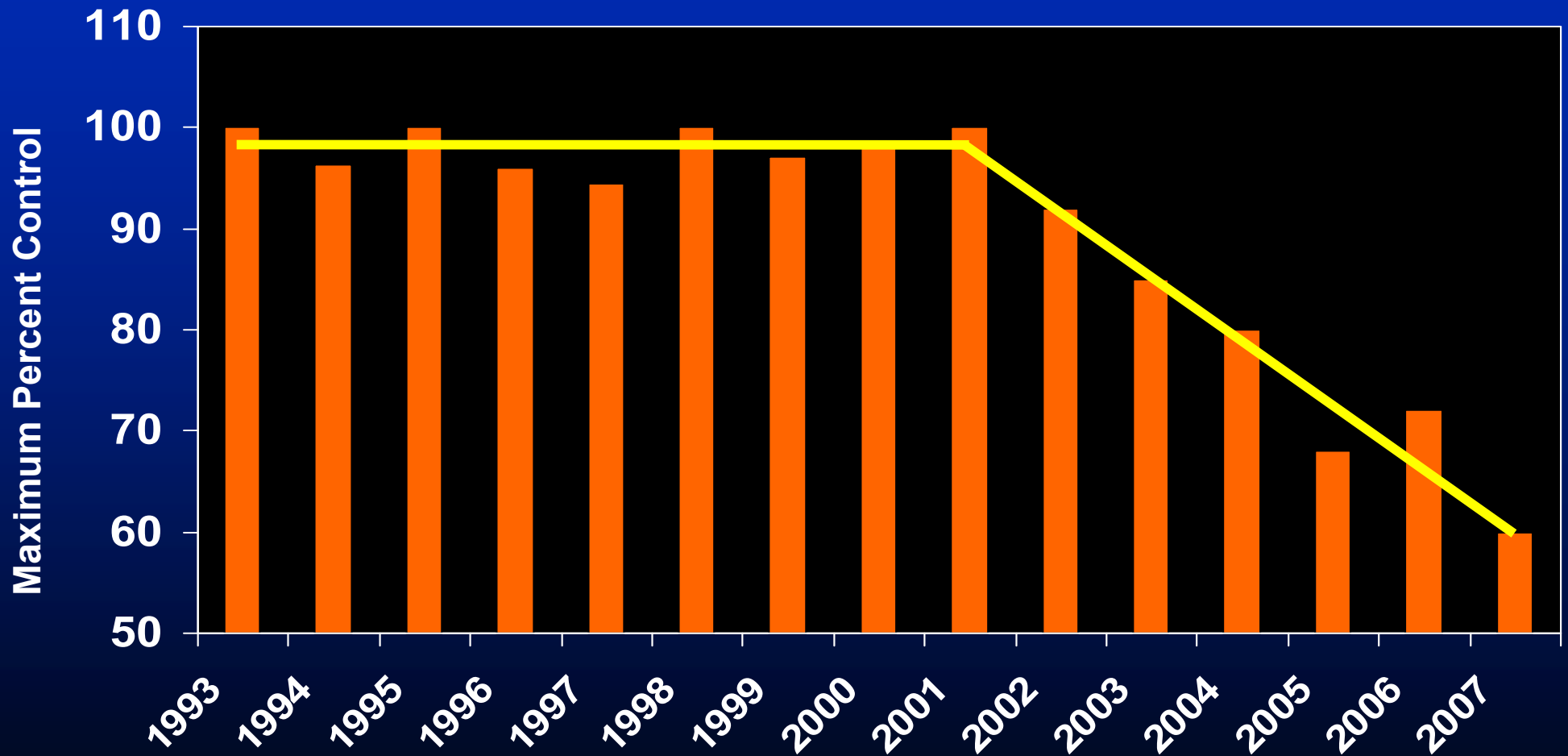
Gordon Snodgrass, USDA-ARS, Stoneville



Tarnished Plant Bug Control

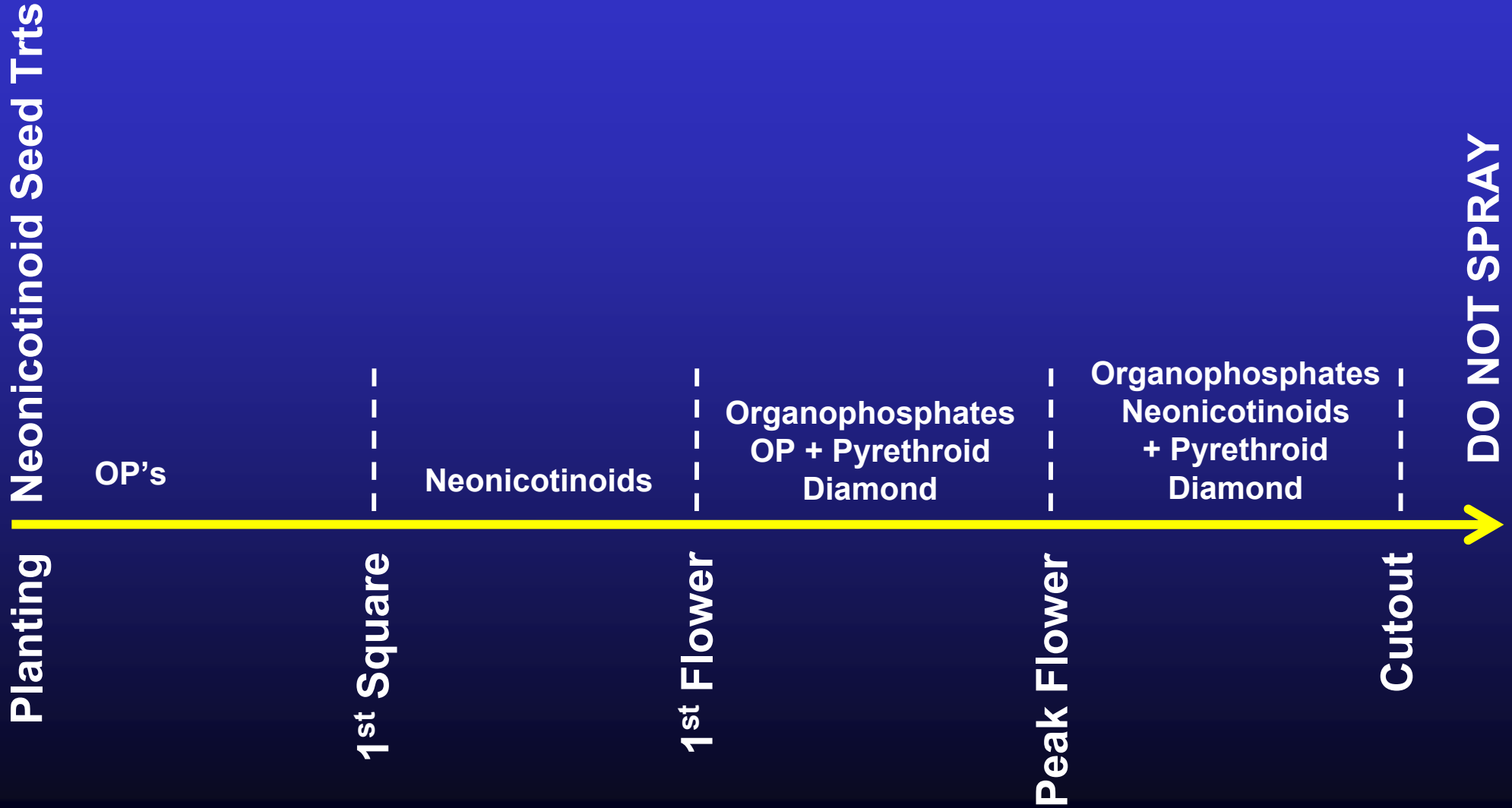
Mid-South States – 123 Tests

Orthene and Bidrin



Data adapted from Arthropod Management Tests 1994-2008

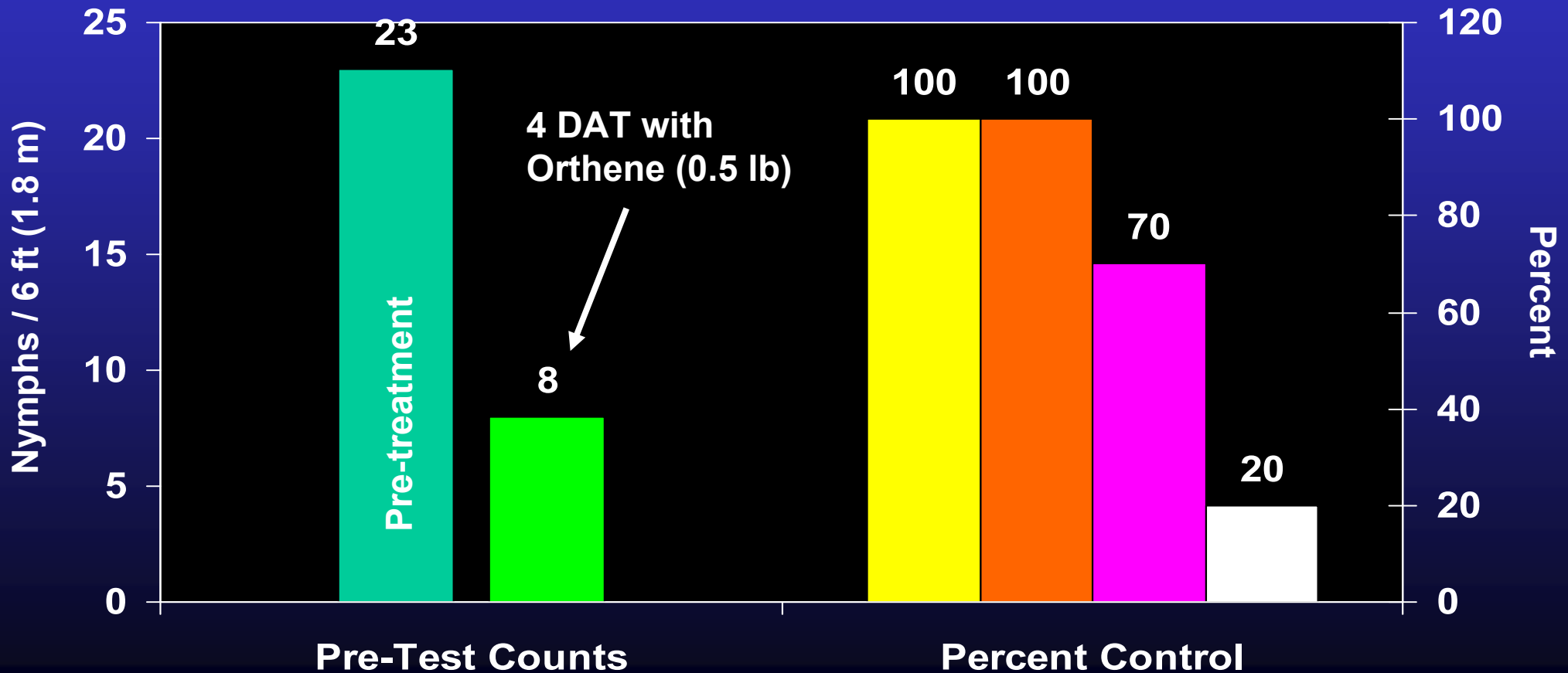
Insecticide Use Patterns



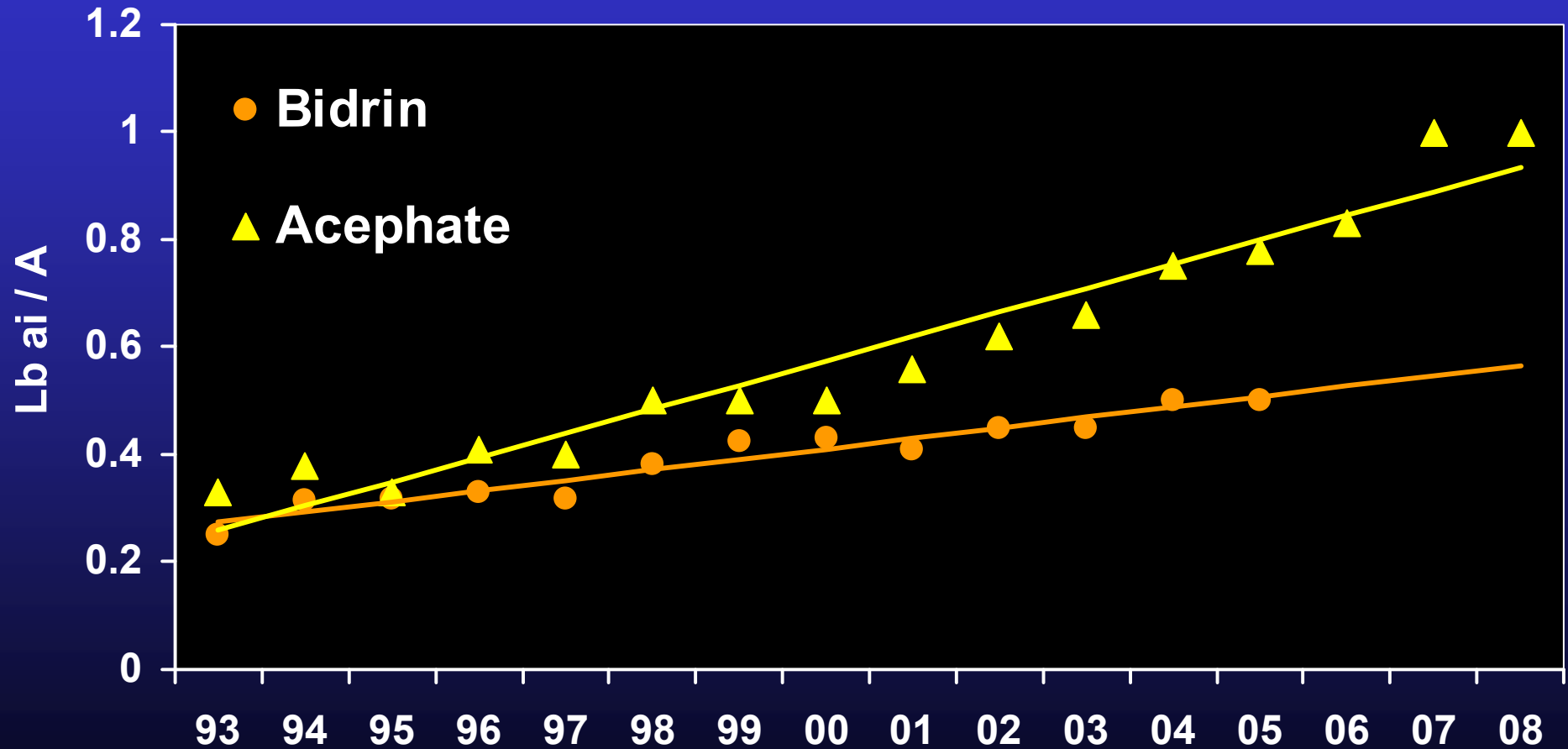
Insecticide Application Intervals

Acephate - Acephate

■ 4 Days ■ 5 Days ■ 6 Days ■ 7 Days

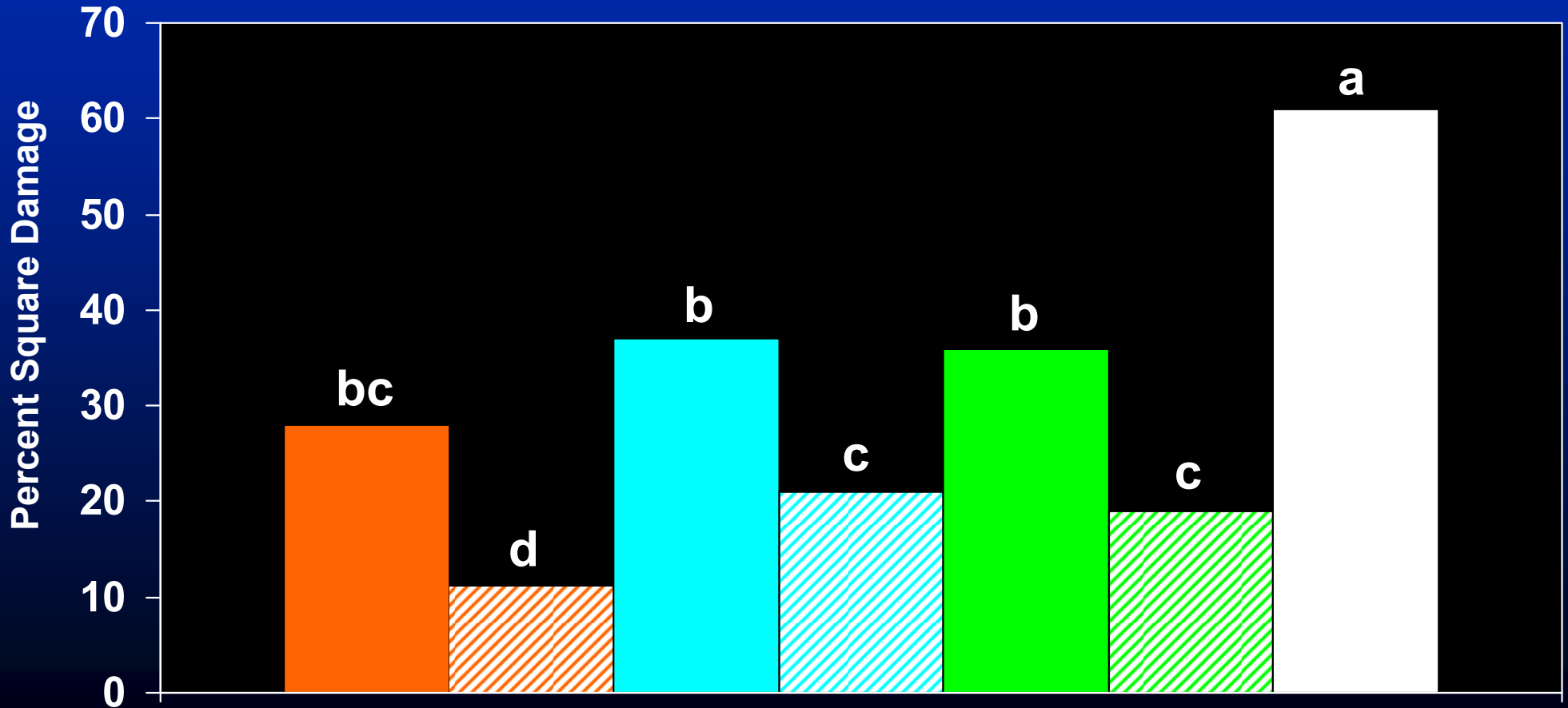


Evolution of Insecticide Use Rates

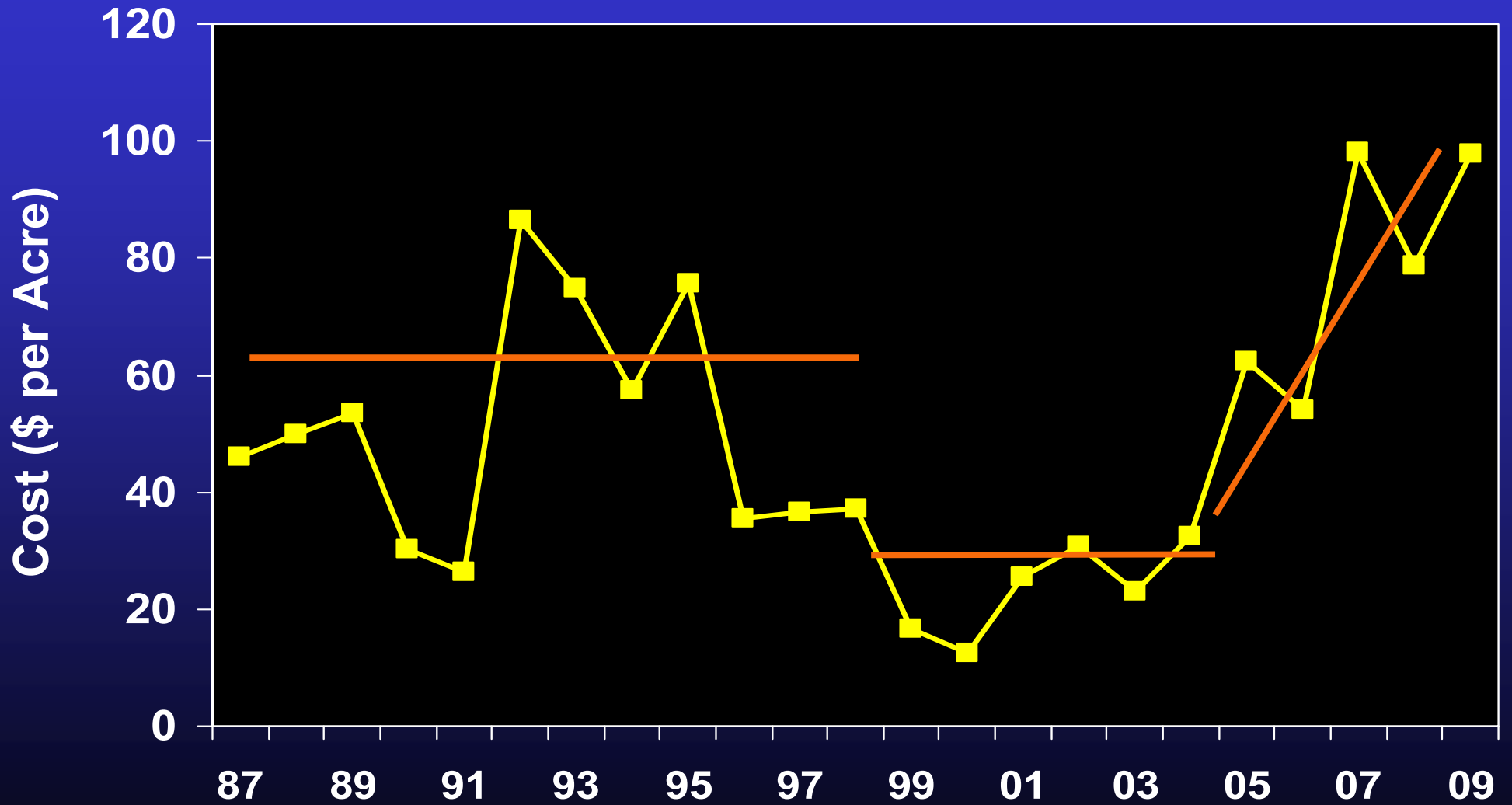


Tank Mixes

- Centric (2.5)
- Trimax Pro (1.8)
- Orthene (1)
- Non-treated
- Endigo (5)
- Leverage (5)
- Orthene (.5) + Brigade (6.4)



Foliar Insect Control: Mississippi



How has this impacted biodiversity in cotton?

- **Secondary Pest Outbreaks:**

Cotton Aphids and Spider Mites

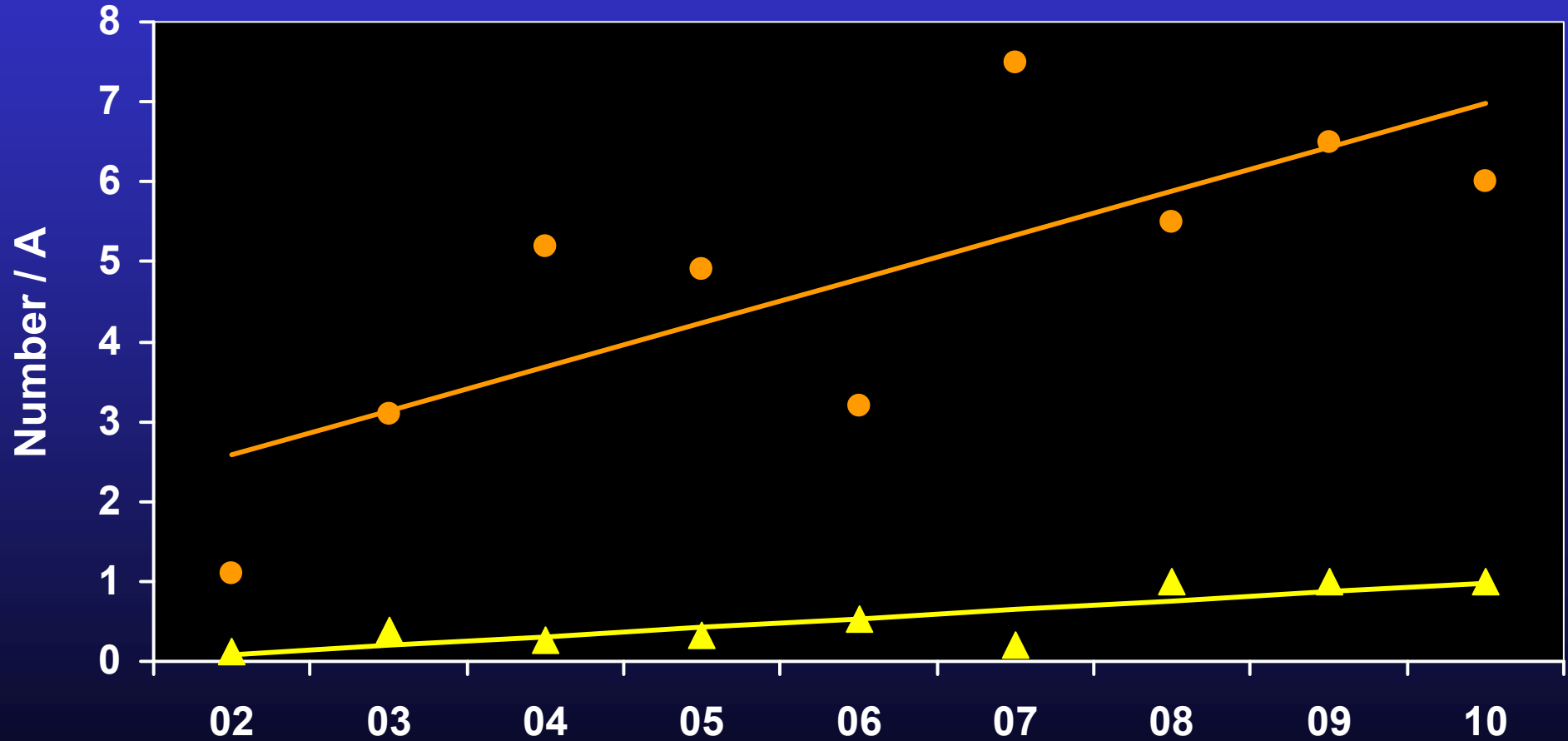
Both are generally maintained at relatively low levels by natural enemies until the natural enemy complex is disrupted.

Selection for resistance

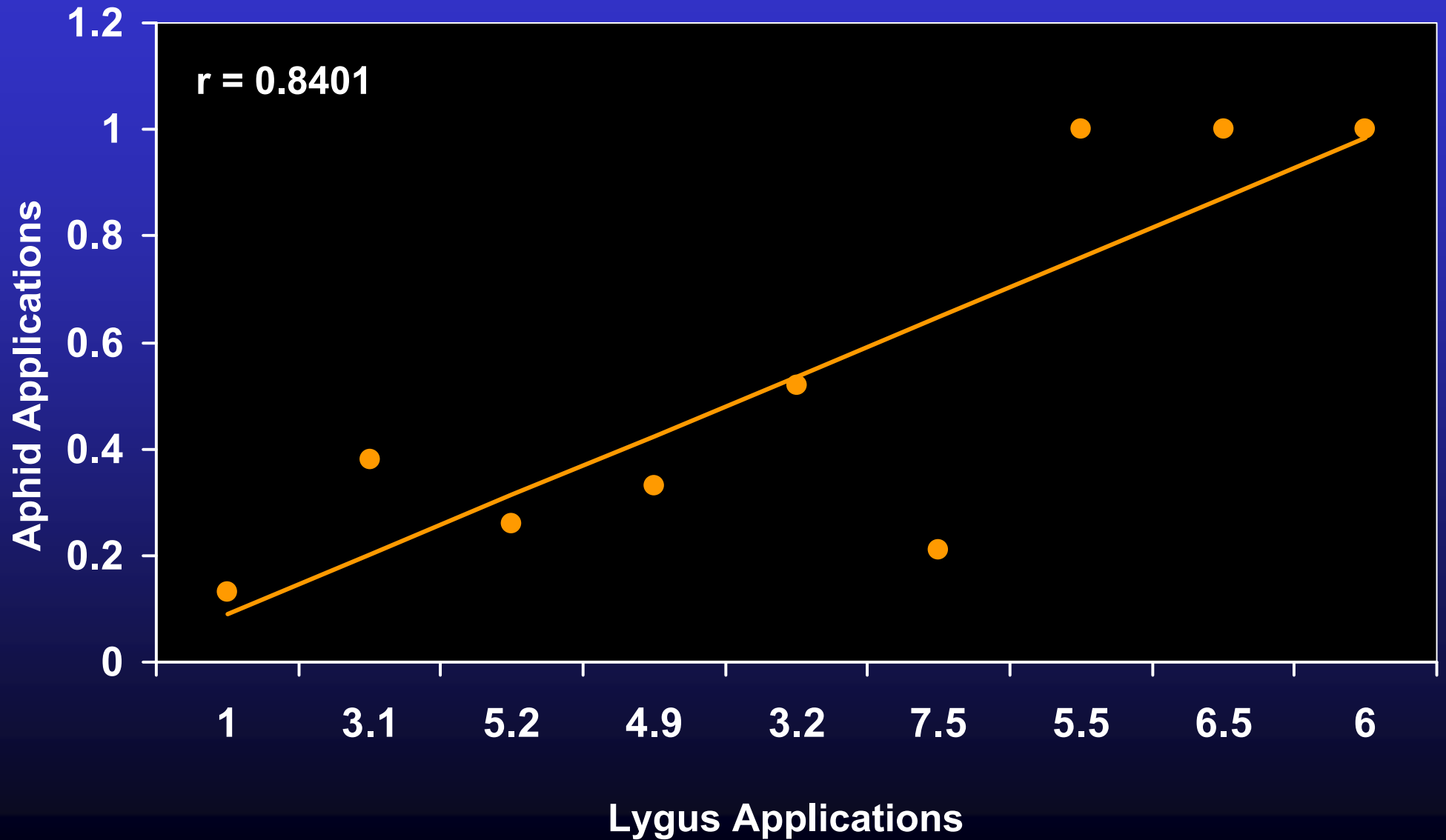
Insecticide Applications

● Lygus

▲ Aphids

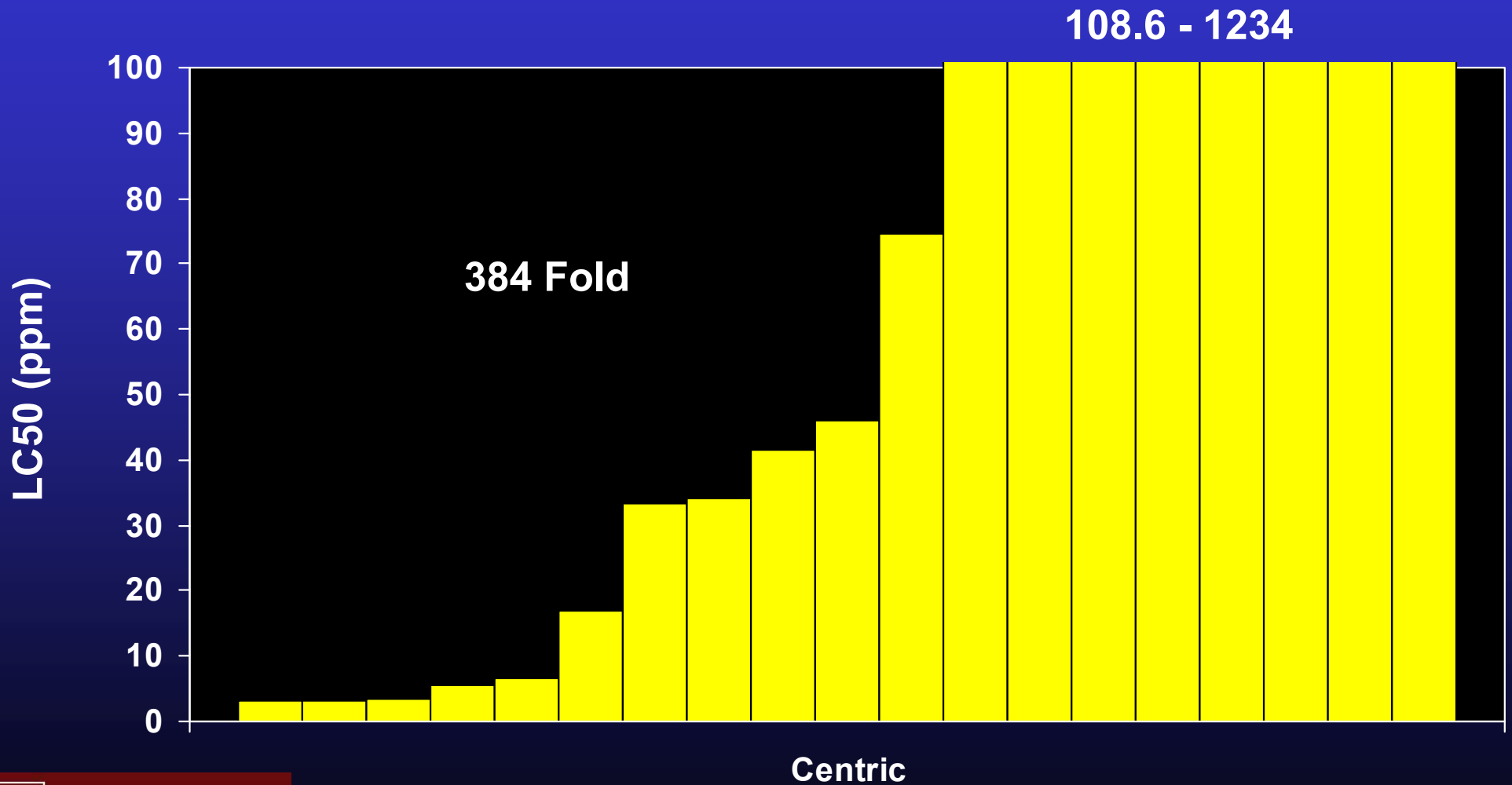


Correlation Between Lygus Control and Aphid Control



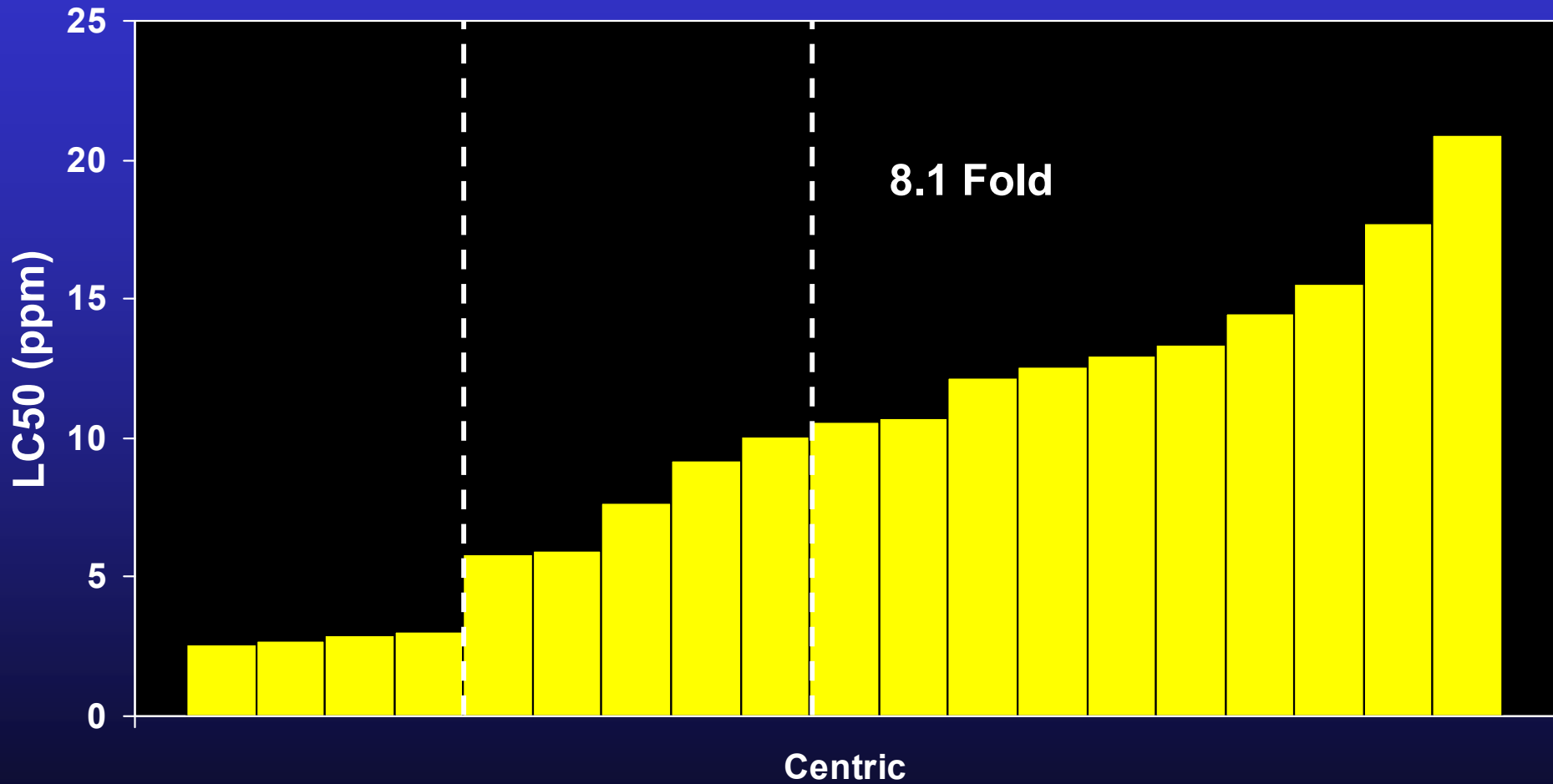
Cotton Aphid Leaf-Dip Bioassays – 2008-2010

48 HAT



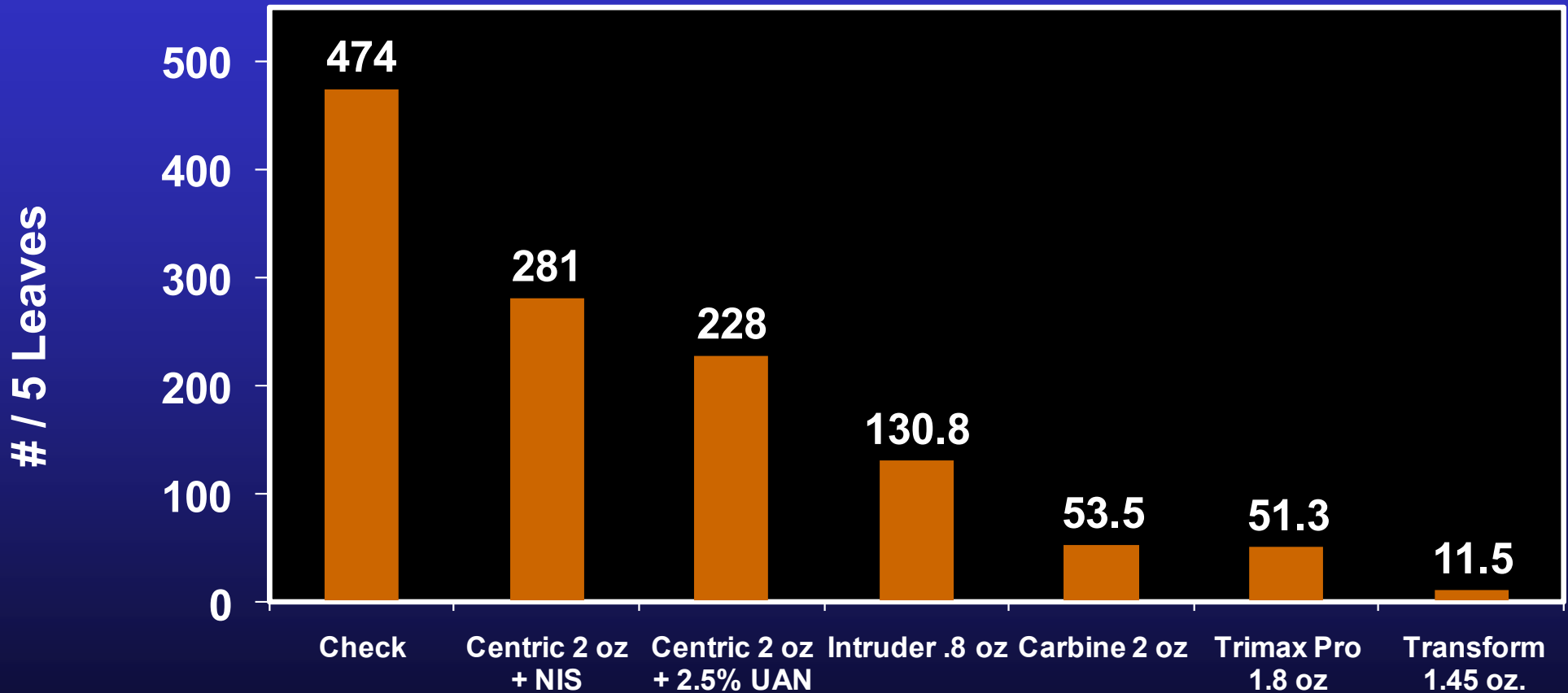
Cotton Aphid Leaf-Dip Bioassays – 2008-2010

72 HAT



Foliar Aphid Control - 2008

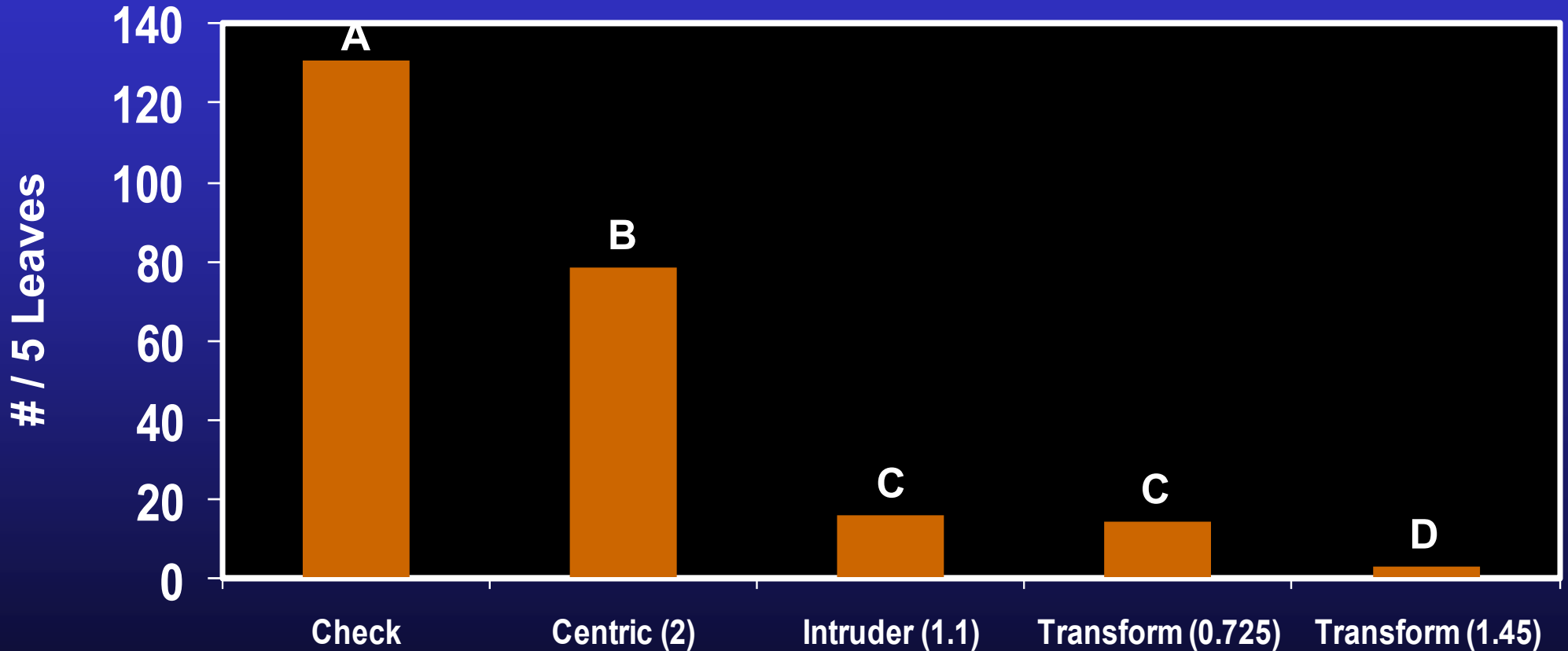
Angus Catchot - Grenada, MS



Centric LC50 = 10.71 at 72h

Foliar Aphid Control - 2010

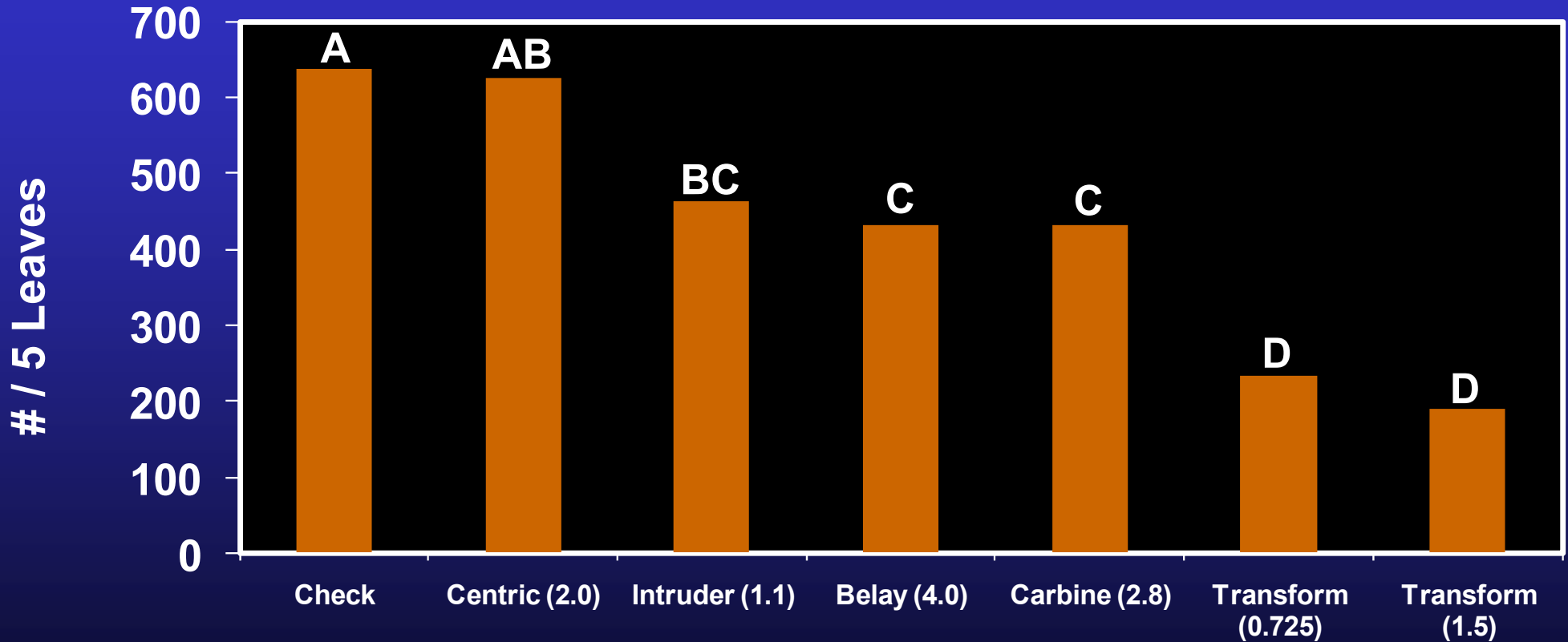
Stoneville, MS



Centric LC50 = 17.71 at 72h

Foliar Aphid Control - 2010

Angus Catchot - Grenada, MS



Centric LC50 = 20.9 at 72h

Cotton Aphid Leaf-Dip Bioassays – 2008-2010

72 HAT





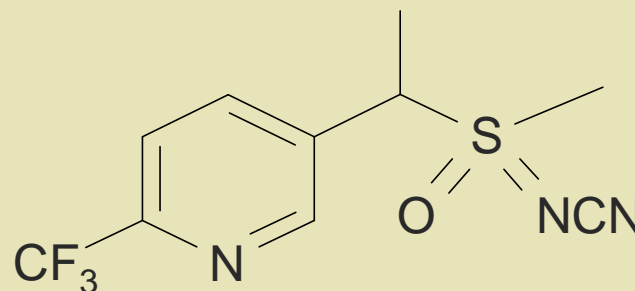
Sulfoxaflor

- Sulfoxaflor is a member of a new chemical class of insecticides: *Sulfoximines*
 - Discovered by and proprietary to Dow AgroSciences
- Sulfoxaflor is targeted for global development in all major crop groups

Insecticide Class: Sulfoximine

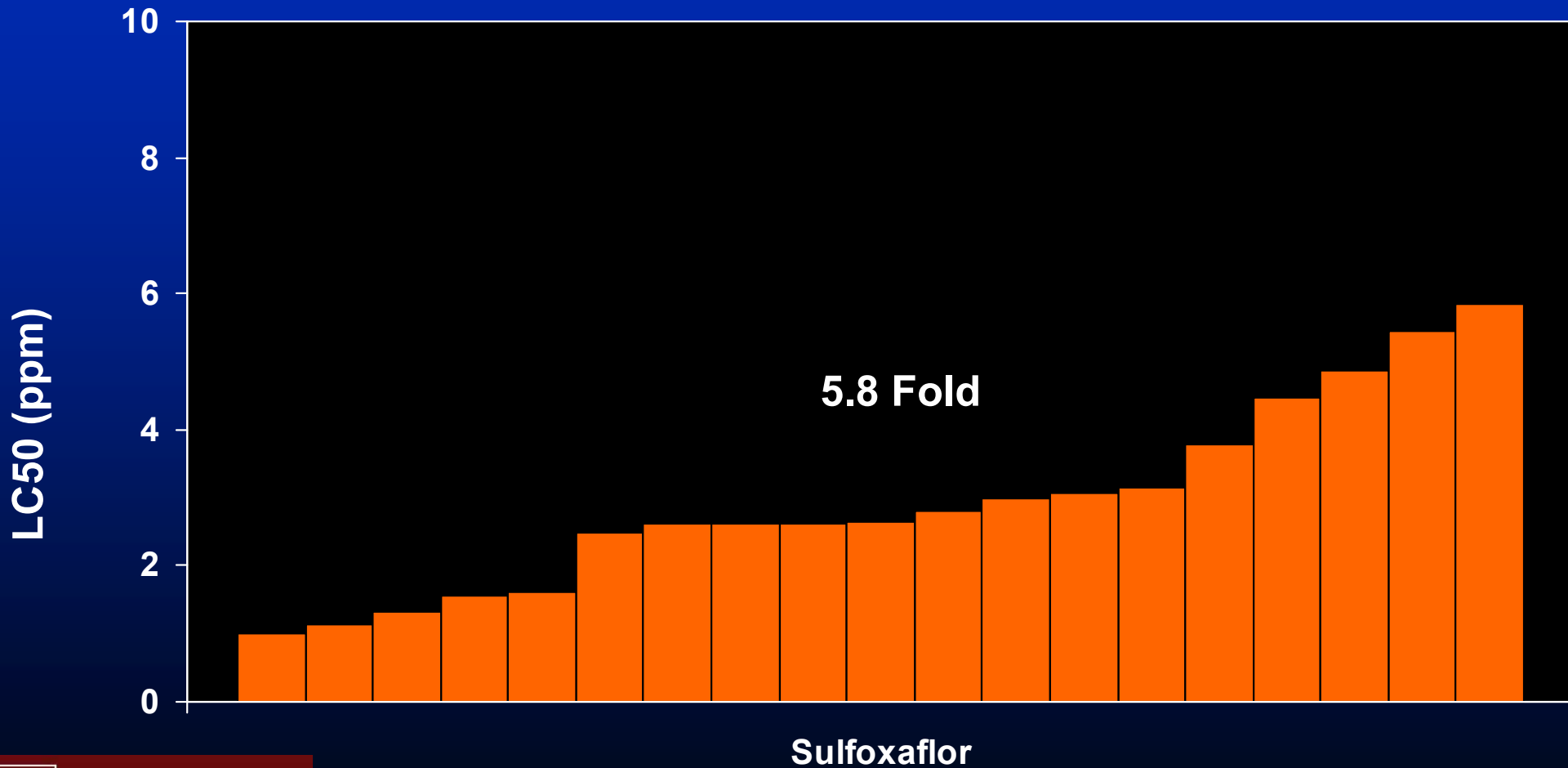
Transform WG

Rates: 0.75-1.5 oz./A



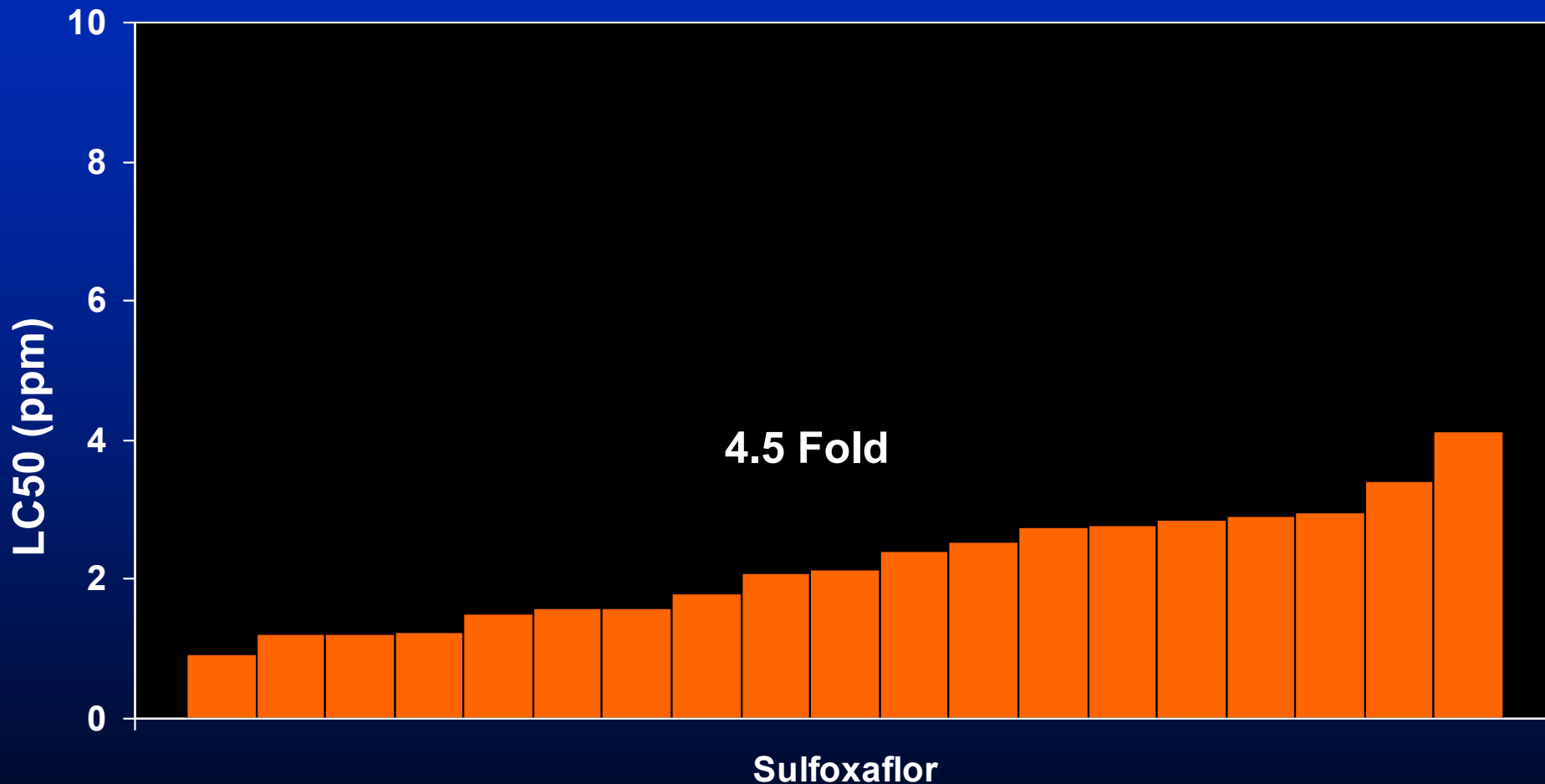
Cotton Aphid Leaf-Dip Bioassays – 2008-2010

48 HAT



Cotton Aphid Leaf-Dip Bioassays – 2008-2010

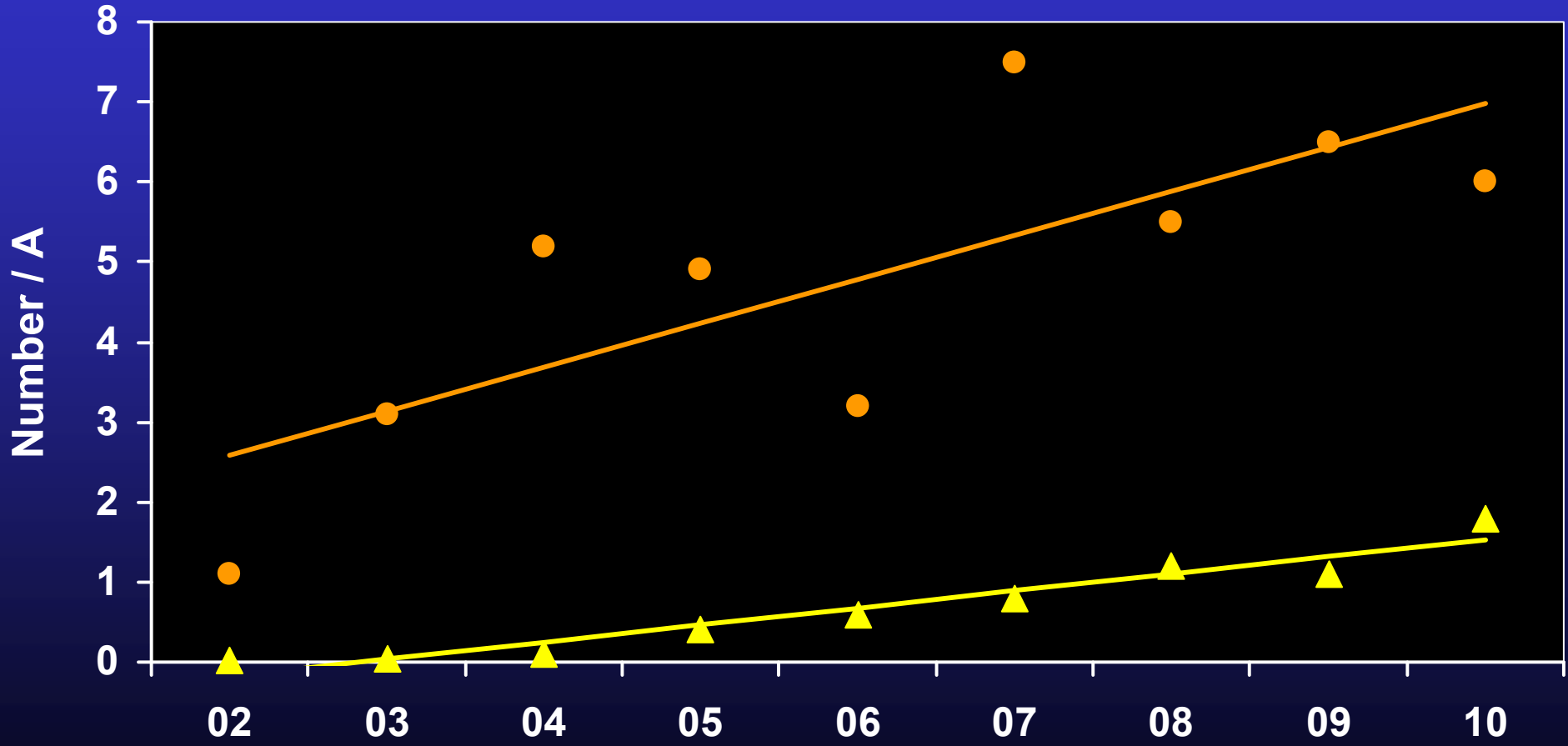
72 HAT



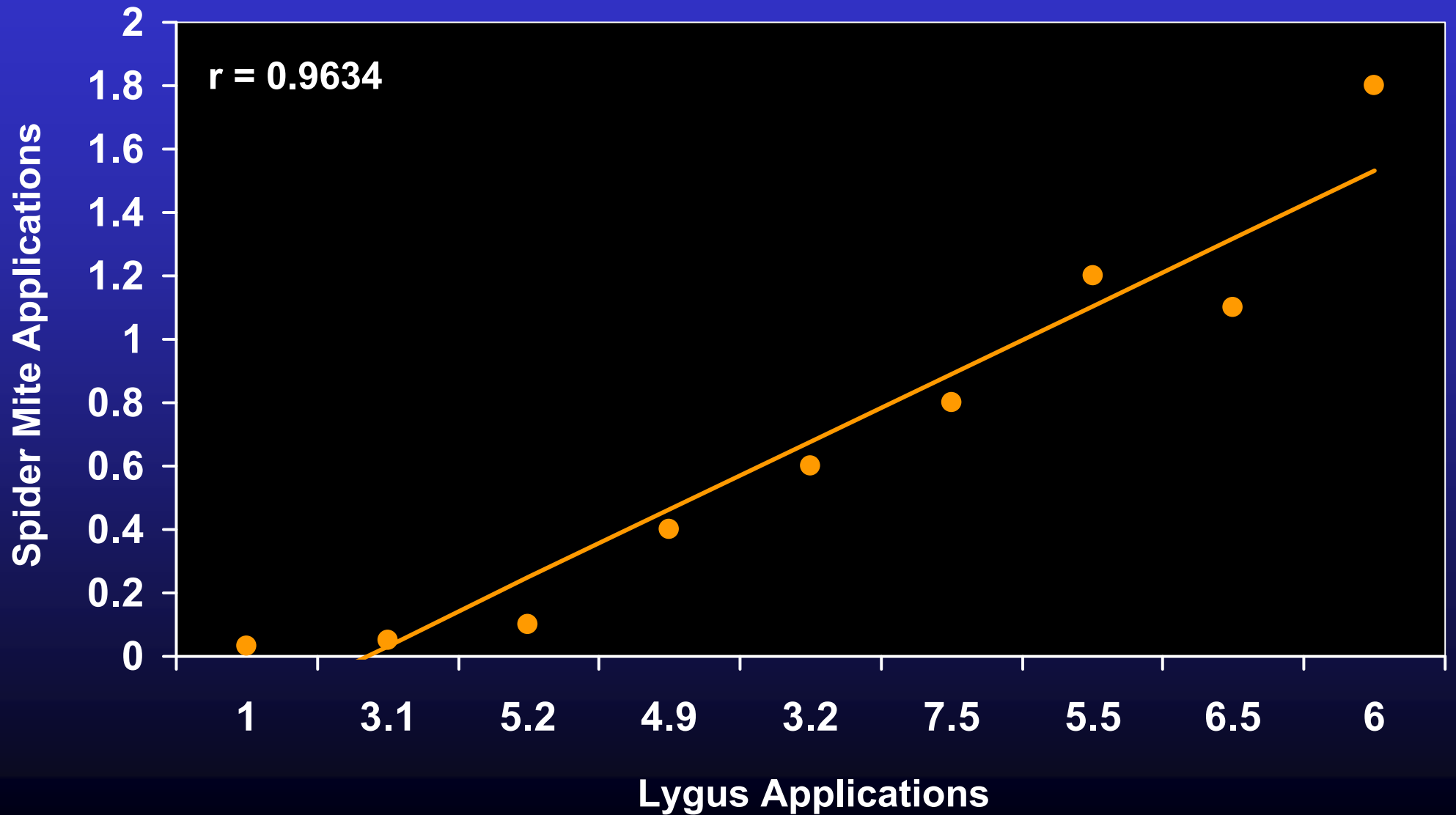
Insecticide Applications

● Lygus

▲ Spider Mites

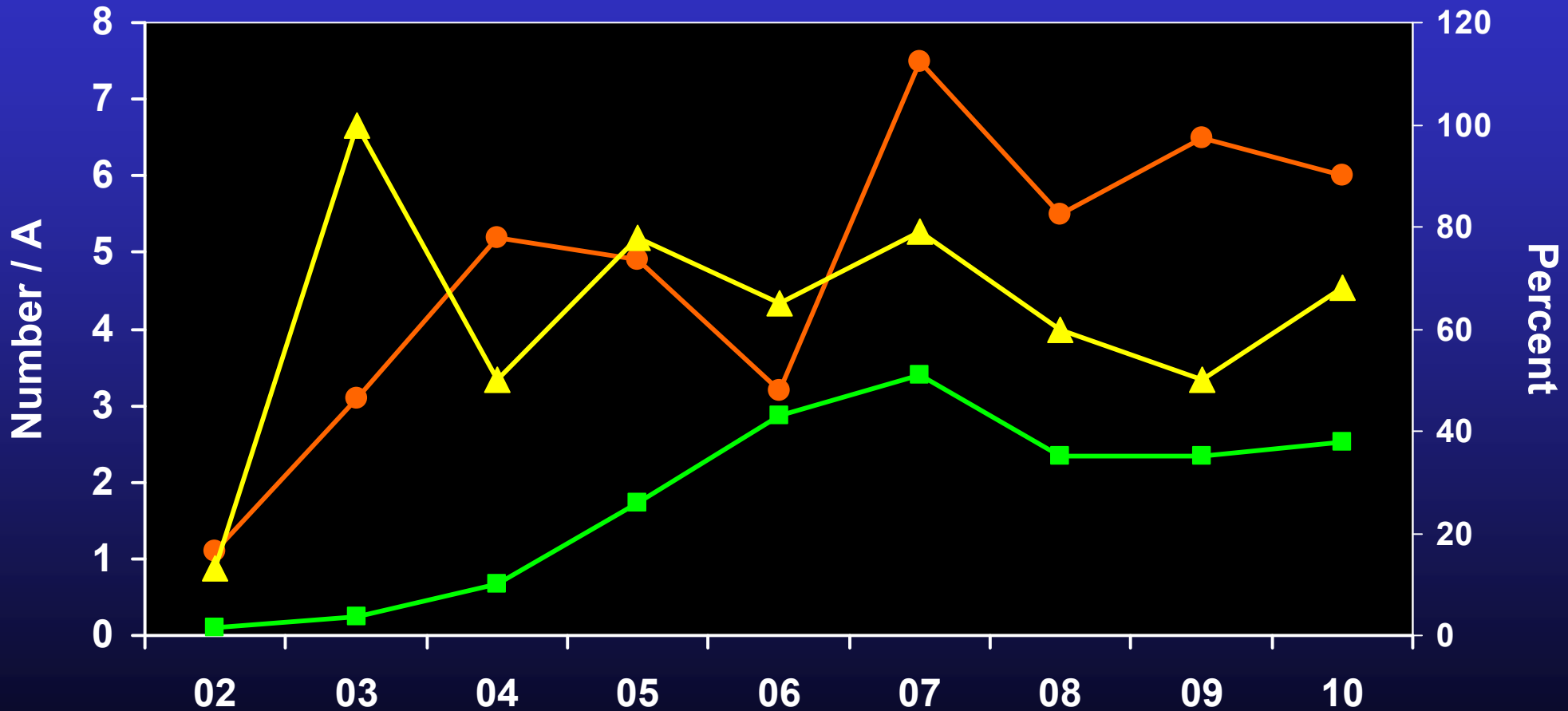


Insecticide Applications

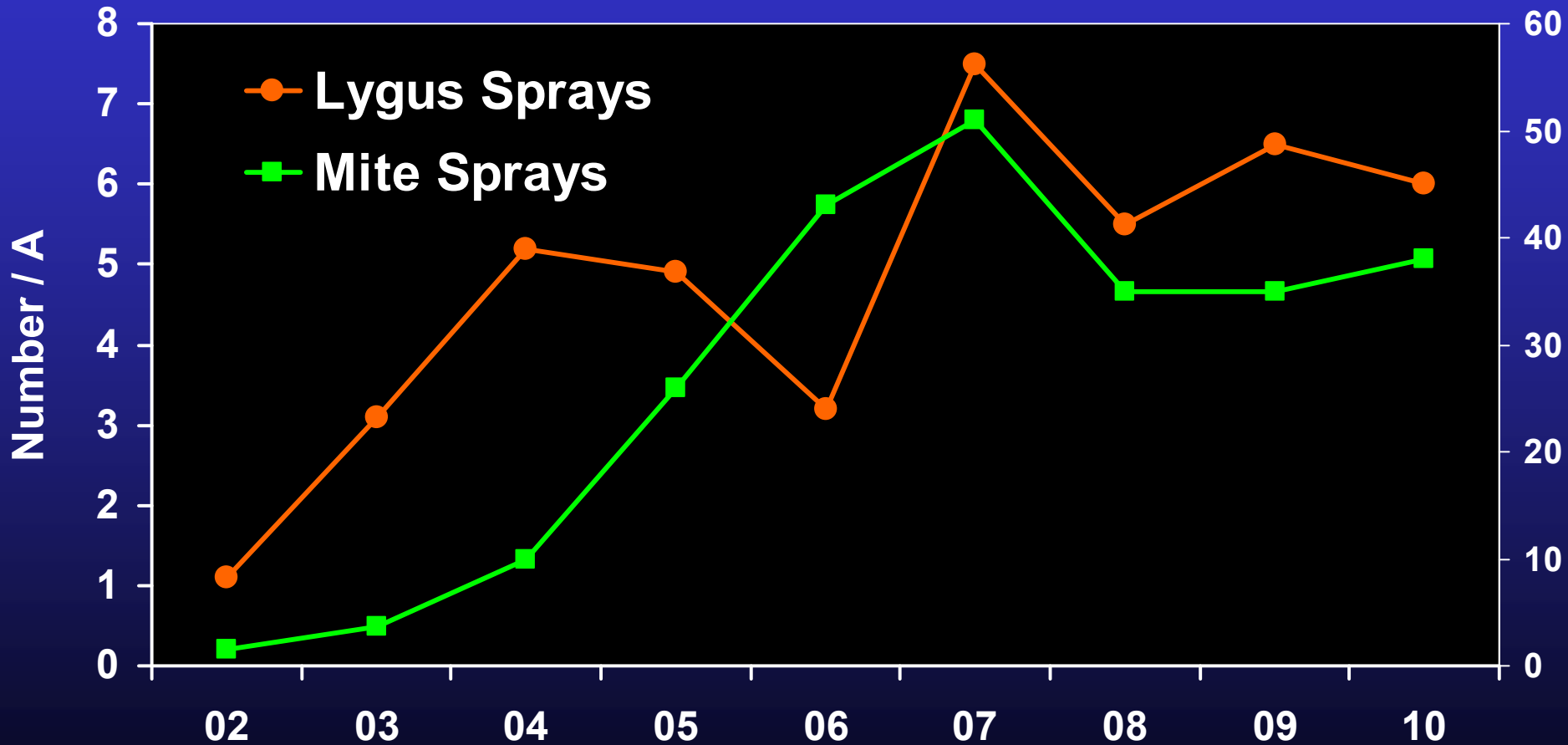


Insecticide Applications

● Lygus ▲ Acres Infested ■ Acres Sprayed



Insecticide Applications



Summary and Conclusions

- Tarnished plant bug is THE key pest of cotton in the Mississippi River Valley
- Resistance to pyrethroids and OP's is widespread
- Use rates have doubled over the last 10 years
- The number of applications has more than doubled

Summary and Conclusions

- Intense plant bug management is impacting other pests
- Cotton aphids are becoming resistant to the neonicotinoids
- Spider mites have become an important early to mid-season pest
- Natural enemy complexes are being disrupted

We are on the “Pesticide Treadmill”

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Modern life is rubbish.



Thank You

