Management Strategies for Spider Mites in Cotton

November 1st, 2006

Cotton Incorporated Crop Management Seminar

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Mississippi State University


Spider Mites
"The Insecticide Budget Busters of Cotton Production in the South"
UC Statewide IPM Project
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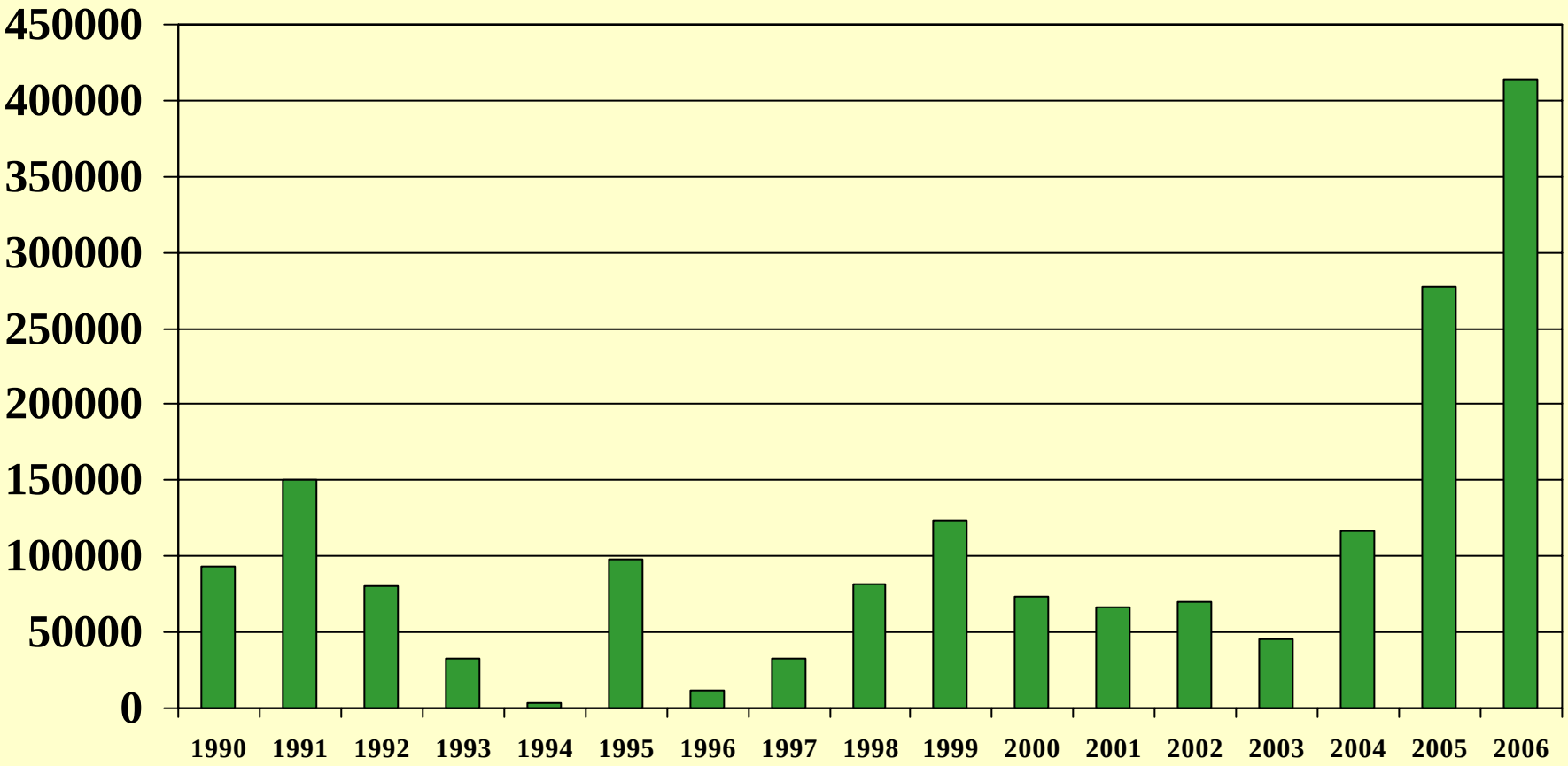
Spider Mite Biology

- **Egg, Larval Stage (3 pair of legs), two nymphal stages, Adult**
- **Generation time is highly temperature dependent**
- **Avg. life span ~ 28-30 days**
- **O/W as adult females in fencerows, rocks, weeds, etc..**
- **Begin becoming active in spring**

Pest Status of Spider Mites in the South

- **As a whole, spider mites have been “occasional” pest of cotton in the southern cotton belt**
- **In recent years treatments for spider mites have become more common and widespread throughout the southern cotton growing states**

Trends in Spider Mite Treatments in Mississippi (Acres Treated)



Typical Spider Mite Pressure in the Mid-South

- **Spider Mites have traditionally been a “cut out” type pest in Mid-South**
- **Early season spider mites can be found but have rarely required action on large acres**
- **Some acres are treated every year late in the season but generally not wide spread**

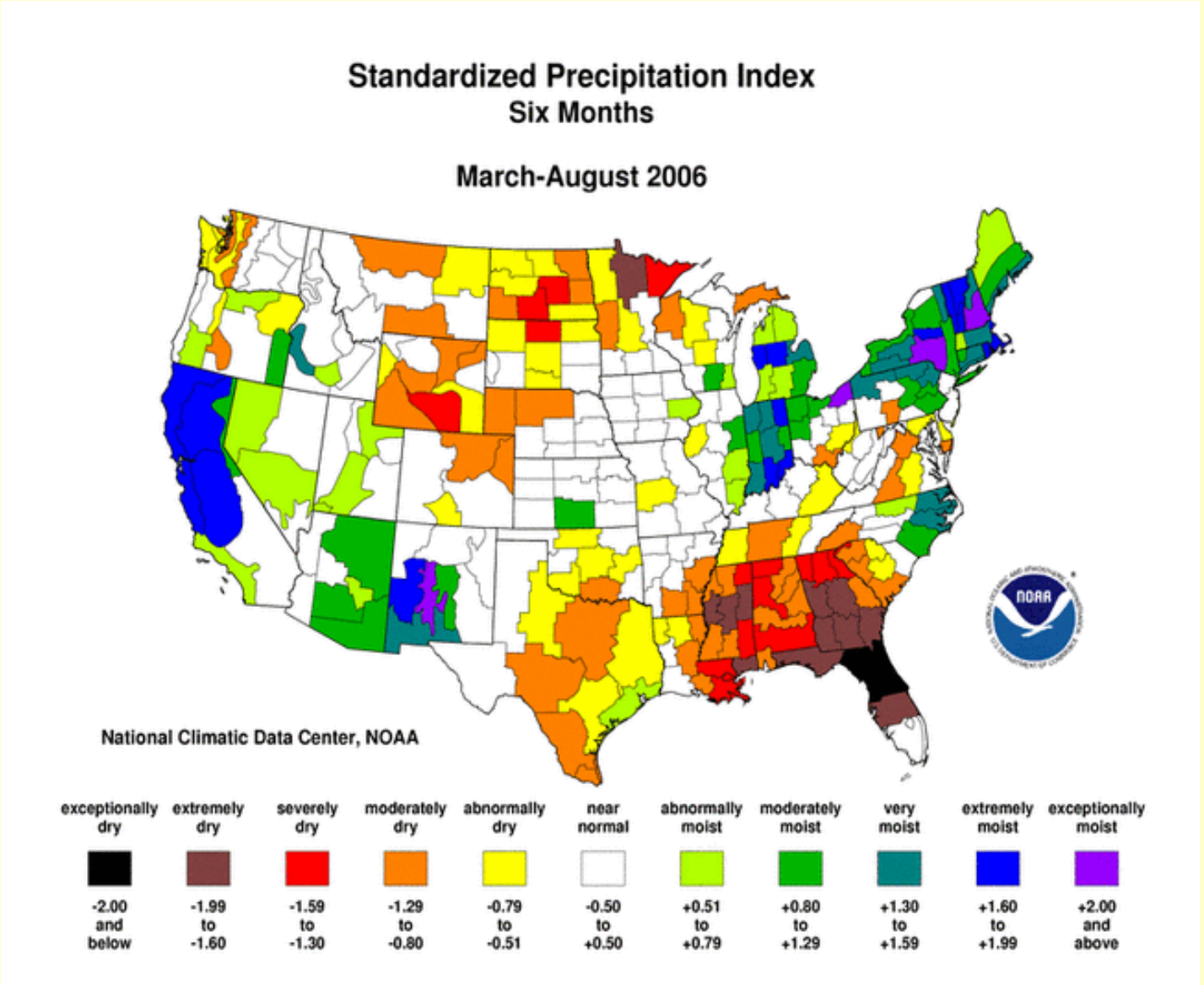
Possible Factors Contributing to Increased Frequency of Spider Mite Outbreaks in the South

- **Delayed burndown/Field Border Management**
- **Hot and Dry Conditions**
- **Beneficial Insect Reduction (Flaring)**
- **Increased use of Insecticide Seed Treatments vs. Temik?**
- **Resistance**


Delayed Burndown

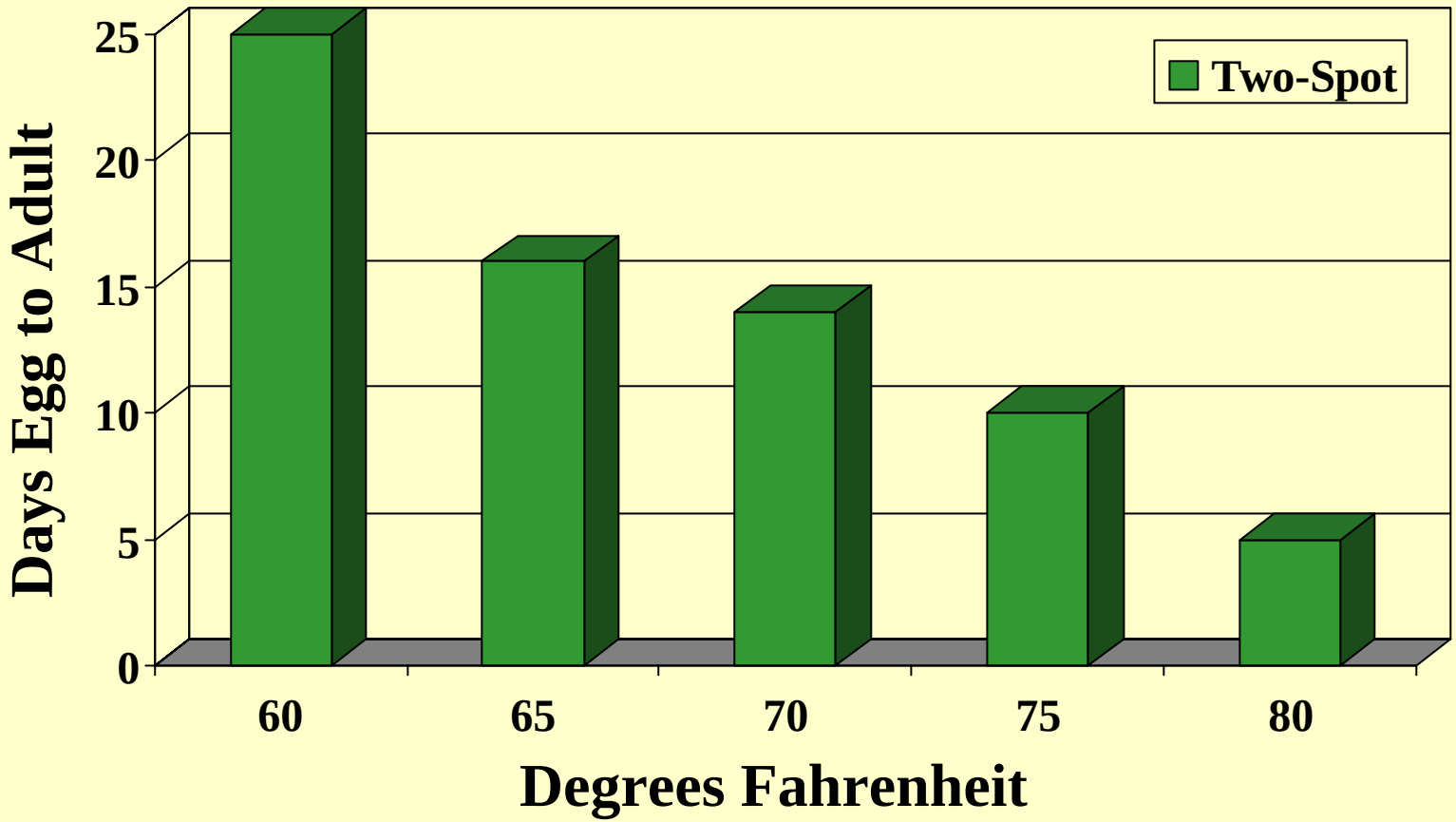
Field Border Management

Hot and Dry Conditions



Spider Mite Developmental Rates

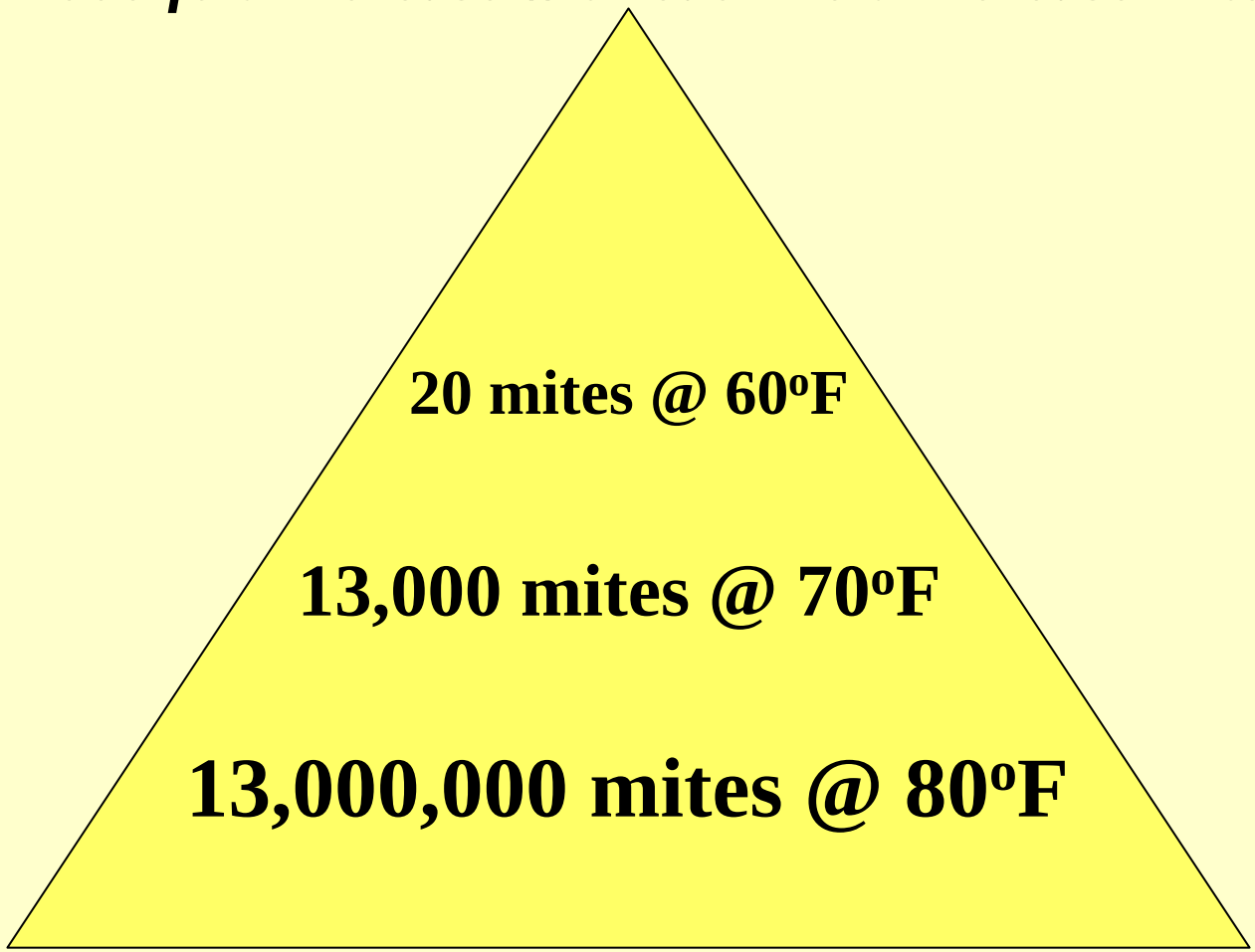
Number of days required to go from egg to adult is shortened as temperatures increase.



Spider Mite Developmental Rates

Number of mites that a single female can give rise to in her 30-day life span through successive generations to an enormous progeny.

Potential 1000 fold increase with each 10 d increase in temperature.



Reduction of Beneficial Insects (Flaring Mites)



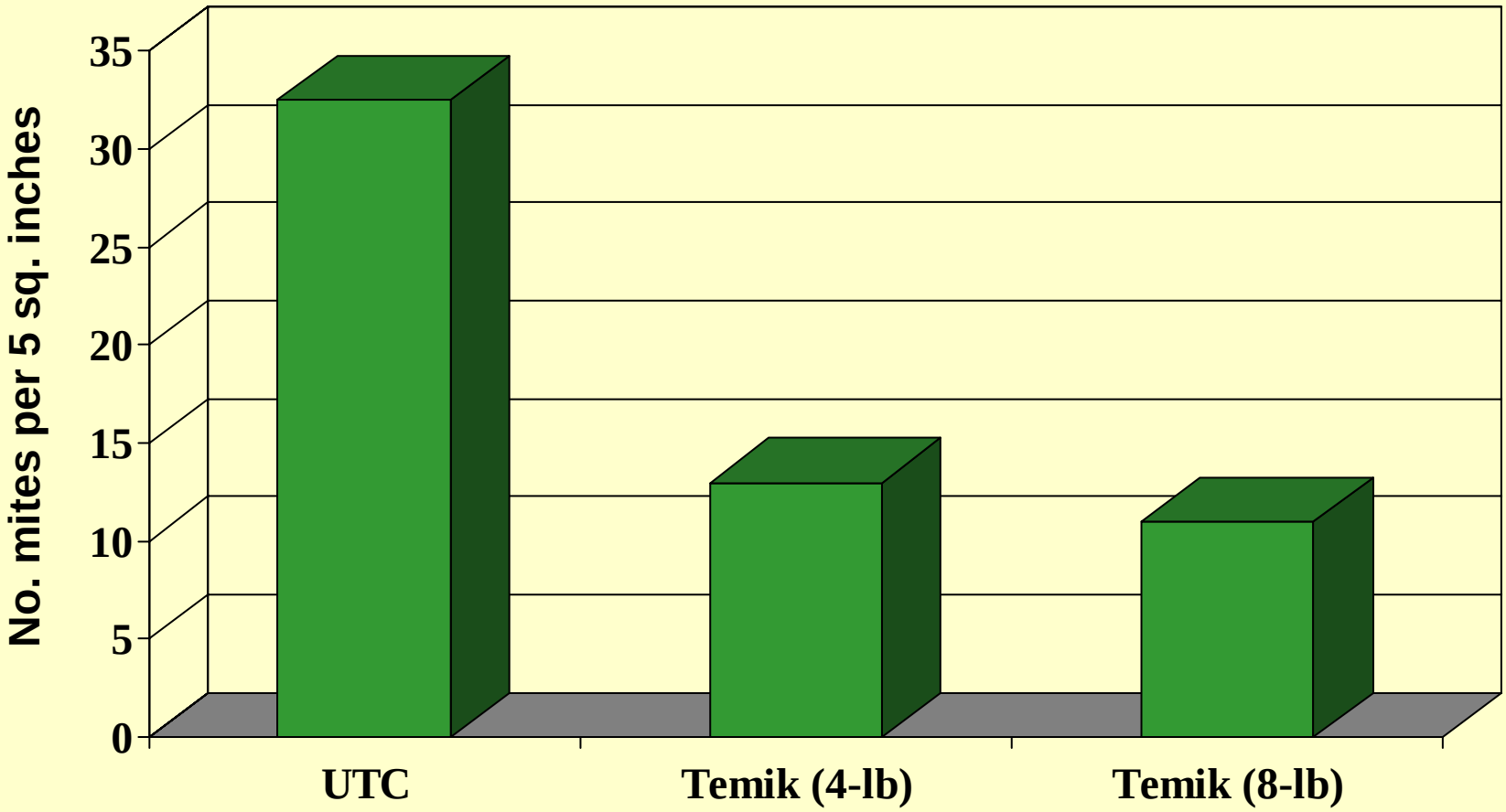



Increased Use of Seed Treatments vs. Temik?

- **Many speculate that spider mite problems are worse when a seed treatment is used vs. Temik for at planting thrips control. (No “hard” data)**
- **Seed treatments do not necessarily flare mites but rather do not control them allowing populations to build.**

Mite Control – Temik Side-Band

Jeff Gore USDA-ARS, Stoneville, MS



7 days after application

NC acreage treated for spider mites
(2004-2005 Consultants' Survey)

Usage pattern	% acres treated	Odds of treatment
Temik (100%)	0.58	1/170
Seed Trt. (74.5%)	5.3	1/19

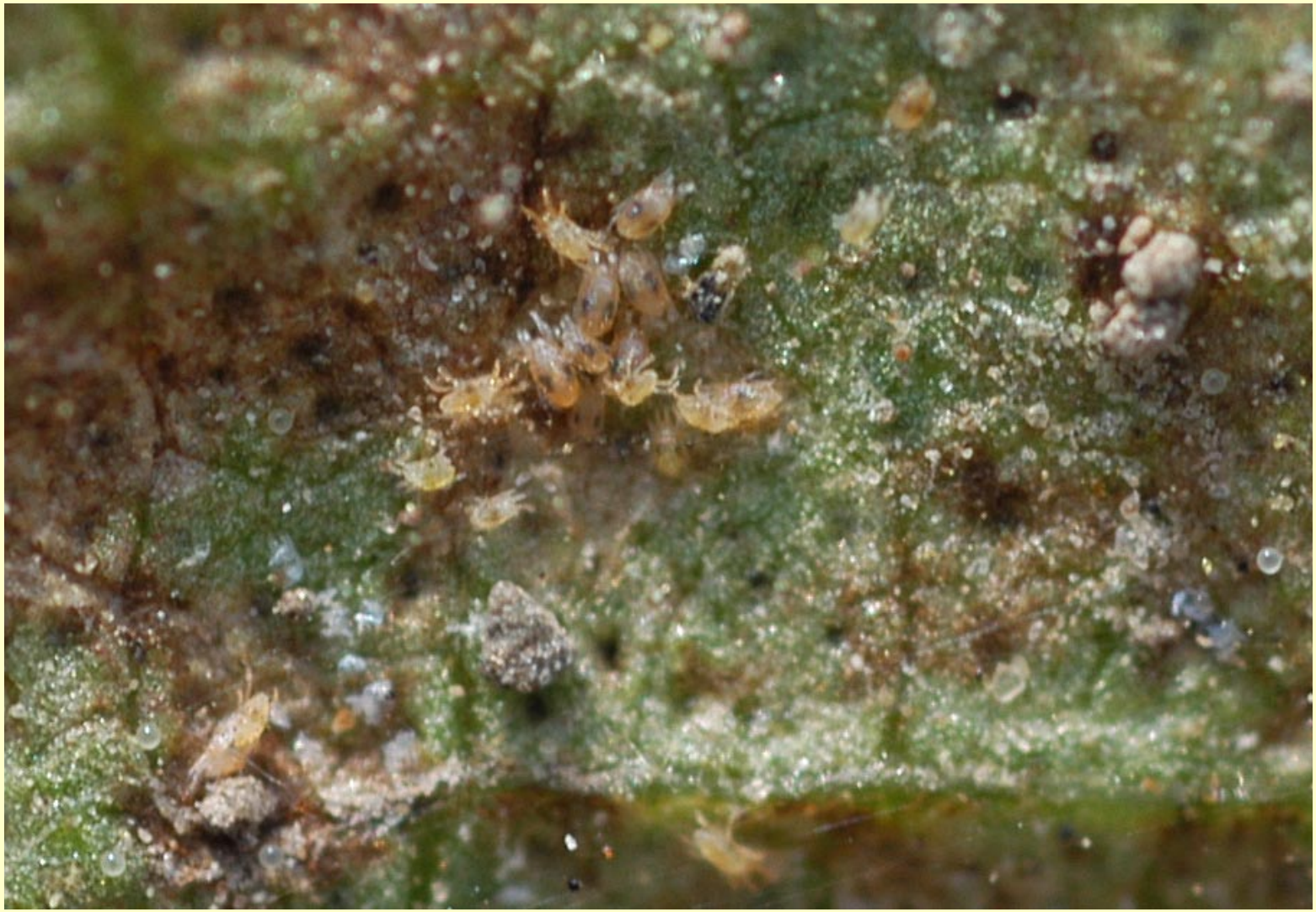
Difference: 9.1-fold

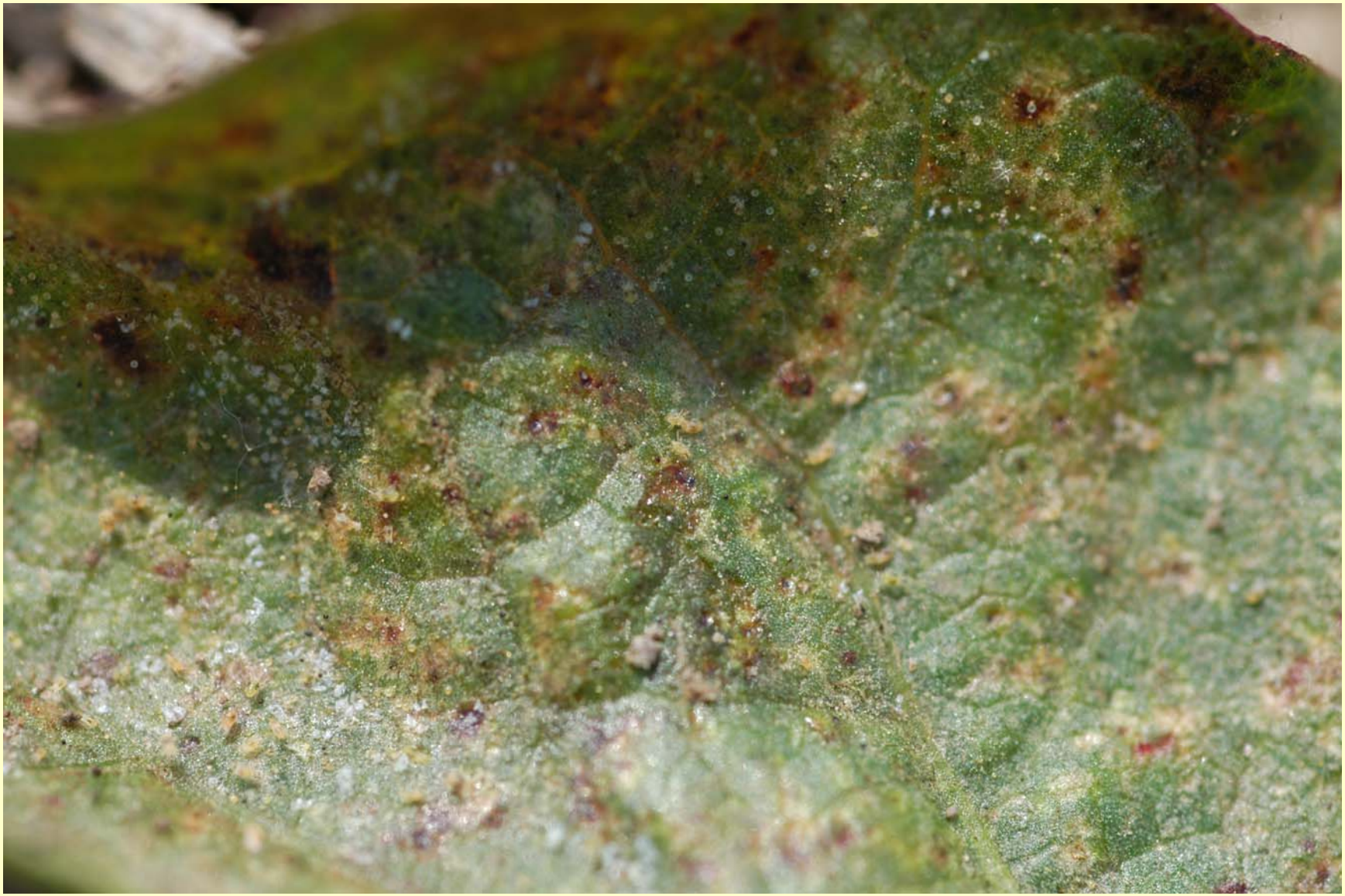
Resistance

- **Spider mites have a history of quickly developing insecticide resistance**
- **Females develop of fertilized eggs and have two sets of chromosomes (arrhenotokous)**
- **Males develop from unfertilized eggs and have one set of chromosomes**
- **Because the male has only one set of chromosomes, new genetic features (arising from mutations) will be immediately expressed. Through natural selection, these characteristics can be added quickly to the population (Helle and Overmeer, 1973).**

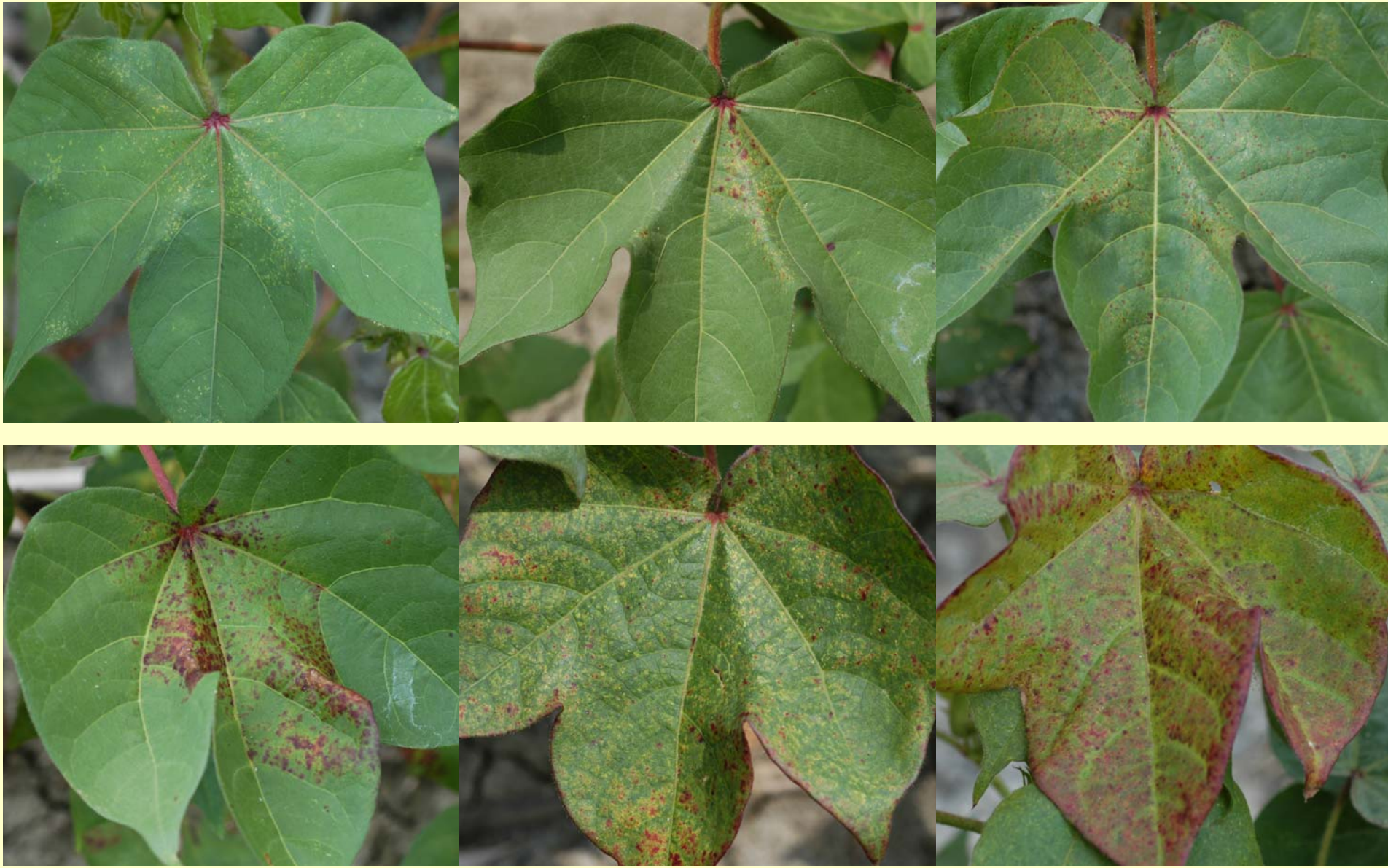
Damage Caused by Spider Mites

Spider mites feed on the underside of the leaf puncturing epidermal cells





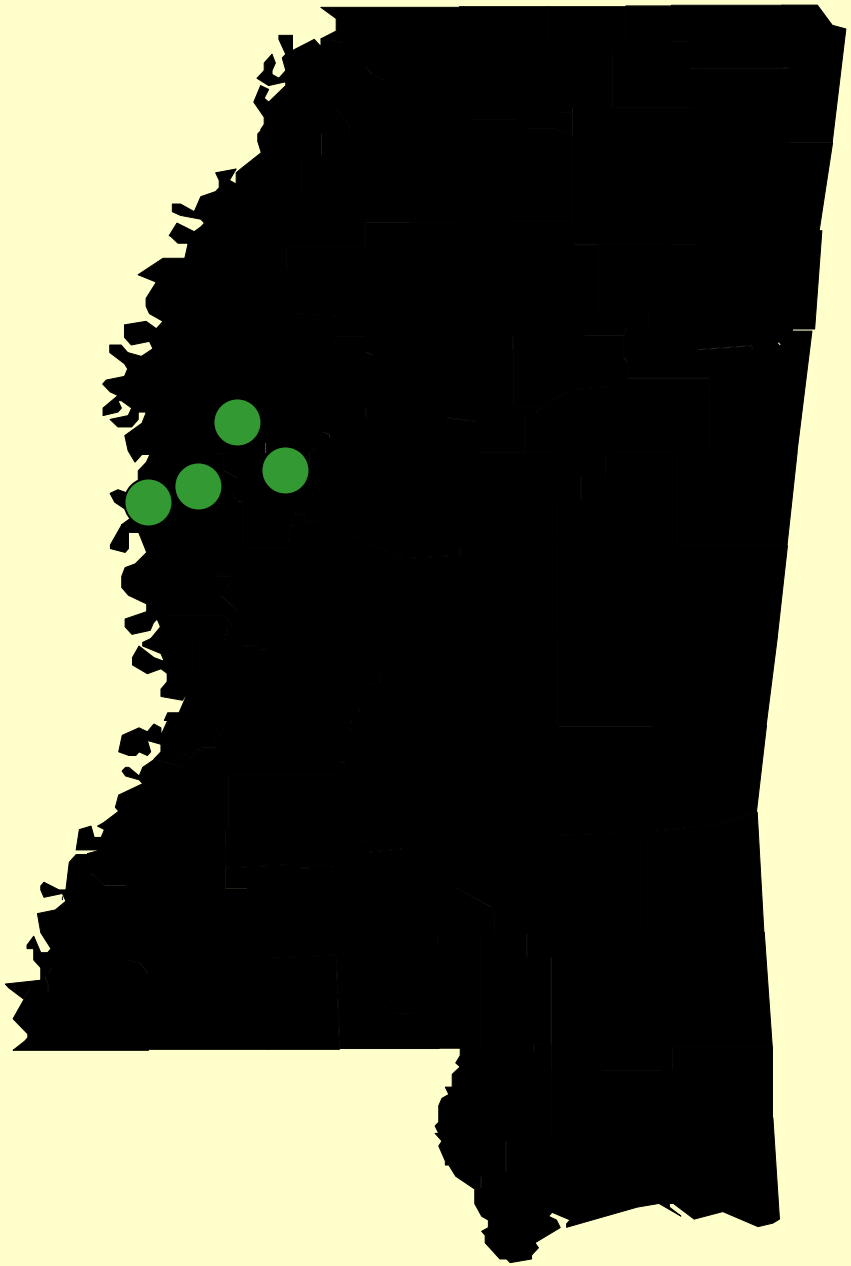
Spider Mites Symptomology



Spider Mites (Soybeans)

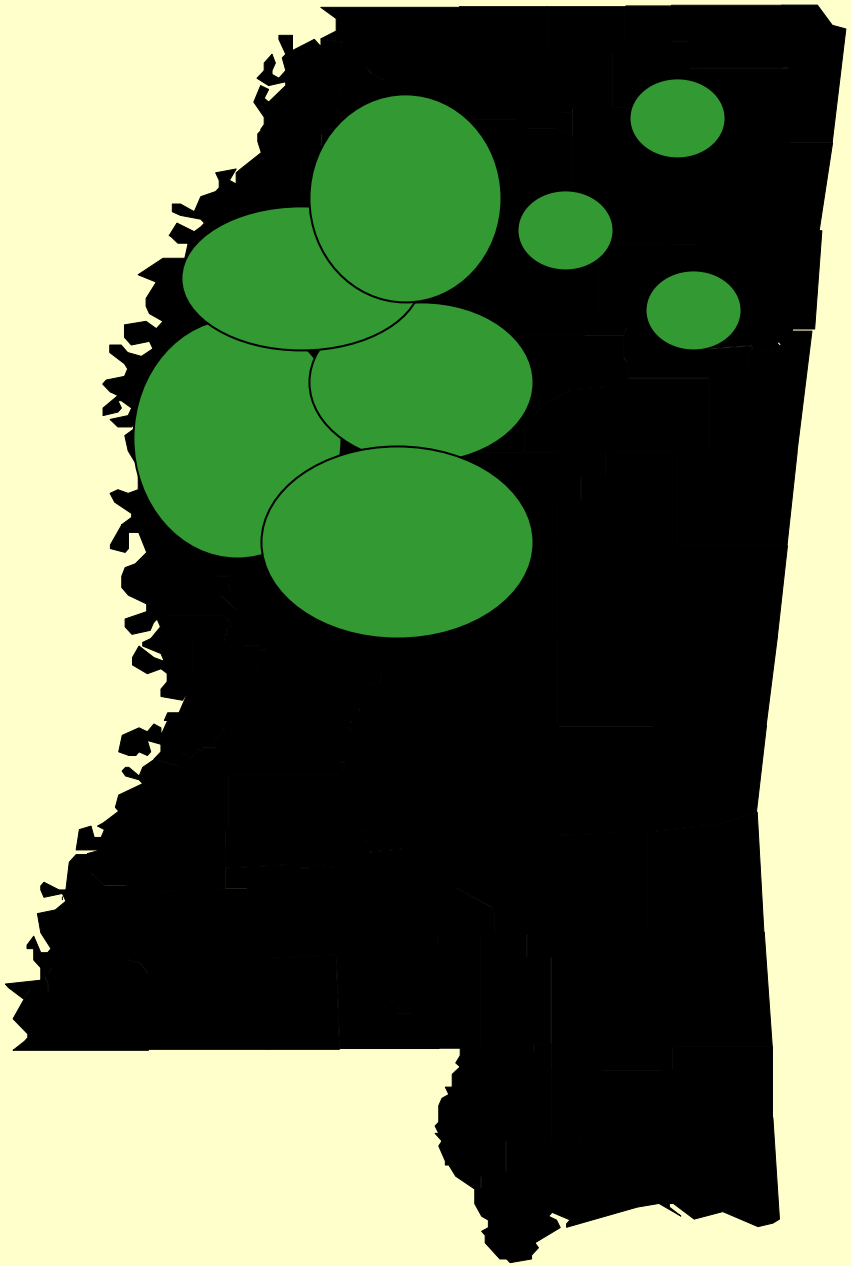
Spider Mites

Early June

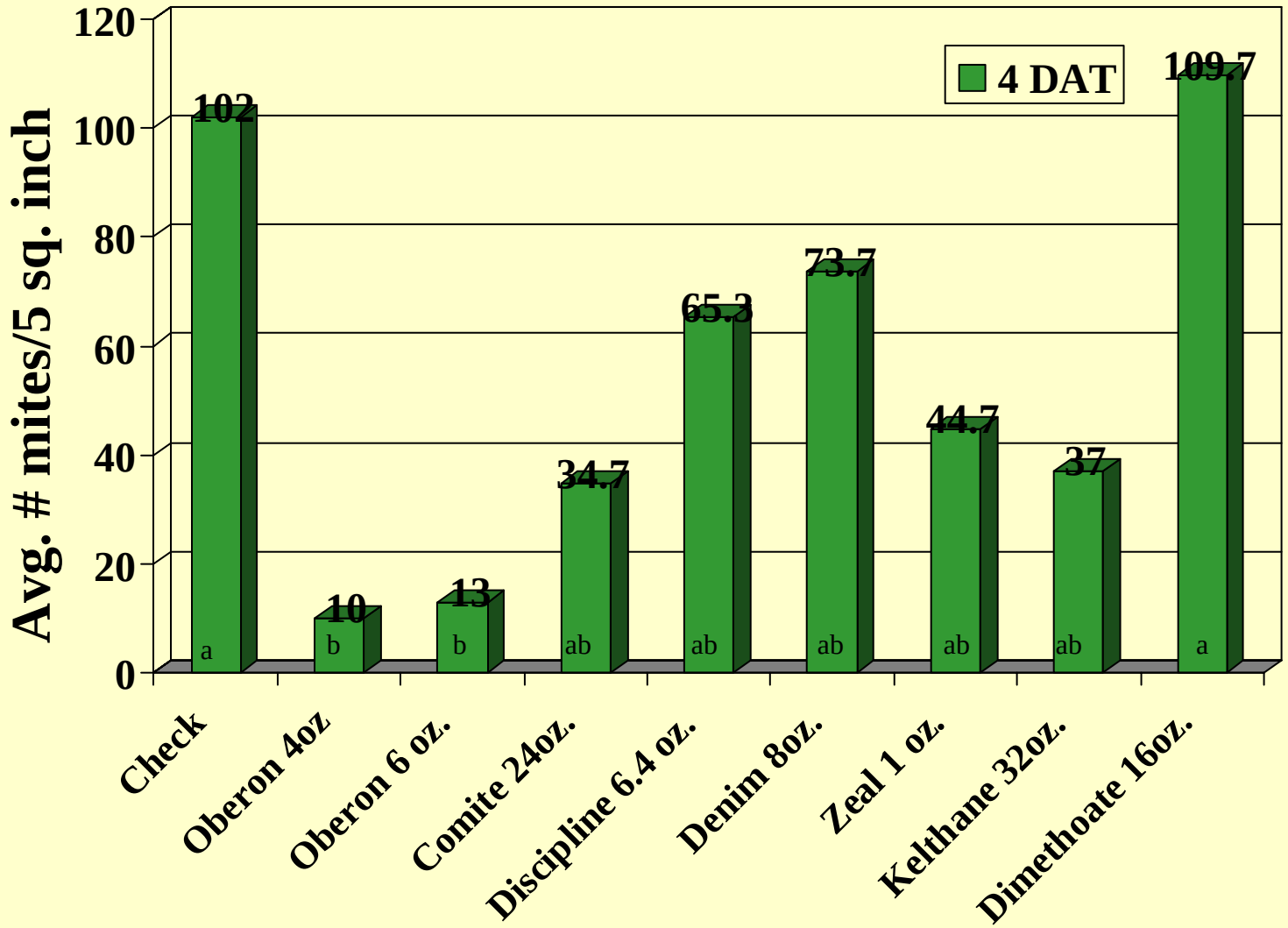


Spider Mites

Early July



Spider Mites (Hills 1)



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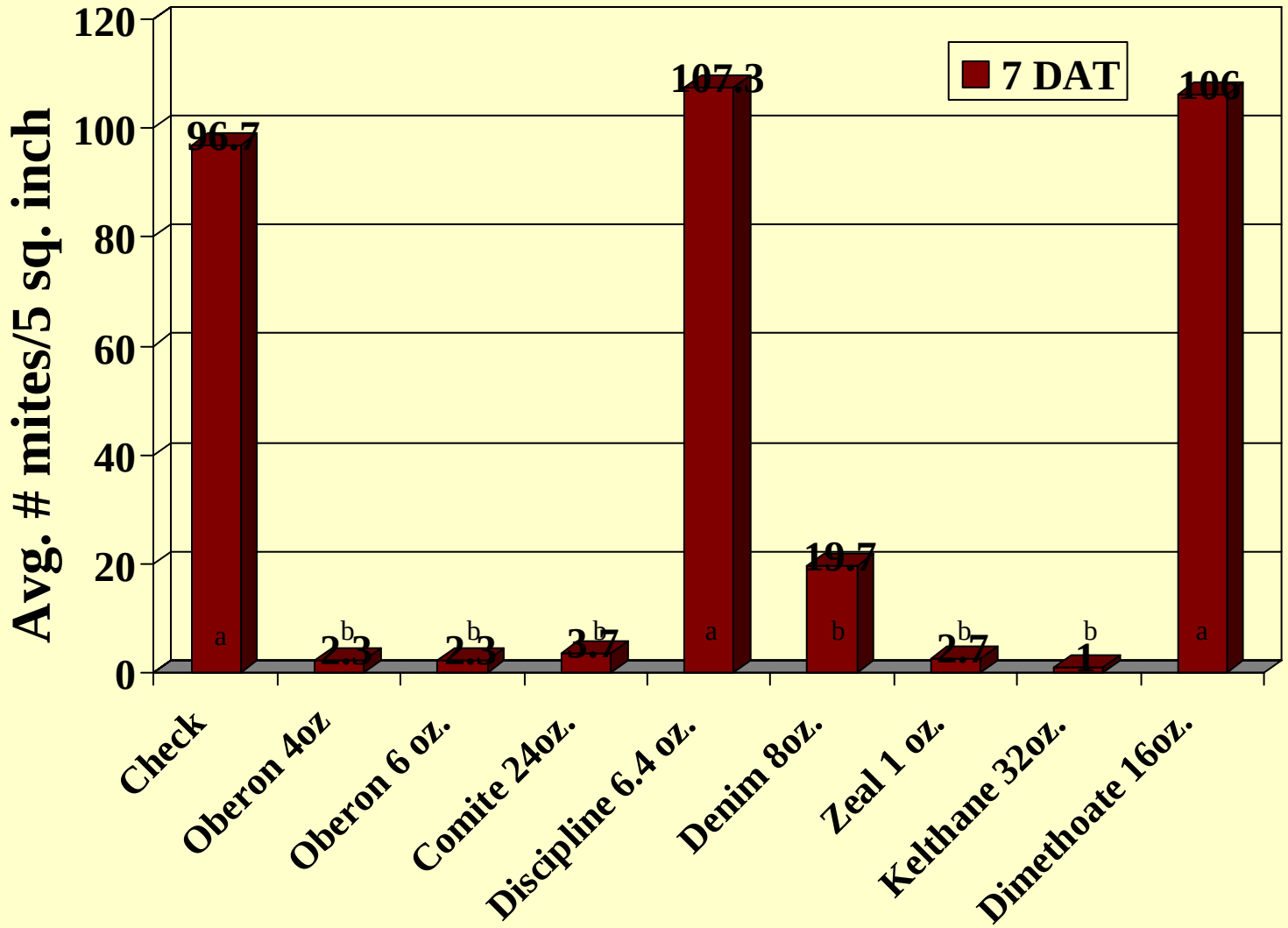

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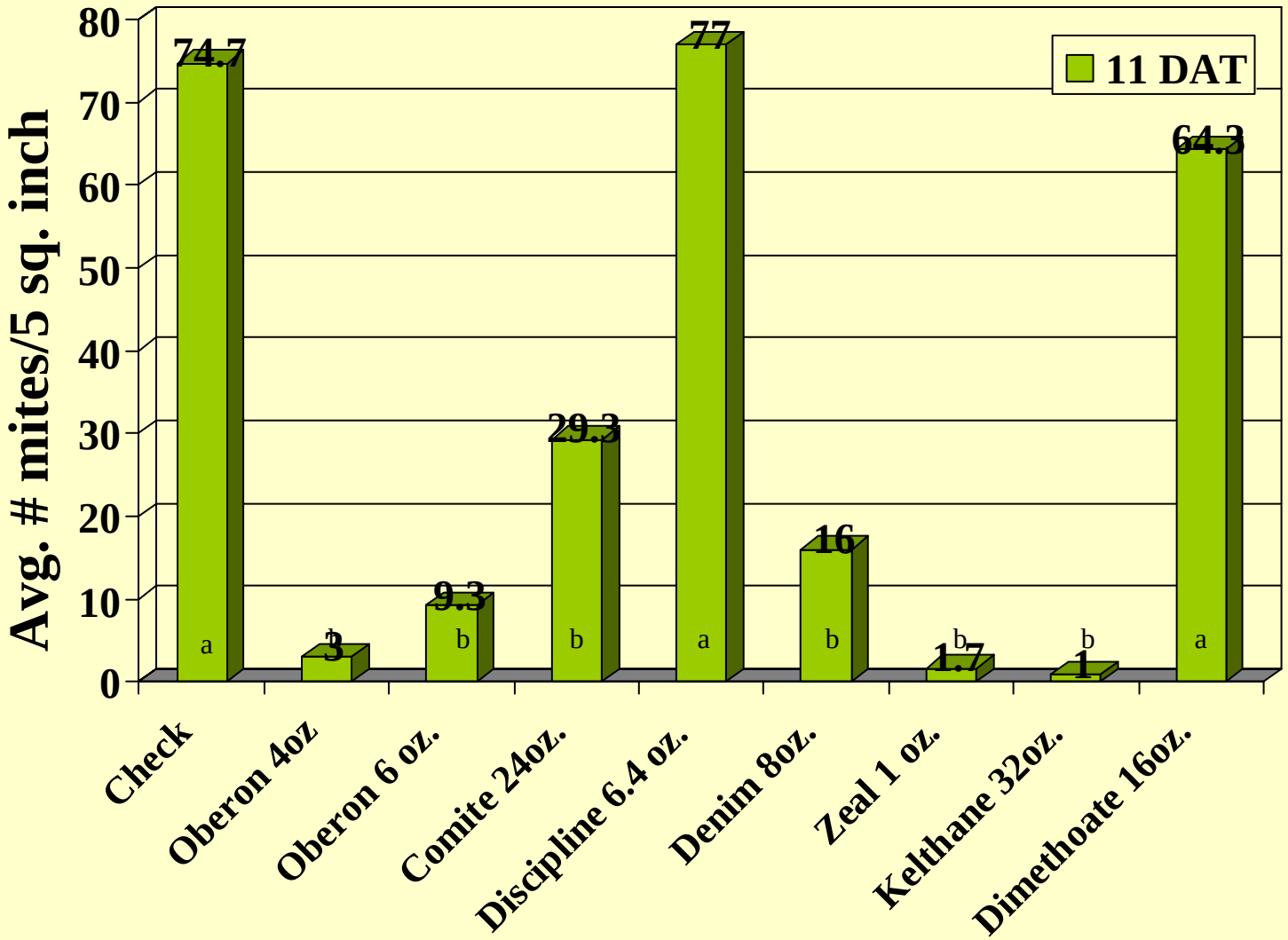
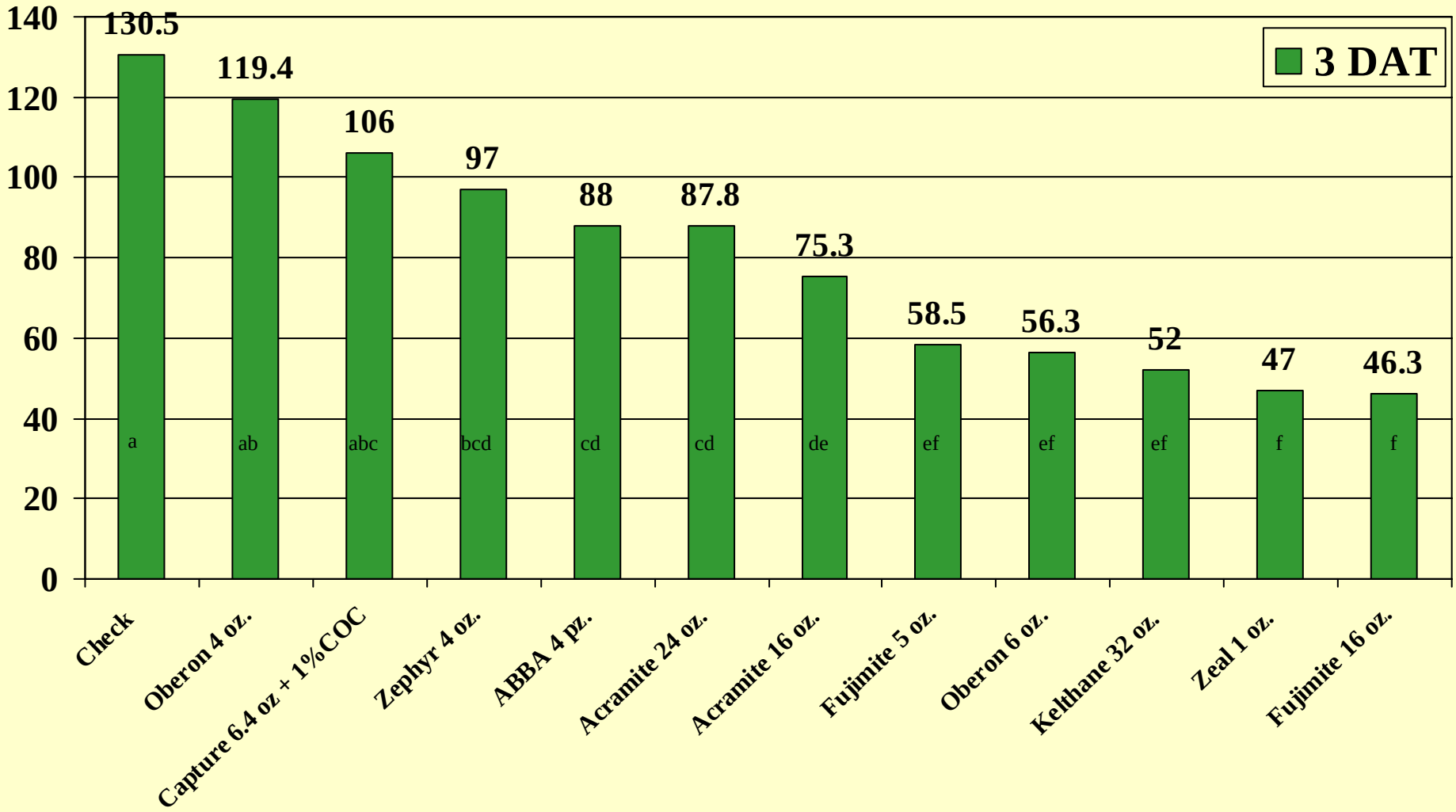


Early Season Spider Mite Test 1

3 DAT (Cotton 5 Node)

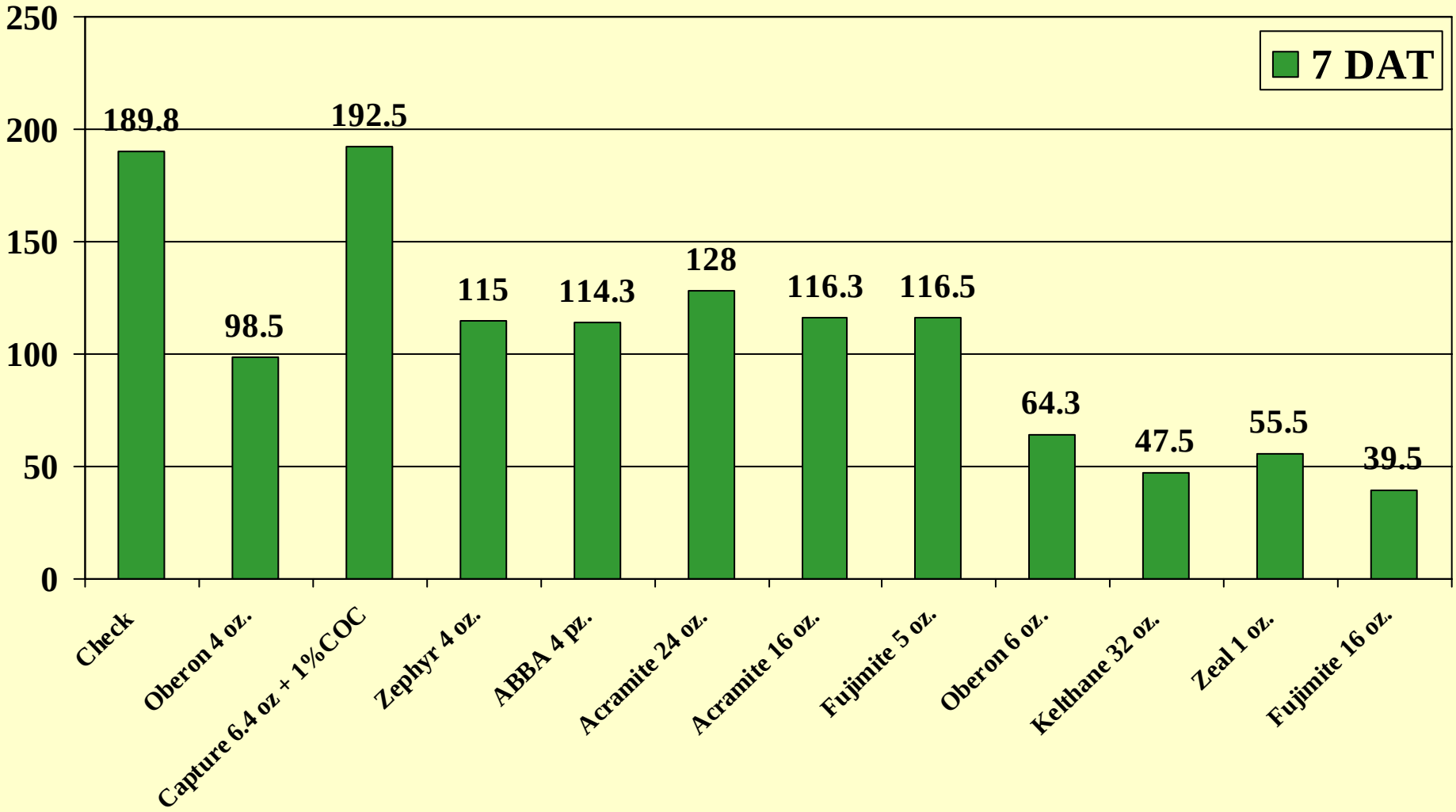
Inverness, MS Number/5 sq. in. (2006)



Early Season Spider Mite Test 1

7 DAT (Cotton 5 Node)

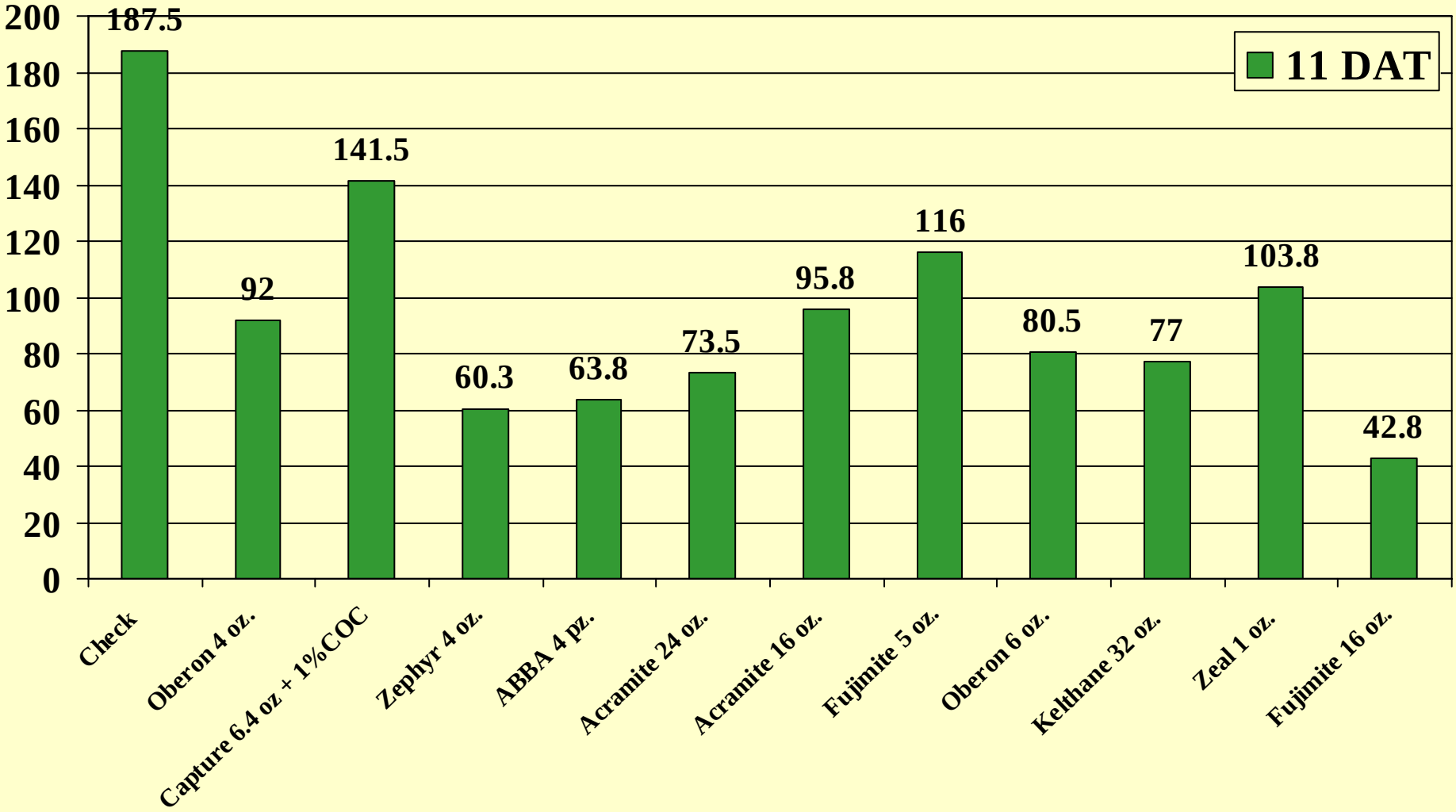
Inverness, MS Number/5 sq. in. (2006)



Early Season Spider Mite Test 1

11 DAT (Cotton 5 Node)

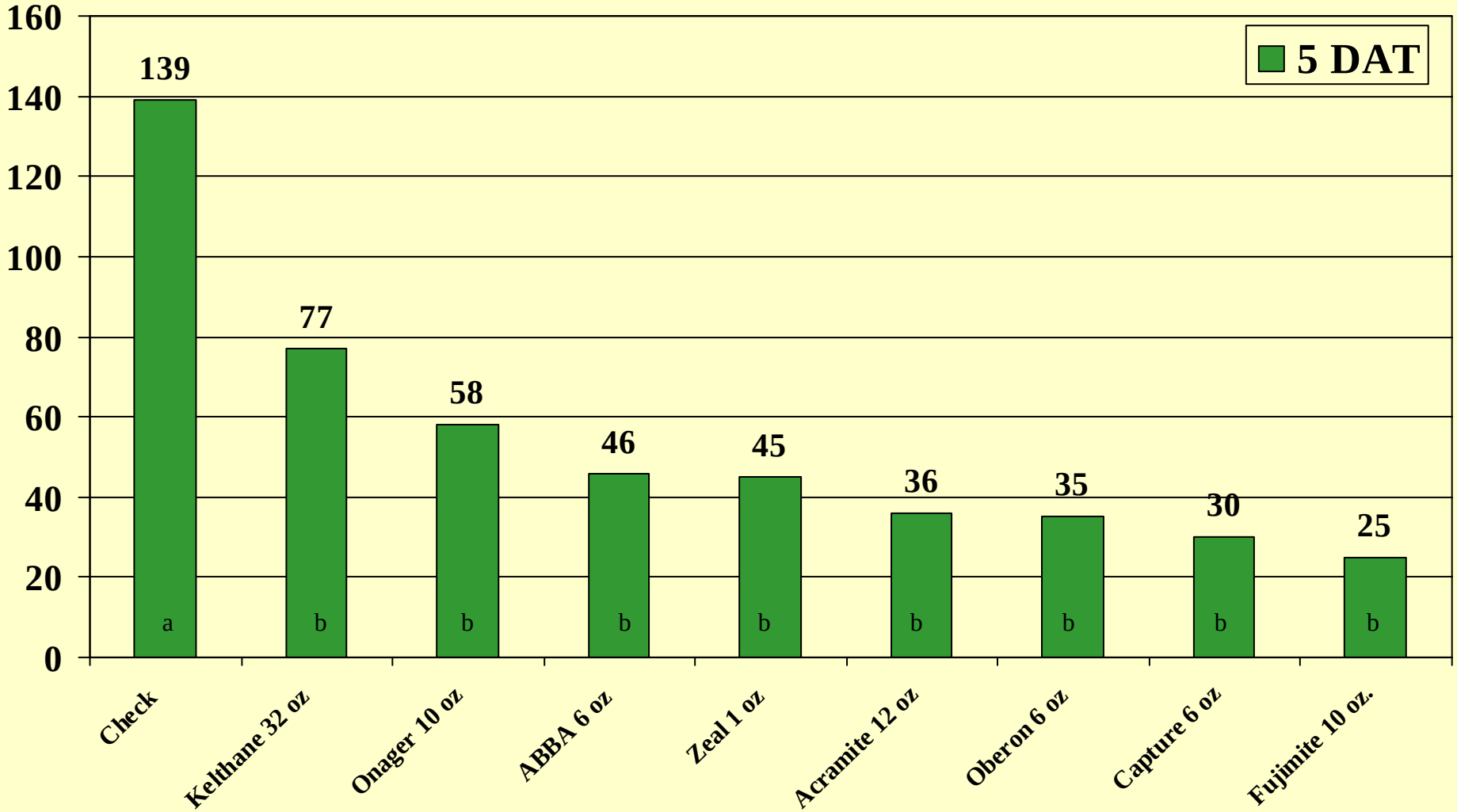
Inverness, MS Number/5 sq. in. (2006)



Late Season Spider Mite

5 DAT (7/25/06)

Gus Lorenz-Barton, AR Number/5 sq. in. (2006)



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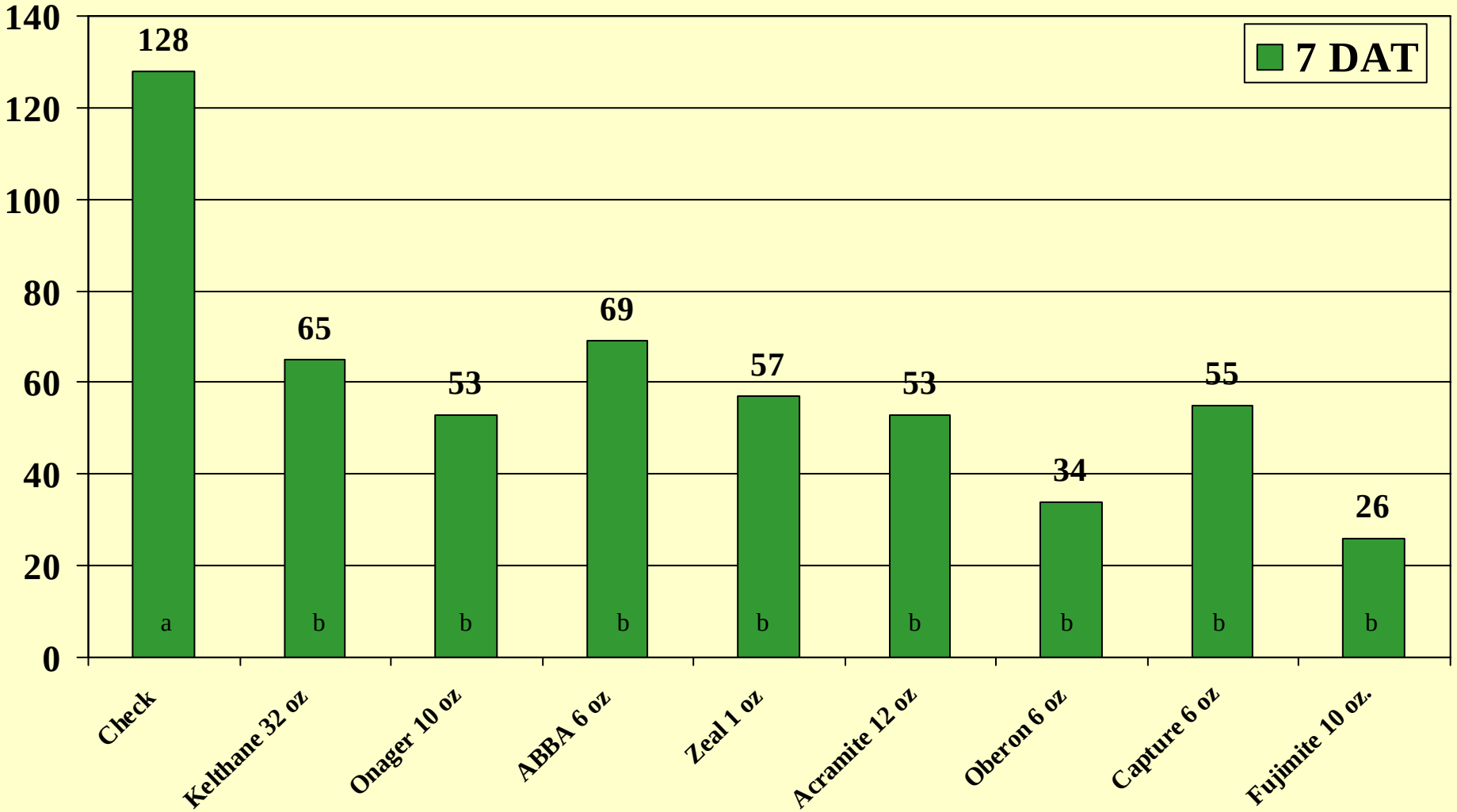
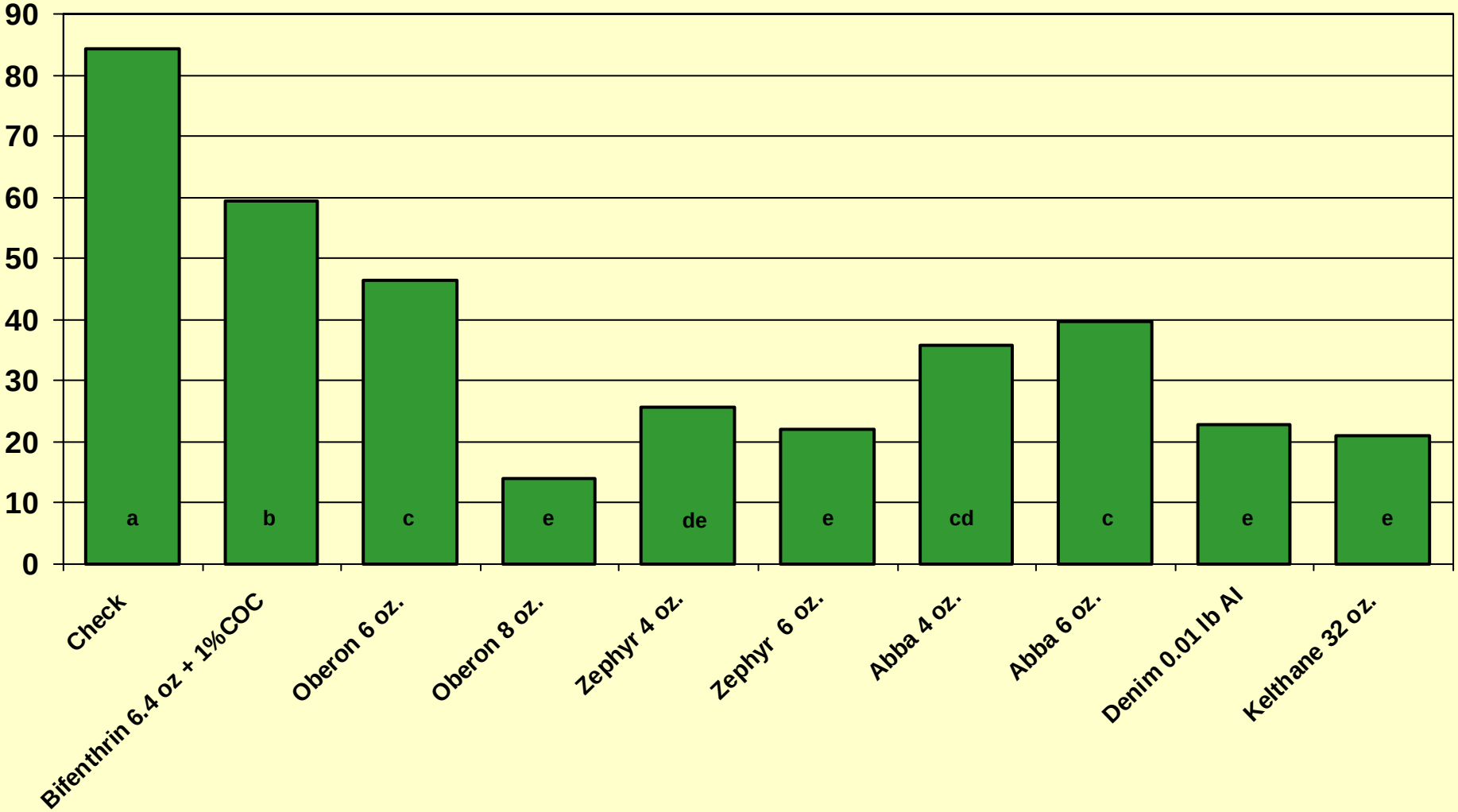


Spider Mite Efficacy Trial

Bayou Macon, LA (3 DAT) (P<0.01)
Number/10 sq. in. (June - 2006)
Roger Leonard-LSU Ag Center



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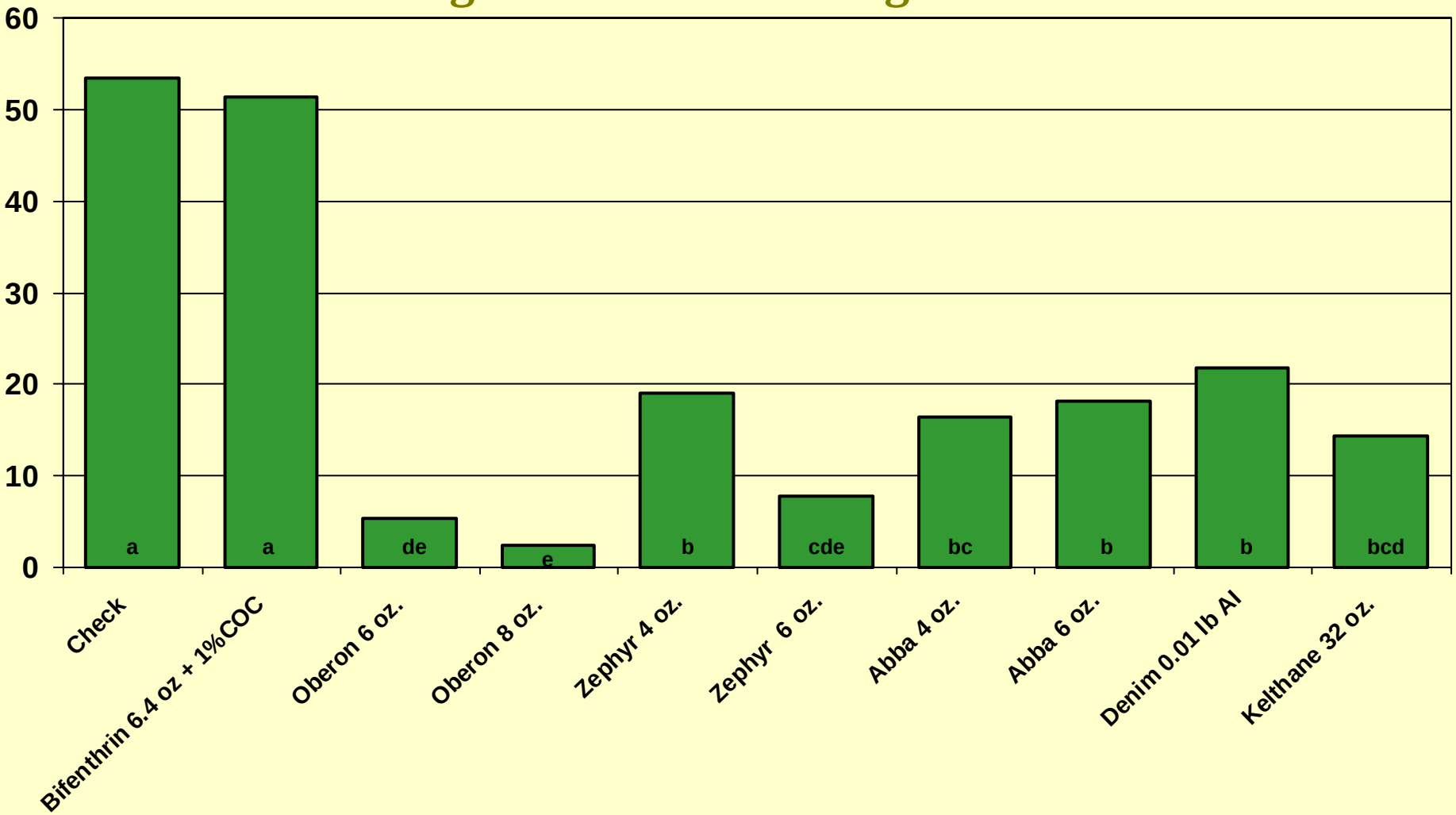
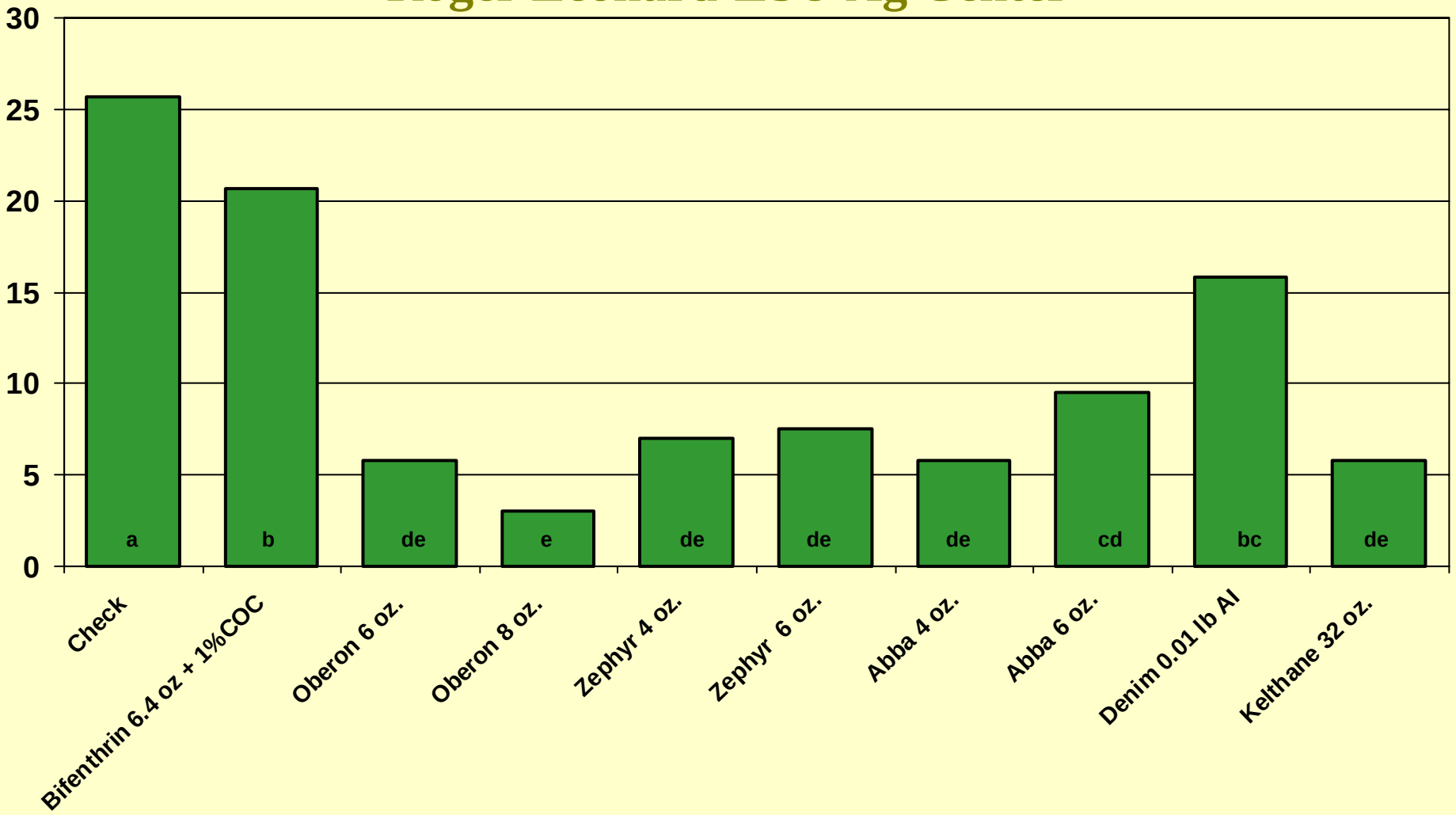
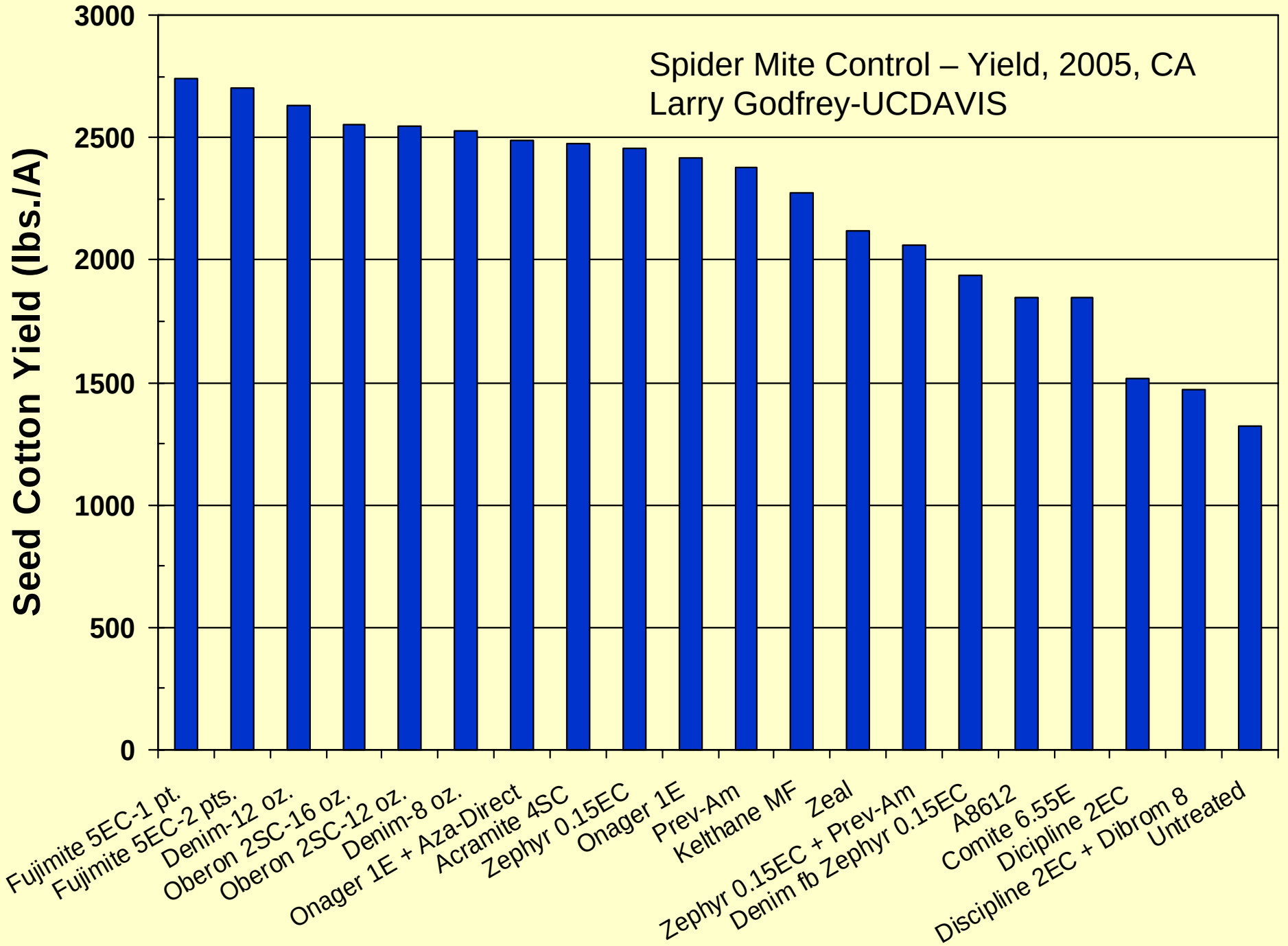


Spider Mite Efficacy Trial

Bayou Macon, LA (11 DAT) (P<0.01)
Number/10 sq. in. (June - 2006)
Roger Leonard-LSU Ag Center




Spider Mite Control – Yield, 2005, CA
Larry Godfrey-UCDAVIS
Seed Cotton Yield (lbs./A)
3000
2500
2000
1500
1000
500
0
Fujimite 5EC-1 pt.
Fujimite 5EC-2 pts.
Denim-12 oz.
Oberon 2SC-16 oz.
Oberon 2SC-12 oz.
Denim-8 oz.
Onager 1E + Aza-Direct
Acramite 4SC
Zephyr 0.15EC
Onager 1E
Prev-Am
Kelthane MF
Zeal
Zephyr 0.15EC + Prev-Am
Denim fb Zephyr 0.15EC
A8612
Comite 6.55E
Dicipline 2EC
Discipline 2EC + Dibrom 8
Untreated

2005 Spider Mite Statistics for Mississippi

- **925,000 acres infested**
- **278,000 acres treated**
- **Delta acres treated on average 1.5 times**
- **Hills acres treated on average 1 time**
- **Lost ~ 24,153 bales to spider mites**

Spider Mite Product Review

Miticides

- **Zephyr**
- **ABBA**
- **Oberon**
- **Zeal**
- **Acramite**
- **Fujimite**
- **Comite II**
- **Onager**
- **Kelthane**

Insecticides

- **Bifenthrin**
- **Bidrin**
- **Curacron**
- **Dimethoate**
- **Lorsban**

Thresholds

- **“Treatment is essential when 50% or more of leaves 5 nodes from the terminal are infested and population is expanding”**
- **“Treat when 40-50% of plants have spider mites and conditions are favorable for populations to increase”**
- **Need to treat out to at least 650 DD60’s**

Summary

- **Spider mites can cause serious injury when conditions are favorable for rapid population increase.**
- **When conditions are favorable for spider mite development and rapid reproductions is taking place, true miticides provide best efficacy but bifenthrin has fit late season window with mixed pest populations**
- **Don’t delay applications and two application are often necessary to provide adequate control with some products.**

Summary

- **Don’t create a your own problem**
- **Early season insecticide applications can “flare” mites**
- **Start clean, burndown early**
- **Watch moving equipment from infested fields to non-infested fields**
- **Increase volume and stay away from low drift tips**

Future Research Needs

- **Need to develop yield loss data for the South**
- **Develop accurate insecticide termination data**
- **Need to refine spider mite thresholds for the South**


Thank You