Observations and Biology of Kudzu Bugs and Their Management in Southeastern Soybeans

Soybean Breeders' & Entomologists' Workshop
St. Louis, MO (27-29 February 2012)

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The University of Georgia

CLEMSON UNIVERSITY

Investigators for Kudzu Bug

- UGA, Clemson University, USDA, etc.
- Nick Seiter, PhD student at Clemson
  - Working on species as it relates to soybean production (threshold development, crop susceptibility, spatial distribution, host selection, insecticide efficacy, etc.) and some urban issues
  - Advisory committee:
    - Dr. Jeremy Greene
    - Dr. Francis Reay-Jones
    - Dr. Phillip Roberts
    - Dr. Eric Benson
    - Dr. Emerson Shipe

Videos

http://landing.newsinc.com/shared/video.html?freewheel=90121&sitesection=ap&VID=23539450

http://widget.newsinc.com/single.html?WID=2015&VID=23539450&freewheel=69016&sitesection=ap

Video 1

Video 2


KUDZU BUG
Megacopta cribraria

Kudzu bug is a beneficial bio-control agent of kudzu, capable of 30%+ reduction in biomass

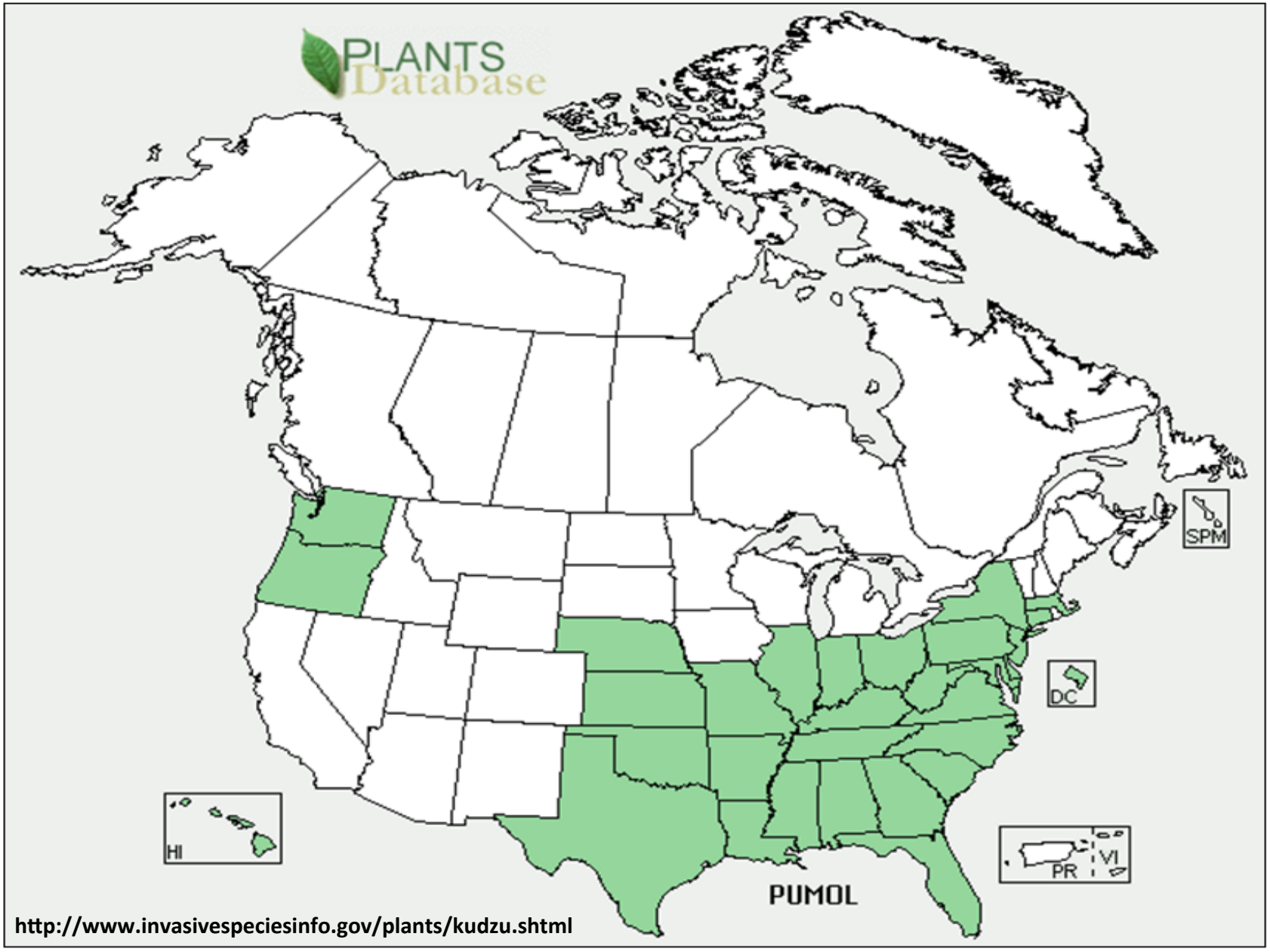
Zhang et al. 2012 – Environ. Entomol. 41(1): 40-50

Kudzu overtaking a house in southeastern U.S.

Distribution of kudzu in USA?

Distribution:
Pueraria montana (Lour.) Merr. var. *lobata* (Willd.) Maesen & S. Almeida

Distribution of kudzu in USA?

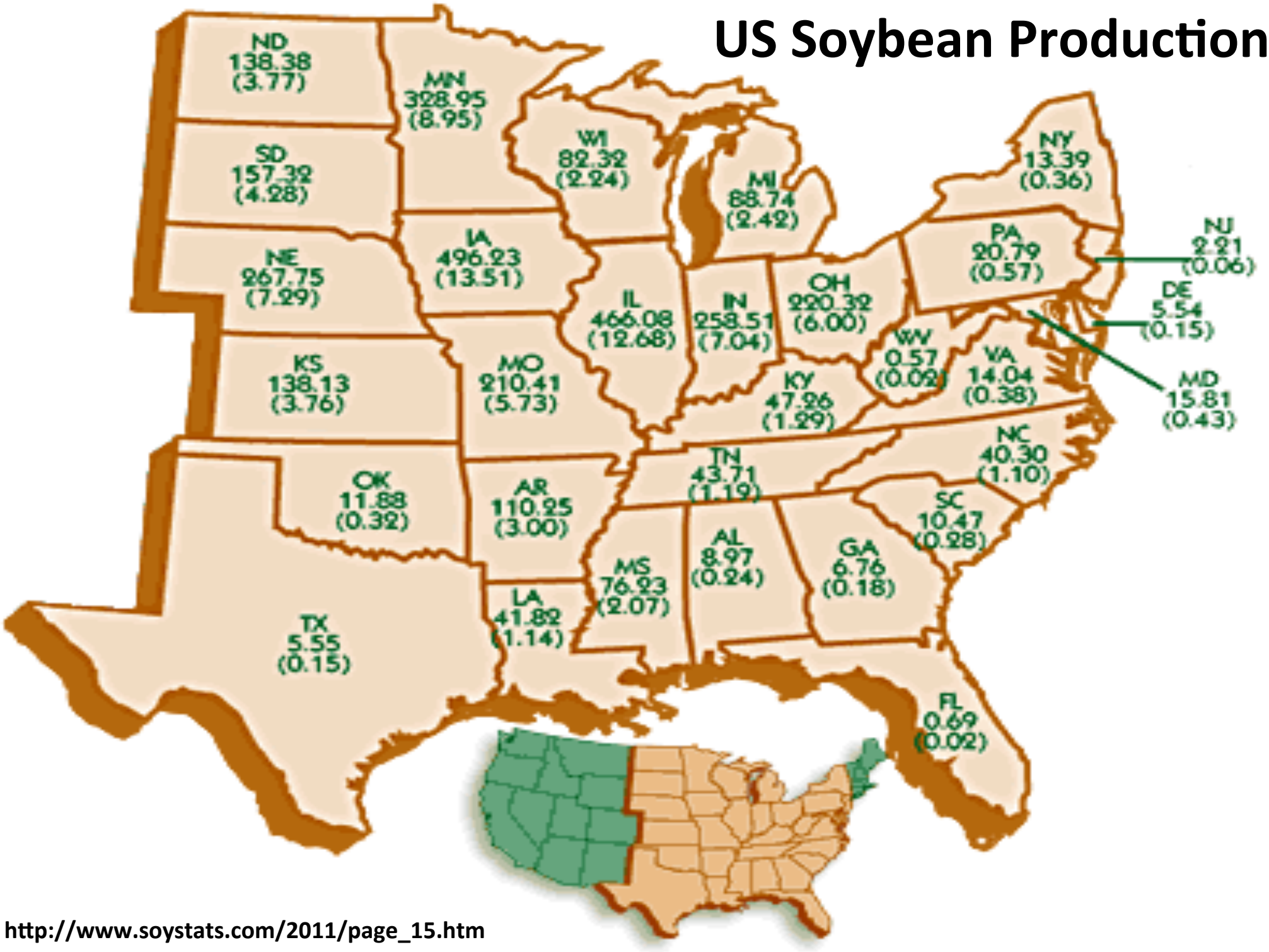


View Native Status

Present Absent

See U.S. county distributions (when available) by clicking on the map or the linked states below:
USA (AL, AR, CT, DC, DE, FL, GA, HI, IL, IN, KS, KY, LA, MA, MD, MO, MS, NC, NE, NJ, NY, OH, OK, OR, PA, SC, TN, TX, VA, WA, WV)

US Soybean Production



http://www.soystats.com/2011/page_15.htm

KUDZU BUG
Megacopta cribraria

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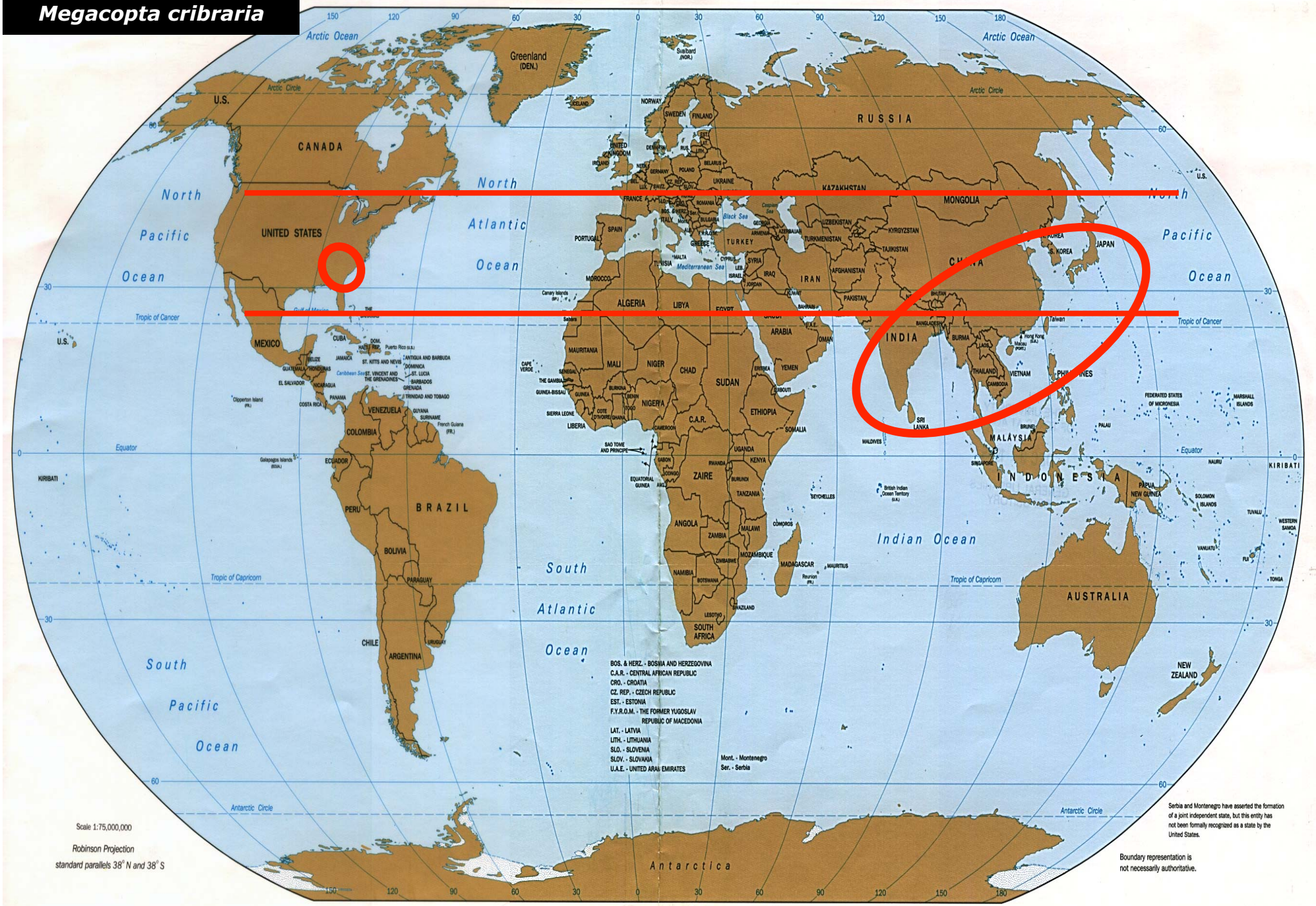
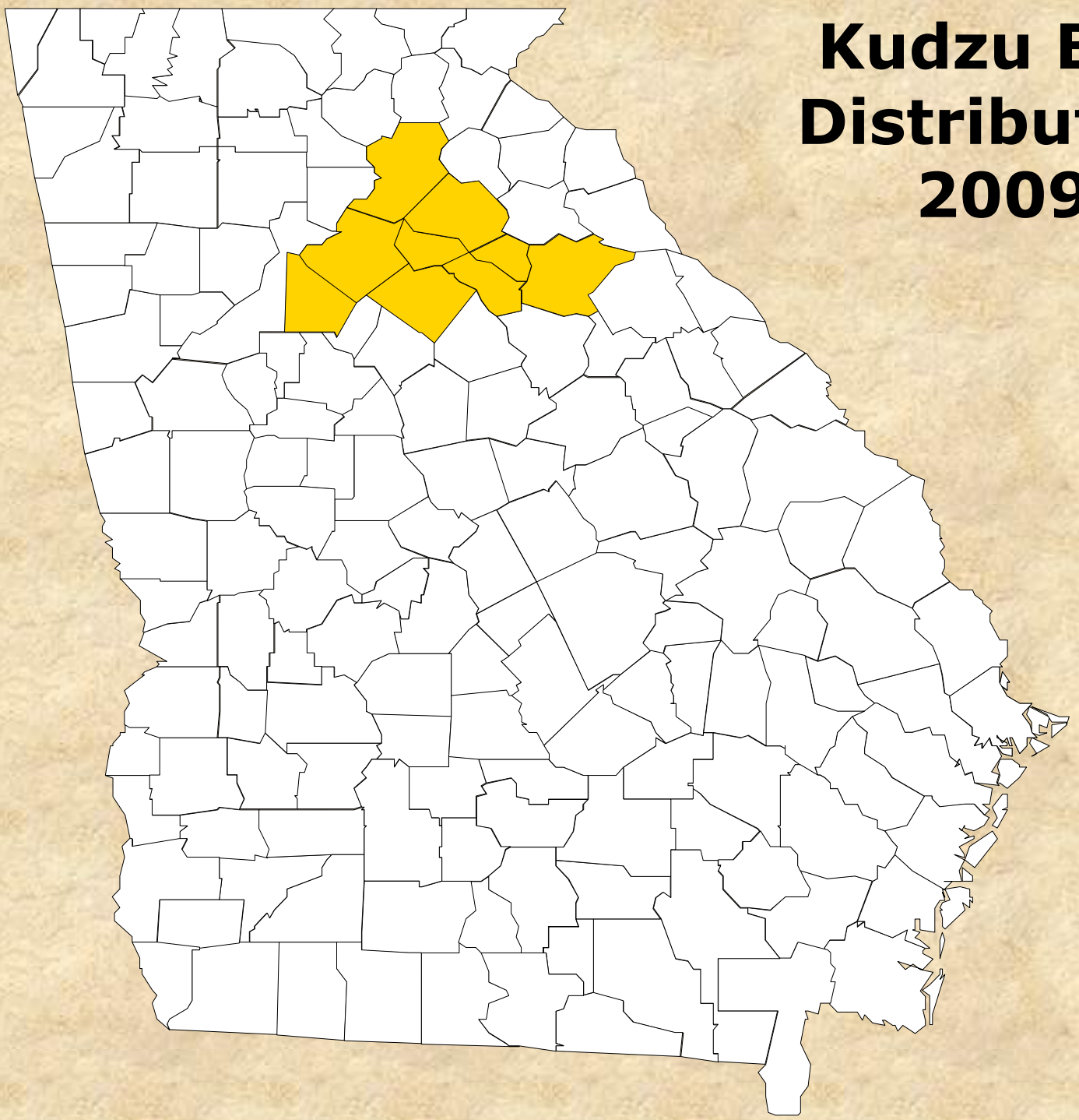
Megacopta cribraria



Megacopta cribraria, "Kudzu Bug"

Late October 2009 in NE GA

Kudzu Bug Distribution 2009

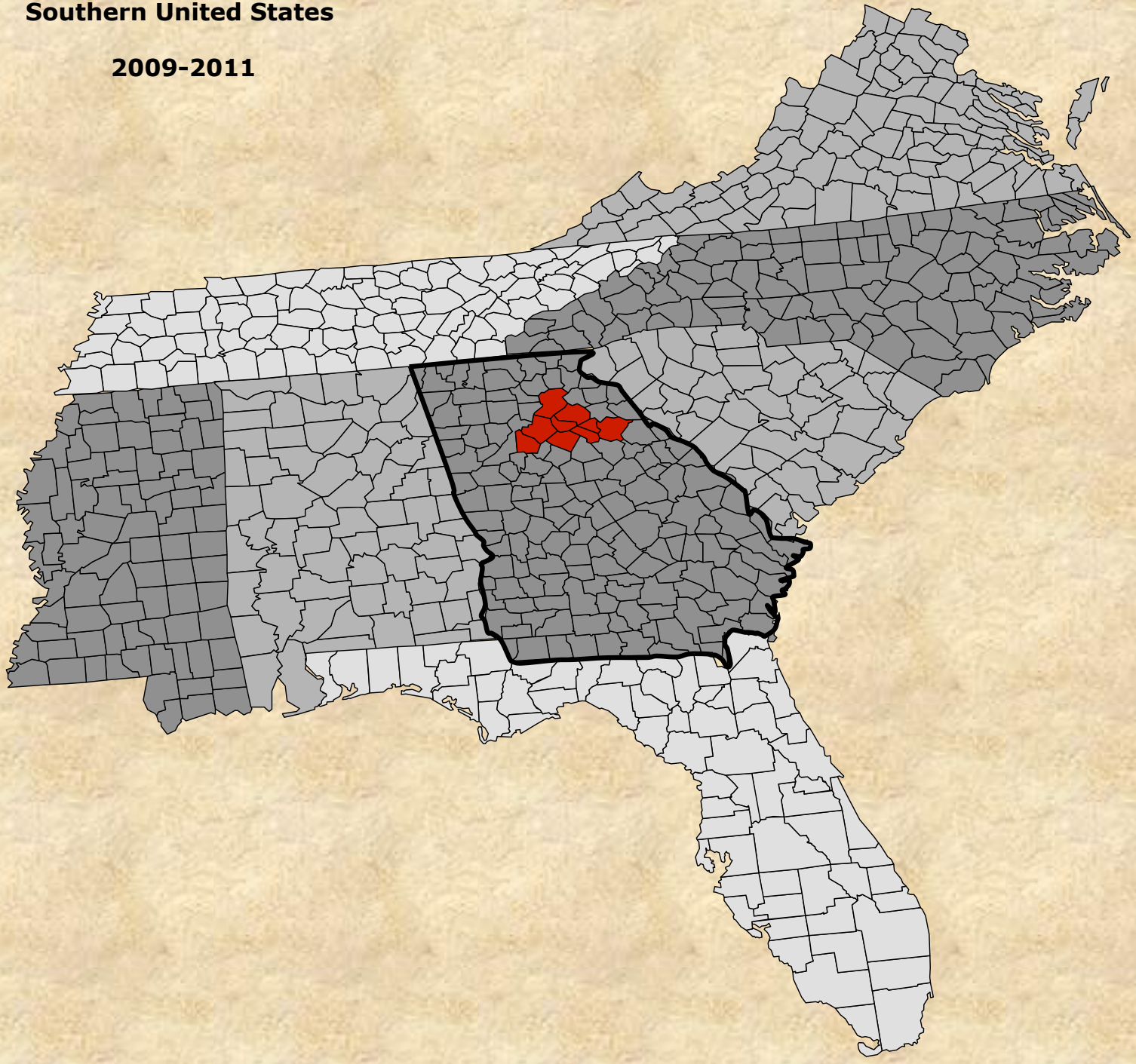


Megacopta cribraria Occurrence

Southern United States

2009-2011

2009

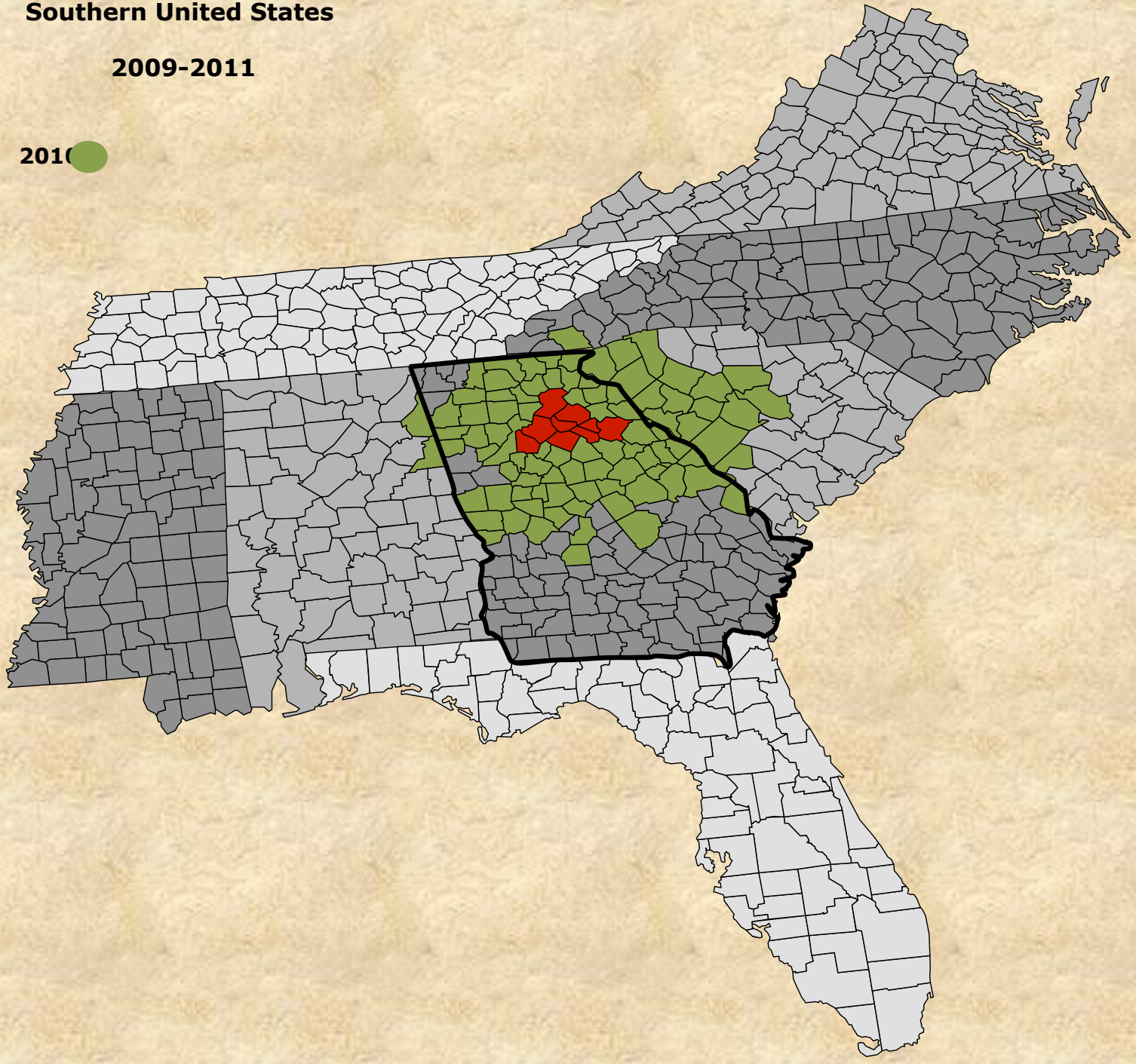


Megacopta cribraria Occurrence

Southern United States

2009-2011

2009 2010

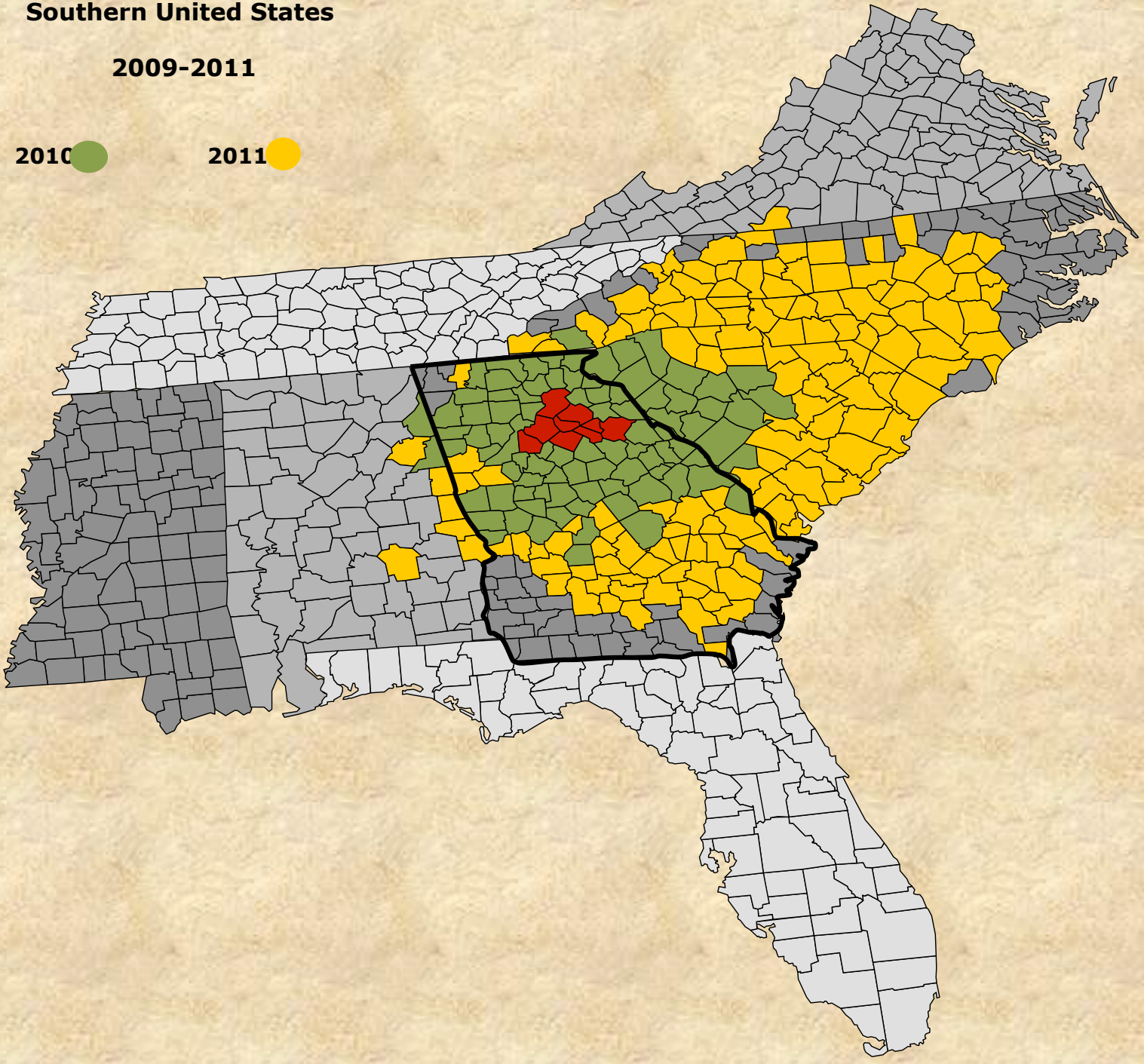


Megacopta cribraria Occurrence

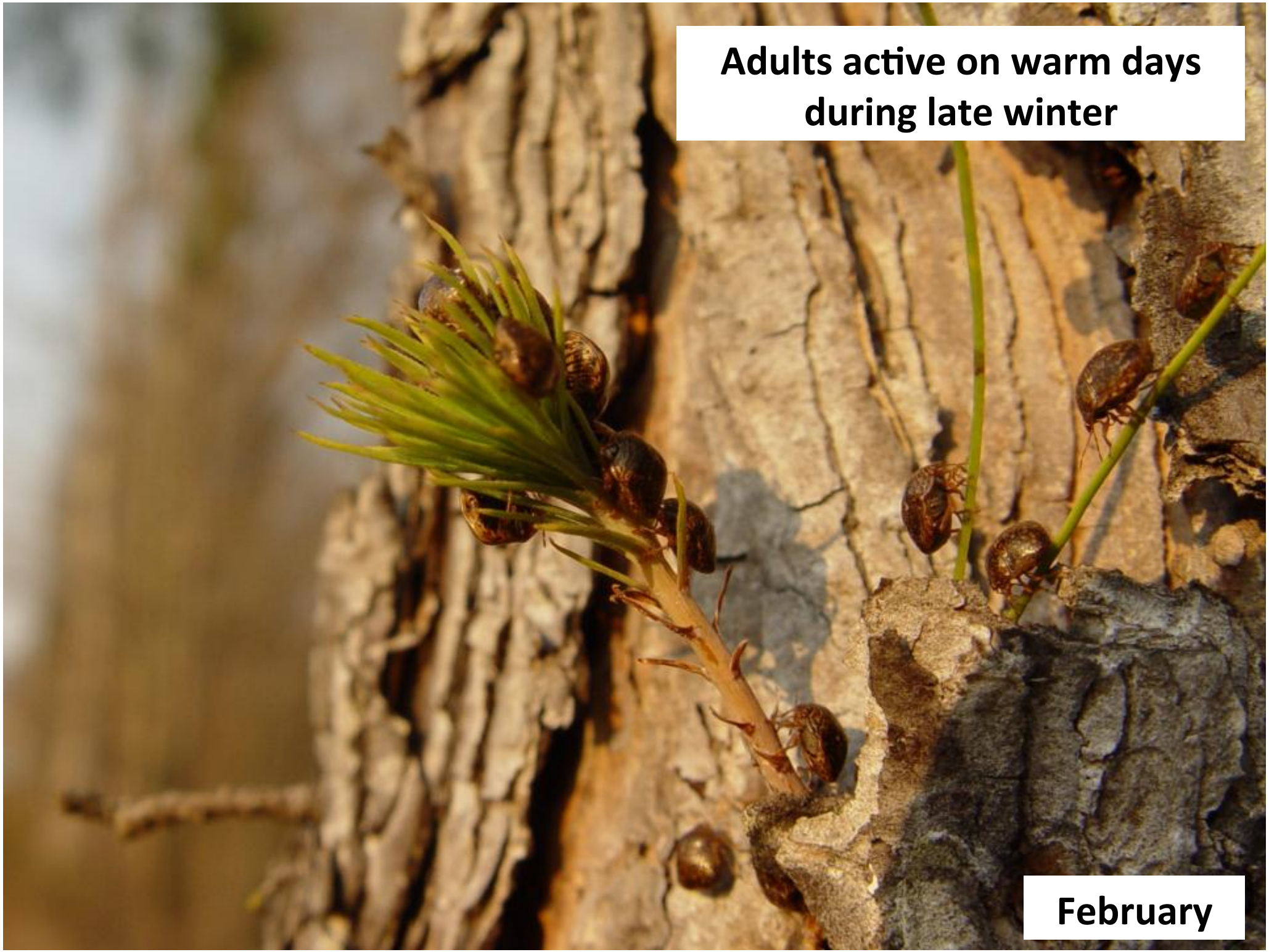
Southern United States

2009-2011

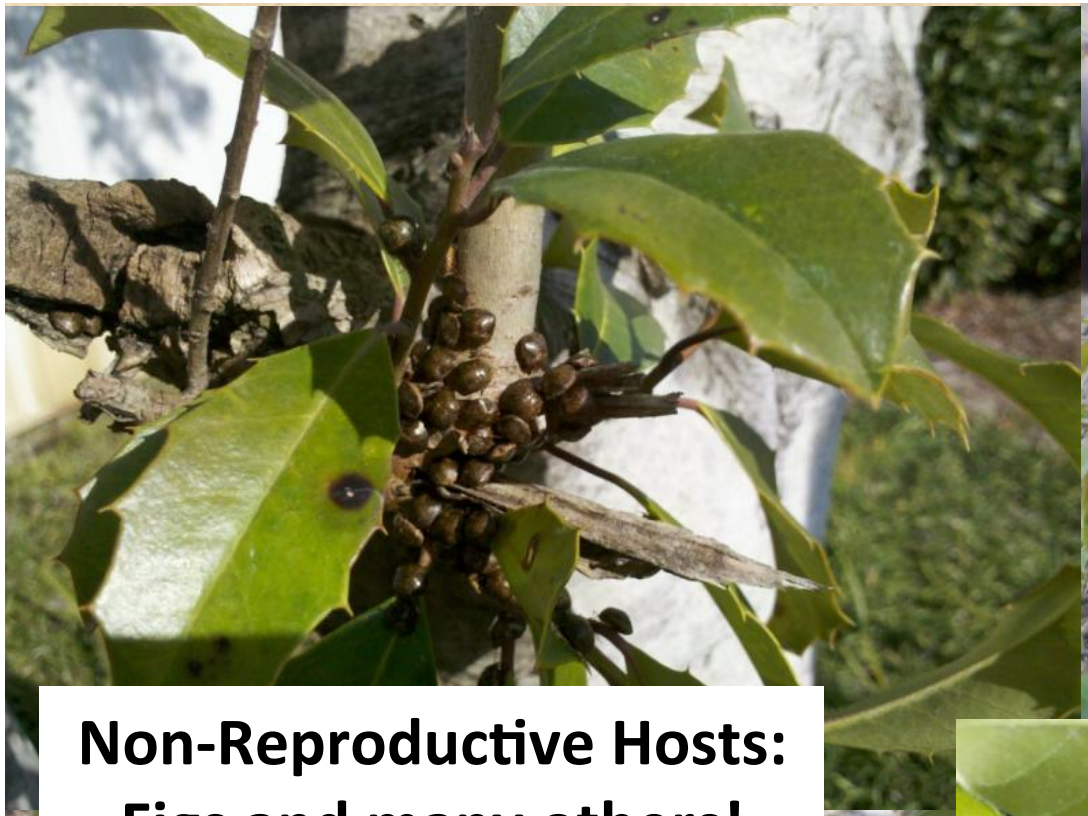
2009 2010 2011




Overwinters in the adult stage
February


Adults active on warm days during late winter
February

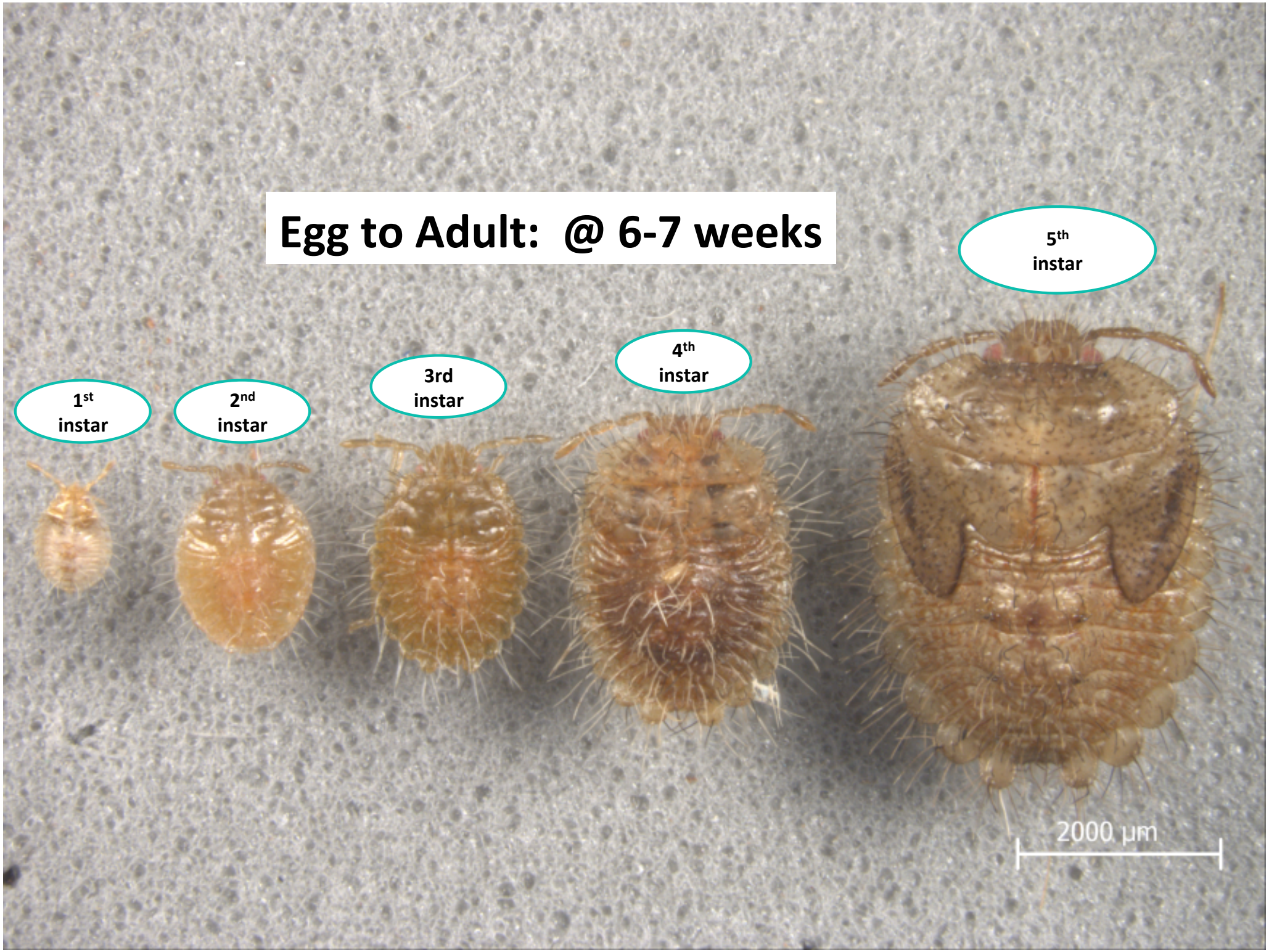

Oviposition in kudzu: mid-April and May
April



Reproductive Hosts:
Kudzu, Wisteria, Soybean, etc.

Non-Reproductive Hosts:
Figs and many others!


First generation adults mid-June
(egg to adult: 6-8 weeks)


Egg to Adult: @ 6-7 weeks
1st instar
2nd instar
3rd instar
4th instar
5th instar
2000 µm

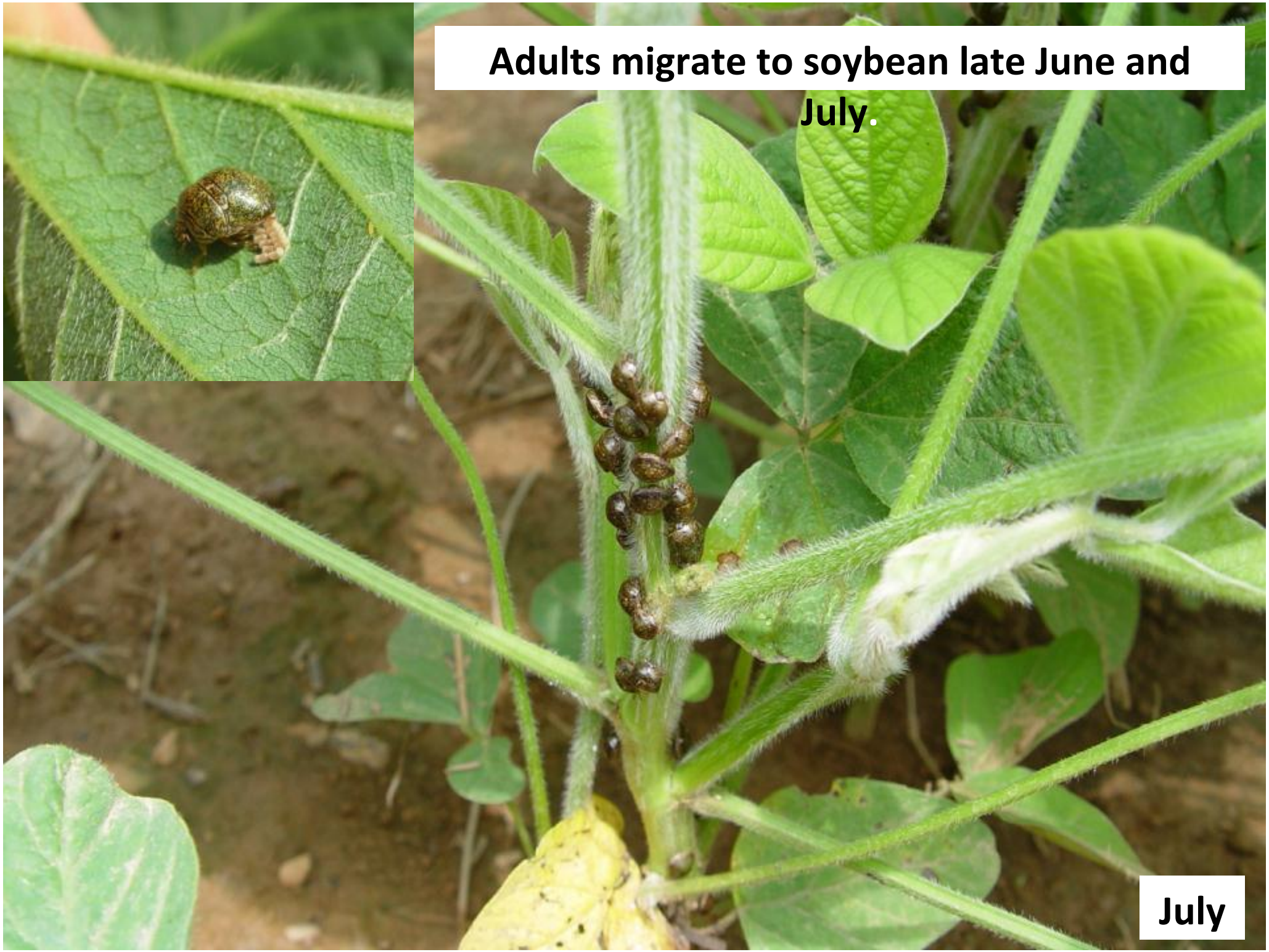
Egg to

1st instar

2nd instar

5th instar

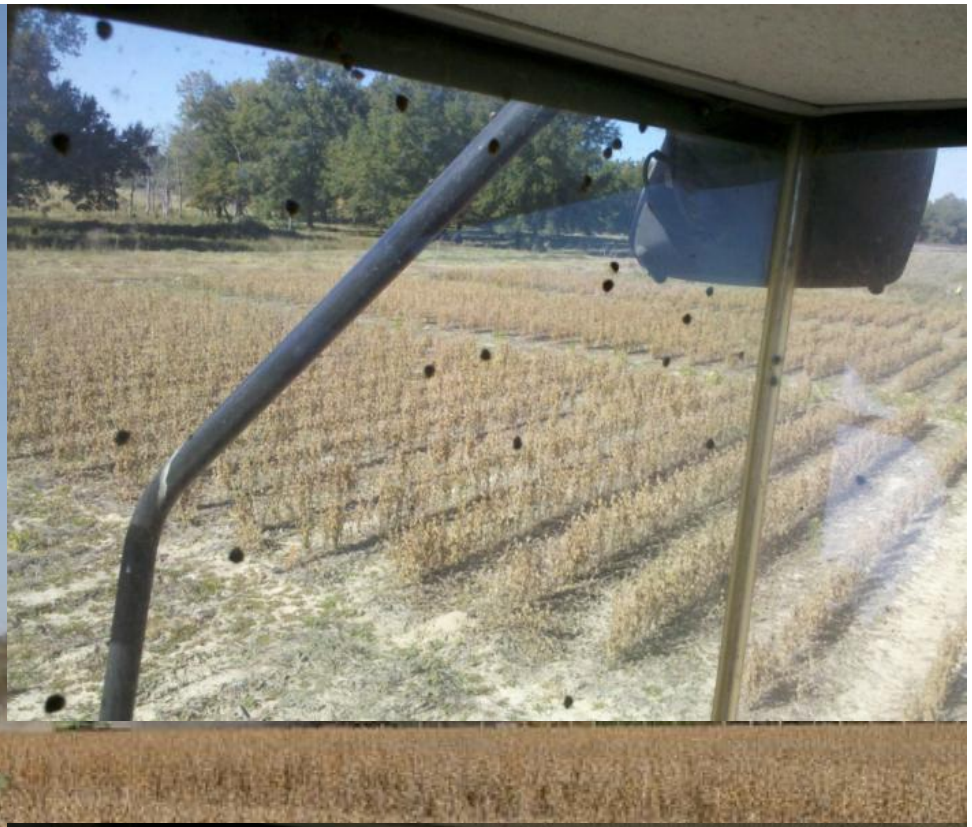
2000 µm

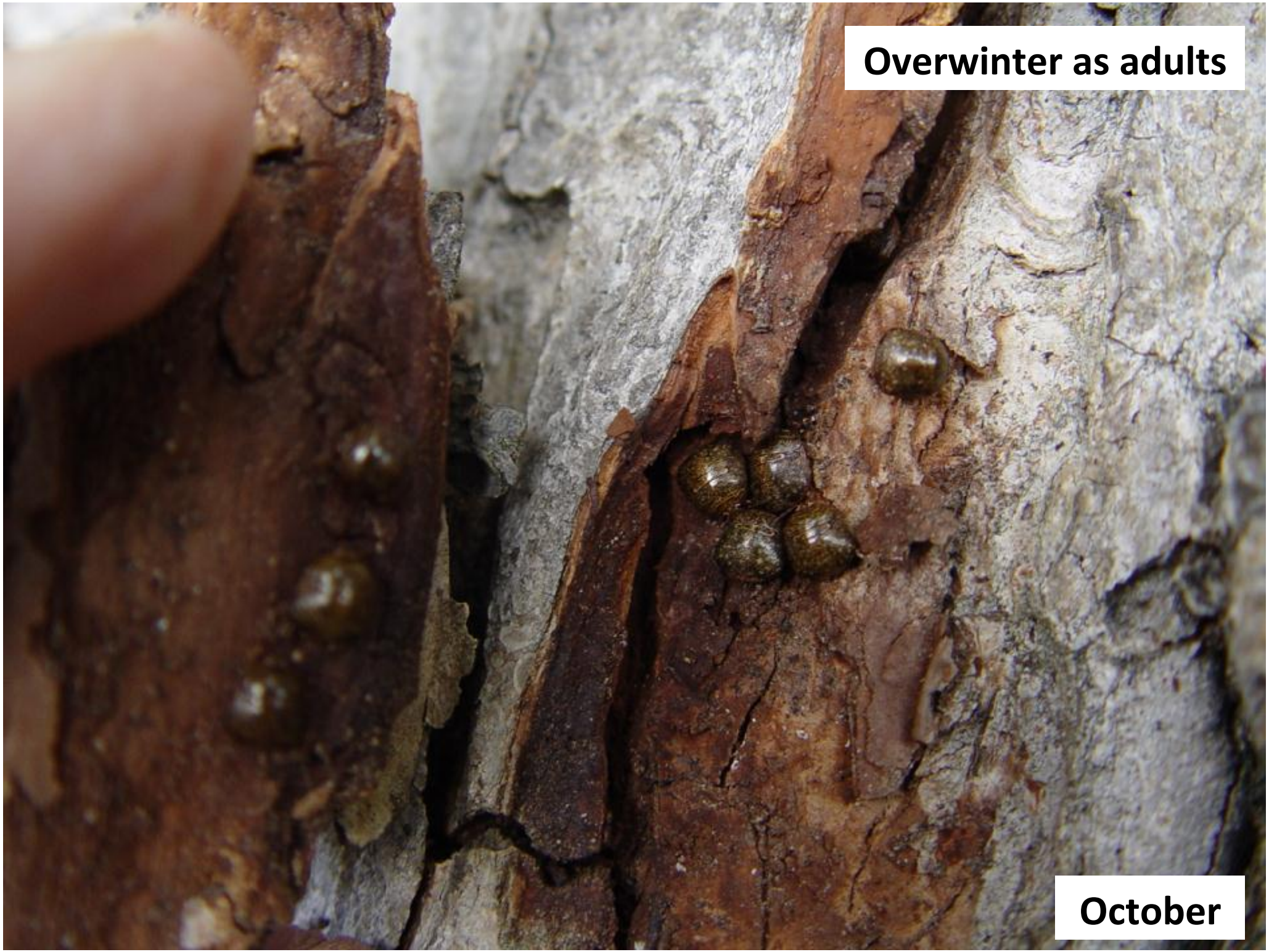

Adults migrate to soybean late June and July.
July


Nymphs present about R2/R3


Complete a generation on soybean
(egg to adult: 6 weeks)


Fall: looking for something green
Preparing for overwintering




Overwinter as adults
October

Kudzu Bug and Soybeans

Megacopta cribraria

- First report on soybeans July 1, 2010 in Georgia
  - Reports from multiple counties in a matter of days
  - Very high numbers, especially on **outer edges of fields**
  - No clear correlation with kudzu patches near infested fields.


2 July 2010


9 July 2010
CLEMSON


Eggs primarily observed on leaves

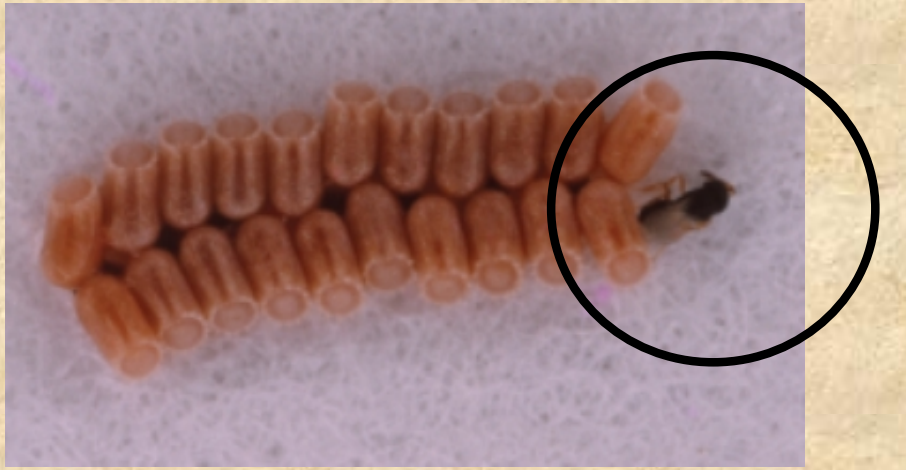

Eggs primarily observed on leaves

Biocontrol of Kudzu Bug

- Parasitoids:
  - No egg parasitoids in US at present
  - Best importation candidate is *Paratelenomus saccharalis* (host specific, climate matching): currently being assessed in quarantine in Mississippi (USDA/UGA/Clemson collaborating)
  - Parasitoids of other life stages? None known

Paratelenomus saccharalis

- Parasitism rates variable, active early season
- Wide geographic distribution, allowing climate matching
- Attacks only Plataspidae (*Megacopta cribraria, M. punctatissimum, Brachyplatys subaeneus*), no other known hosts



Paratelenomus saccharalis distribution

Biocontrol of Kudzu Bug

- Pathogens:
  - *Beauveria bassiana* may offer some possible control options; other fungi?

- Predators:
  - Several native predators have been found in association with *Megacopta* (*Chrysoperla*, *Geocoris*) – potential for augmentation?
  - By necessity, native predators will be generalists, which may limit their impact

Pathogens

- *Beauveria bassiana* (Fungus: Entomophthorales) in Assam, India
  - Naturally occurring
  - Lab tests: 60-80% mortality of adults and nymphs (moist dishes)
  - Offers potential in moist conditions (kudzu?)

(Borah and Sarma *Insect Environment:* 2002, 2009)

Native Predator Studies

- *Geocoris* spp. adults and *Chrysoperla rufilabris* larvae consume nymphs; found in association with Megacopta in kudzu, soybeans
- Adult coccinellids eat few nymphs and show little interest, but L3 *Hippodamia* eat nymphs
- Adult predatory mirids and nabids eat some, but not many

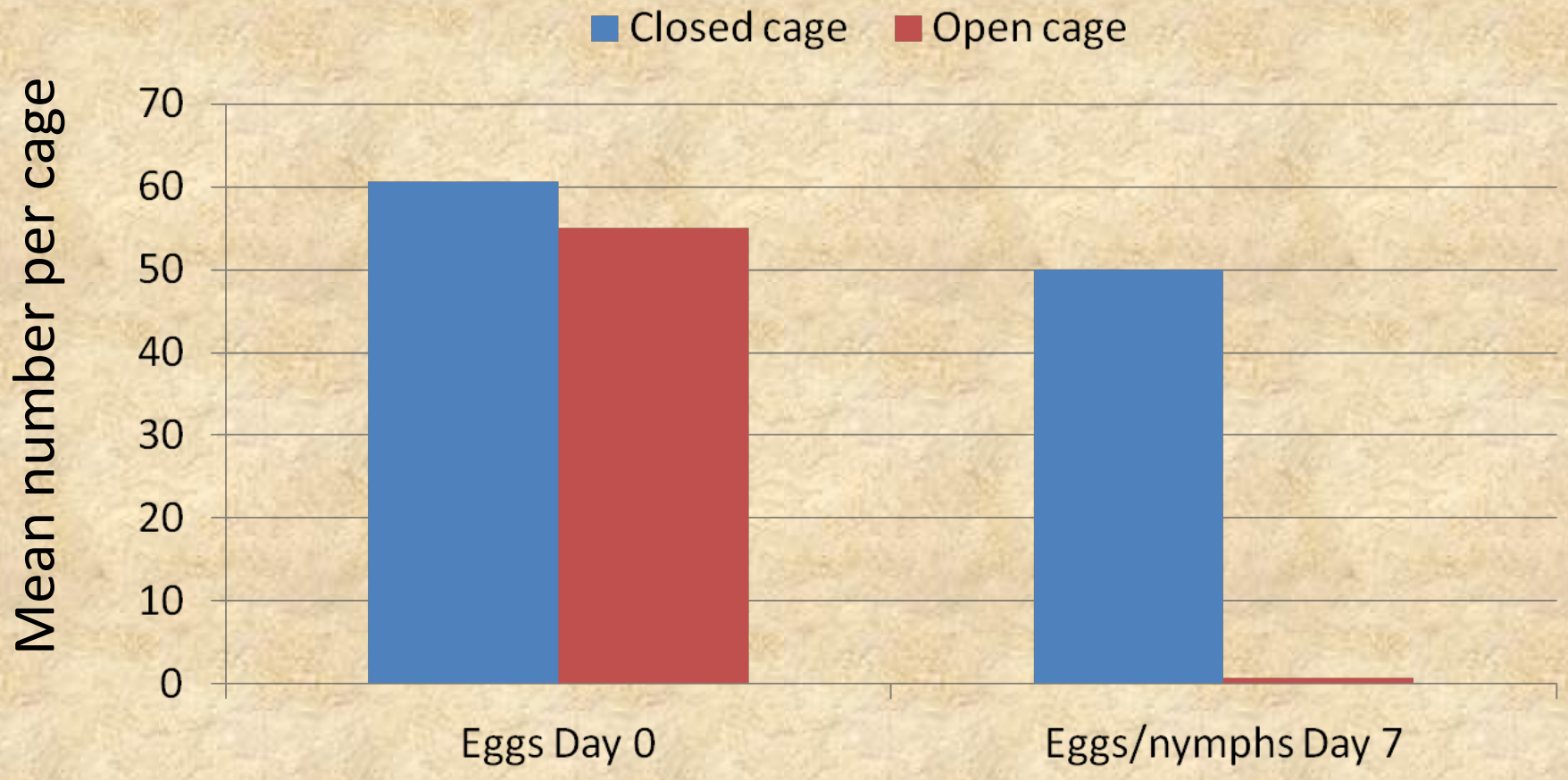
Native Predators of Kudzu Bug

Predatory stink bug,
Euthyrhynchus floridanus

Big-eyed bug,
Geocoris uliginosus

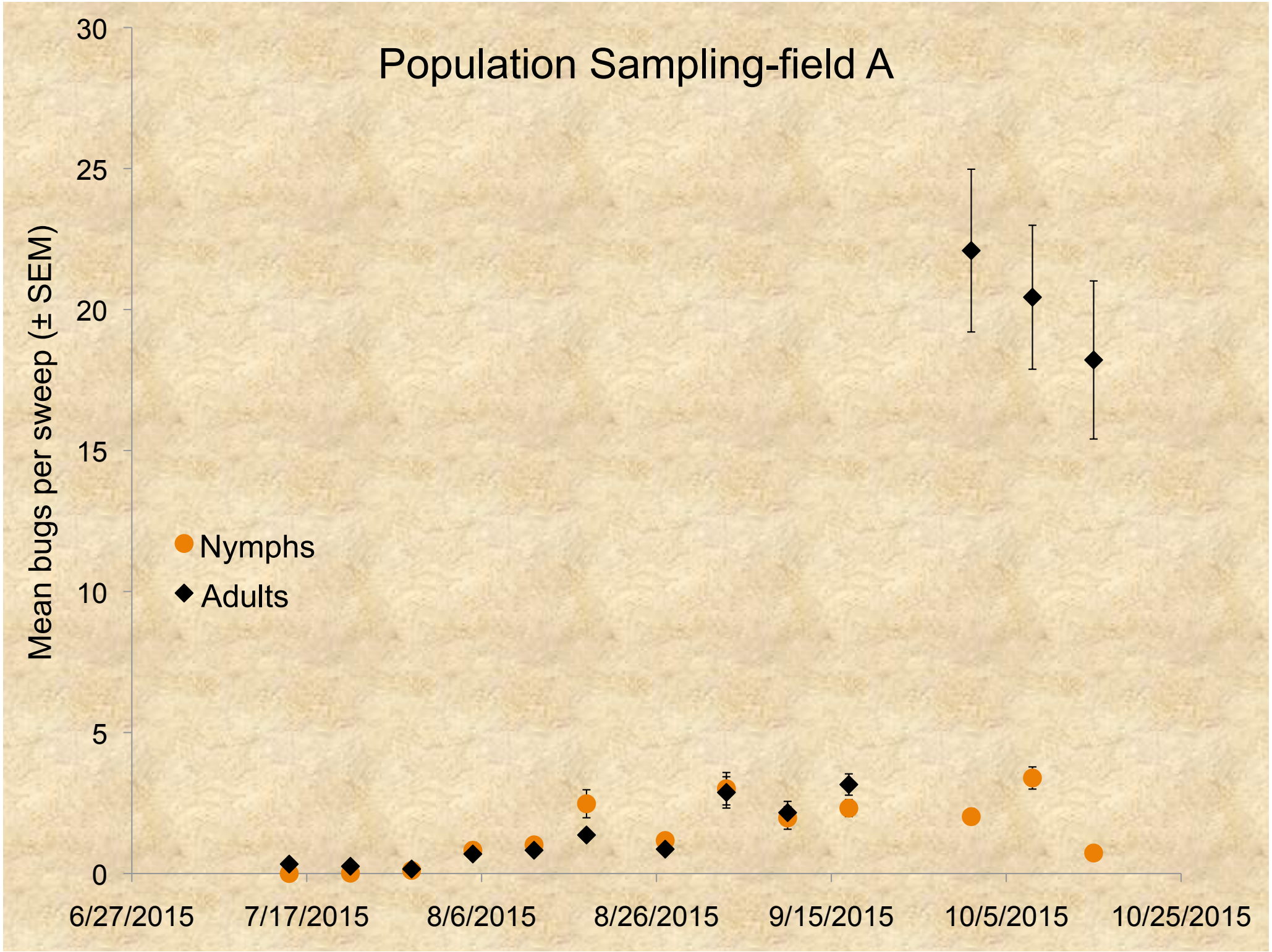
Green lacewing larva,
Chrysoperla rufilabris

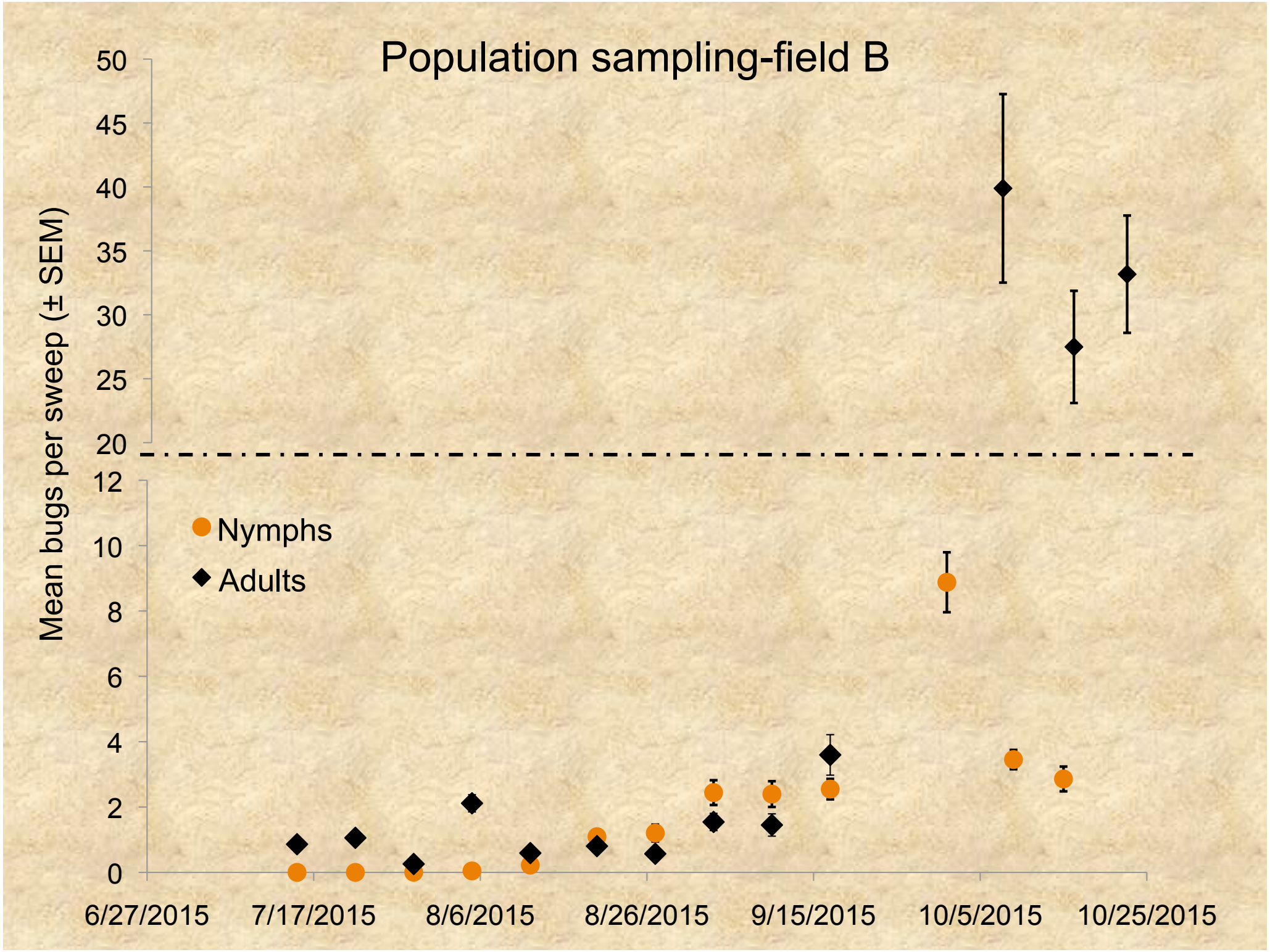
Native Predators and Kudzu Bug



N=3 cages per type; conducted in kudzu near Statesboro, GA, 6-13 July 2011


Medically important?


Population Sampling-field A
Mean bugs per sweep (± SEM)
30
25
20
15
10
5
0
Nymphs
Adults
6/27/2015
7/17/2015
8/6/2015
8/26/2015
9/15/2015
10/5/2015
10/25/2015


Population sampling-field B
Mean bugs per sweep (± SEM)
50
45
40
35
30
25
20
12
10
8
6
4
2
0
Nymphs
Adults
6/27/2015
7/17/2015
8/6/2015
8/26/2015
9/15/2015
10/5/2015
10/25/2015