The Bean Plataspid, *Megacopta cribraria*, Feeding on Kudzu: an Accidental Introduction with Beneficial Effects

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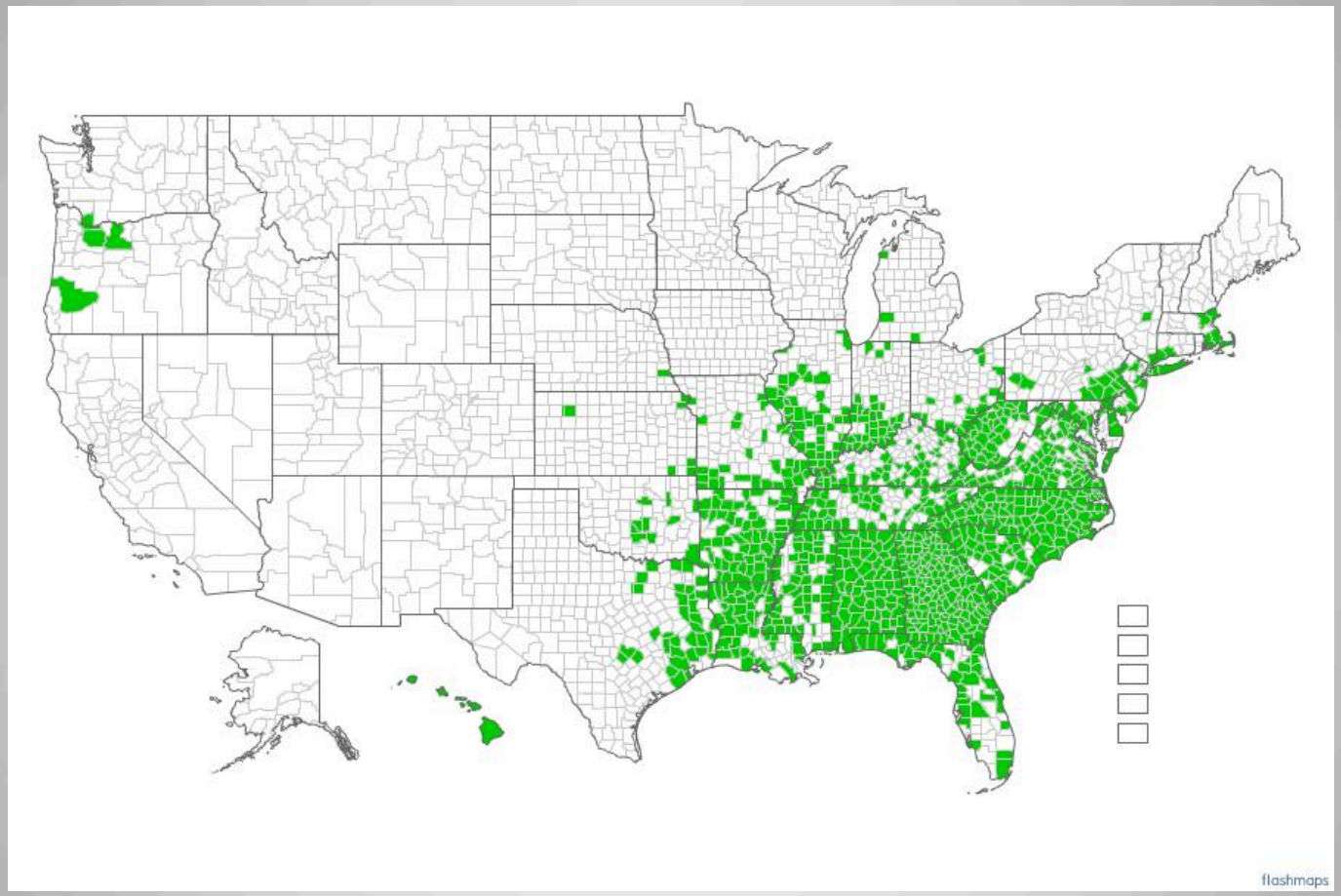
Kudzu: the vine that ate the South

- Rapid growing woody vine
- Grows at a rate of 1 foot per day

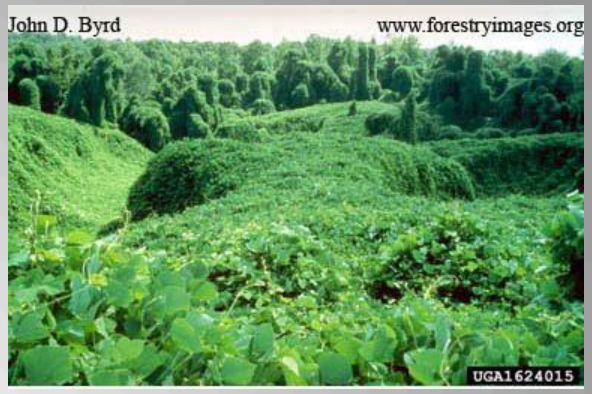
- Massive root system up to 12 feet deep and 300 lbs.

Distribution of Kudzu



EDDMapS. 2012. Early Detection & Distribution Mapping System. The University of Georgia - Center for Invasive Species and Ecosystem Health. Available online at http://www.eddmaps.org/; last accessed March 1, 2012.

Kudzu Facts



- Native to Asia kudzu was introduced in 1876 at the Philadelphia Centennial Exposition by Japan
- Initially promoted as an ornamental
- In early 1900's it was promoted it as a forage crop
- 1930's and 40's widely distributed for erosion control by the Soil Erosion Service
- By 1946 over 1.2 million hectares (3 million acres) planted
- In 1999 Time magazine listed kudzu's introduction as one of the 100 worst ideas of the century
- Today kudzu is a federally listed noxious weed that occupies 3 million ha (7.4 million acres).
- Estimated that 50,000 ha (123,550 acres) of new infestation each year
- $100-500 million estimated annual losses in forest productivity

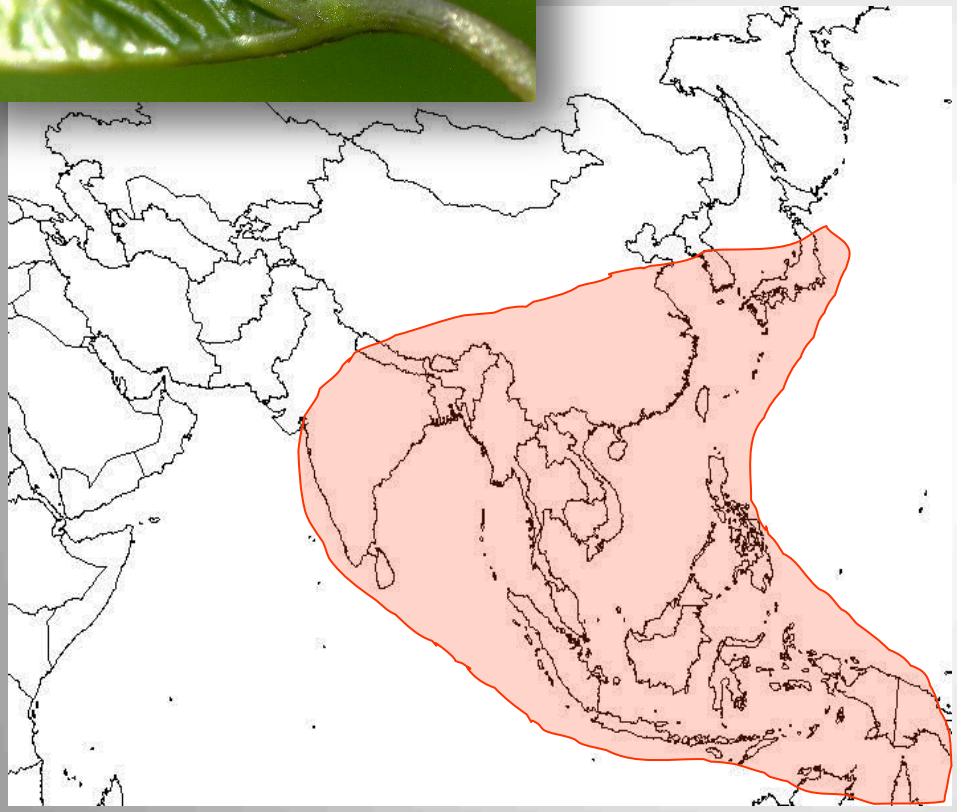
The Bean Plastaspid aka “the kudzu bug”

Megacopta cribraria (Hemiptera: Plataspidae)

The Kudzu Bug

- Native to Asia
- First discovered near Atlanta in 2009 on houses
- Rapid spread!
- New family for North America
- Obligate symbiotic bacteria

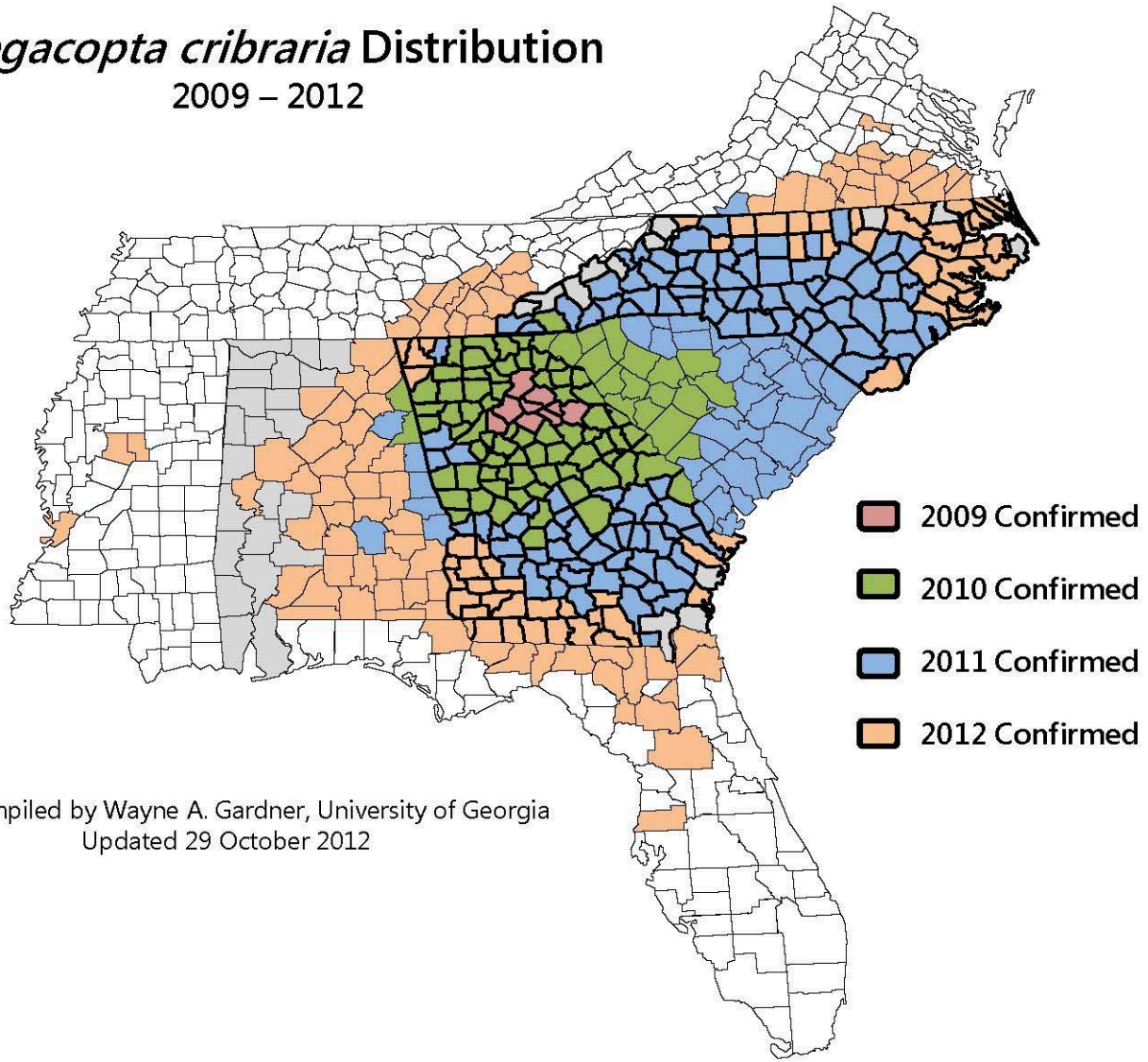
Distribution in Asia



- 2-3 generations/yr
- Extensive list of hosts from Asian literature; primarily legumes (Eger et al. 2010).
- Not considered a major pest of soybeans in China.
- U.S. population is from Japan (Jenkins et al. 2012).

Megacopta cribraria Distribution

2009 – 2012



Map compiled by Wayne A. Gardner, University of Georgia
Updated 29 October 2012

Suiter D.R. et al. 2010. Discovery and distribution of *Megacopta cribraria* (Hemiptera: Heteroptera: Plataspidae) in Northeast Georgia. Journal of Intergrated Pest Management. 1(1): 1-4.

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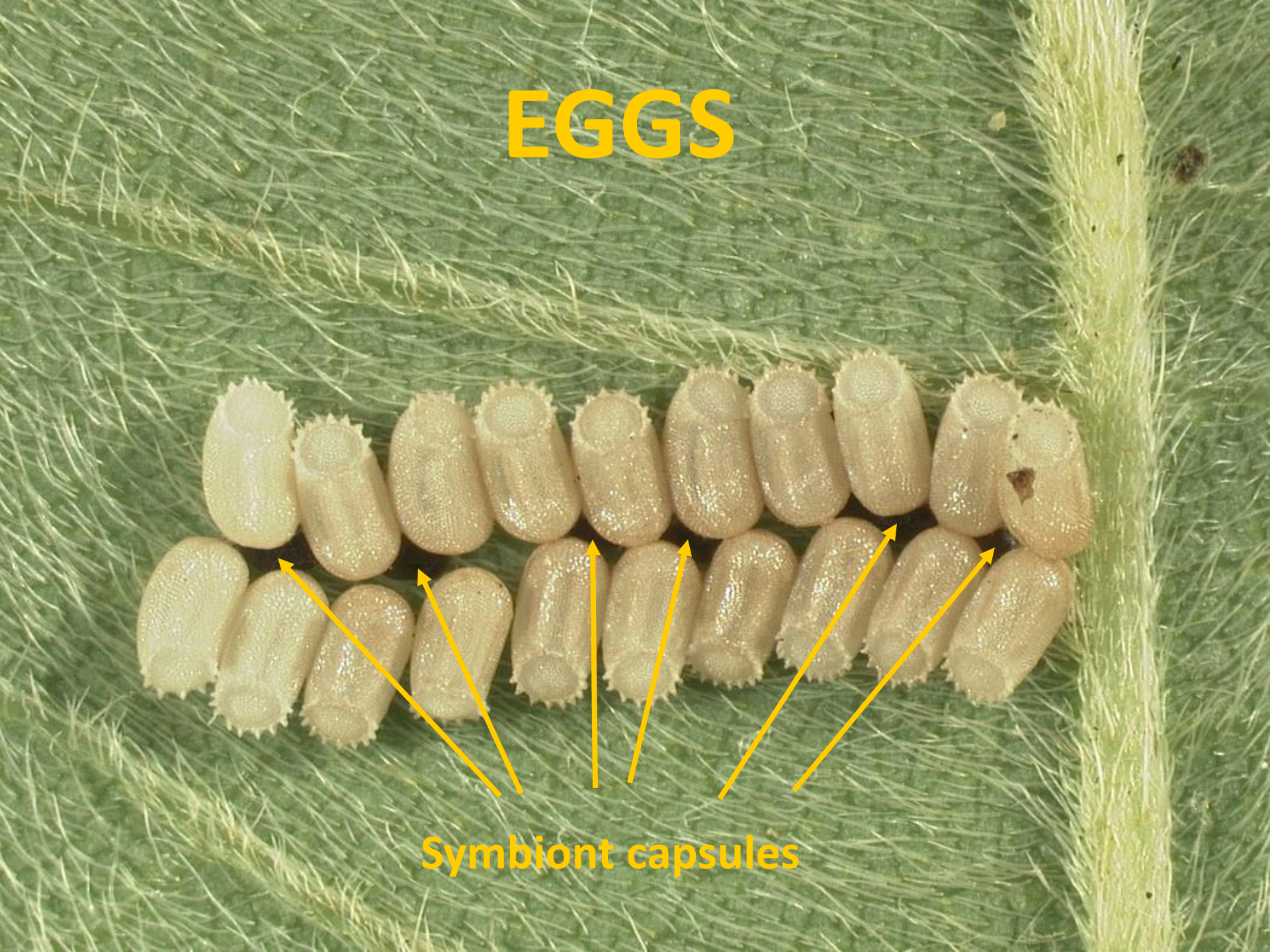
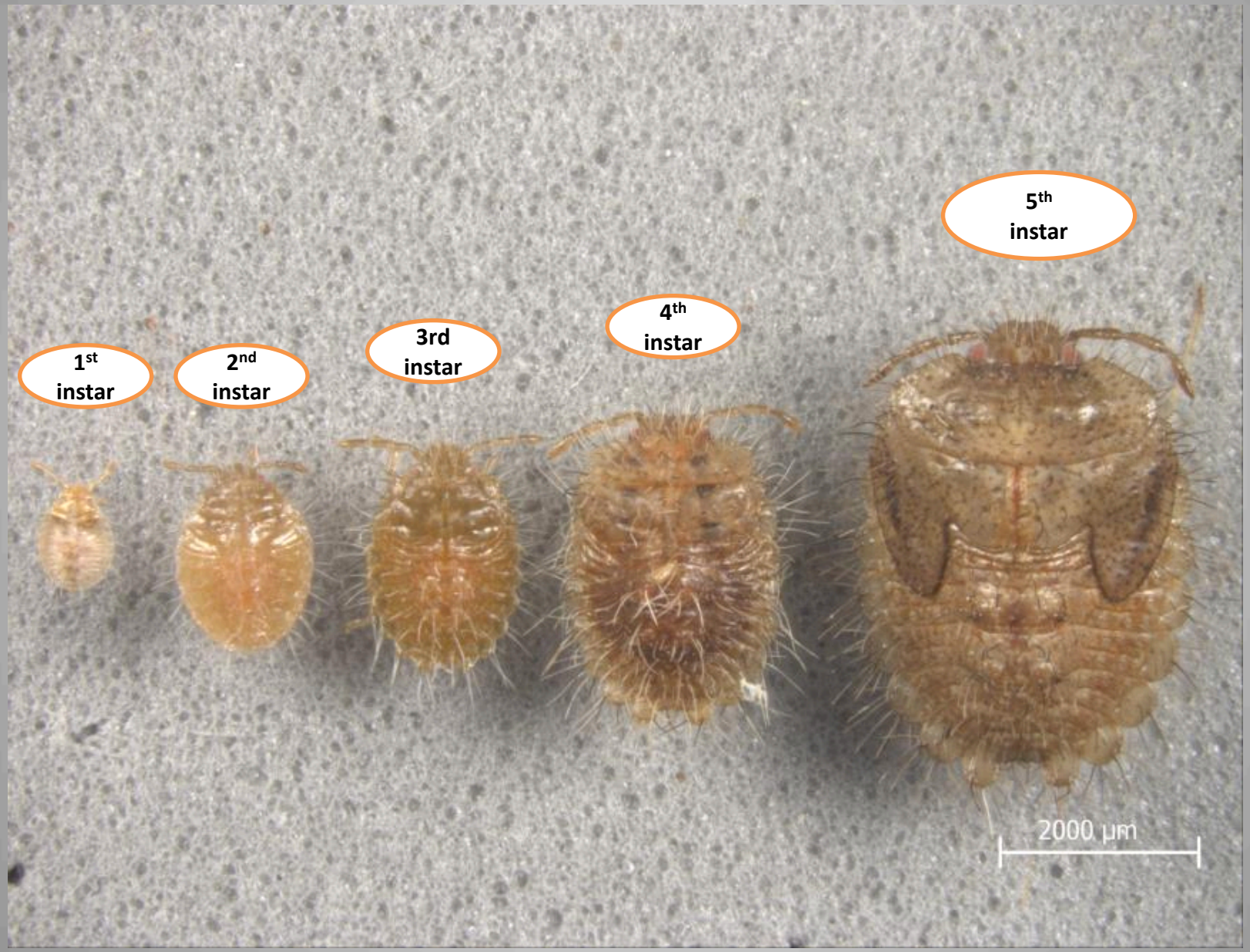
What's its Biology on Kudzu?
and
Will it Have a Significant Impact on Kudzu?

1) In 2010and 2011 we took weekly samples of kudzu and examined for *M. cribraria*.
2) We developed a simple method for monitoring adult flight activity and monitored that in 2010 and early 2011.
3) We measured the impact of *M. cribraria* on kudzu in 2010, 2011 and 2012.


EGGS
Symbiont capsules

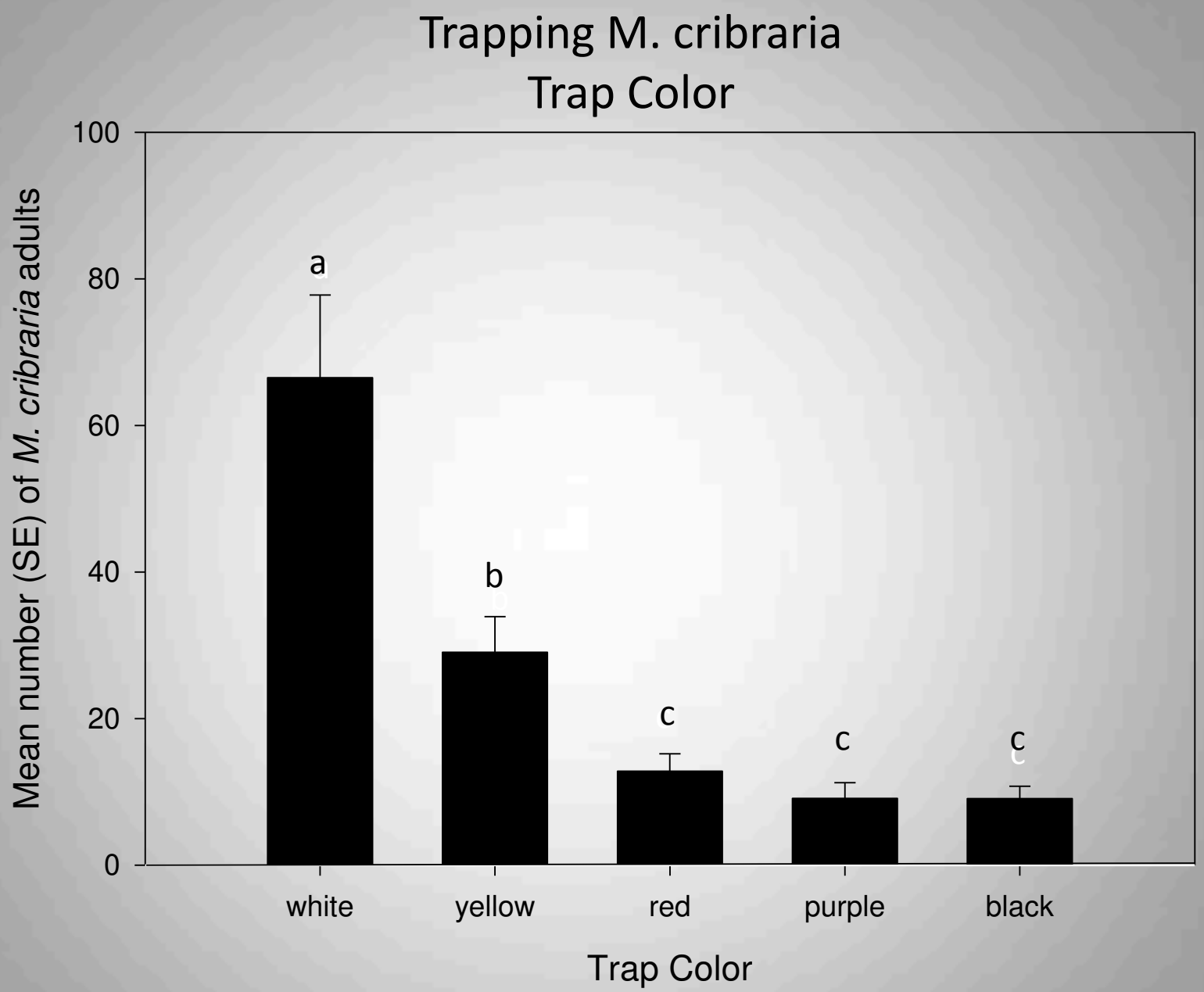

First Instar Nymphs
Provided by Dr. Joe Eager

Nymphs

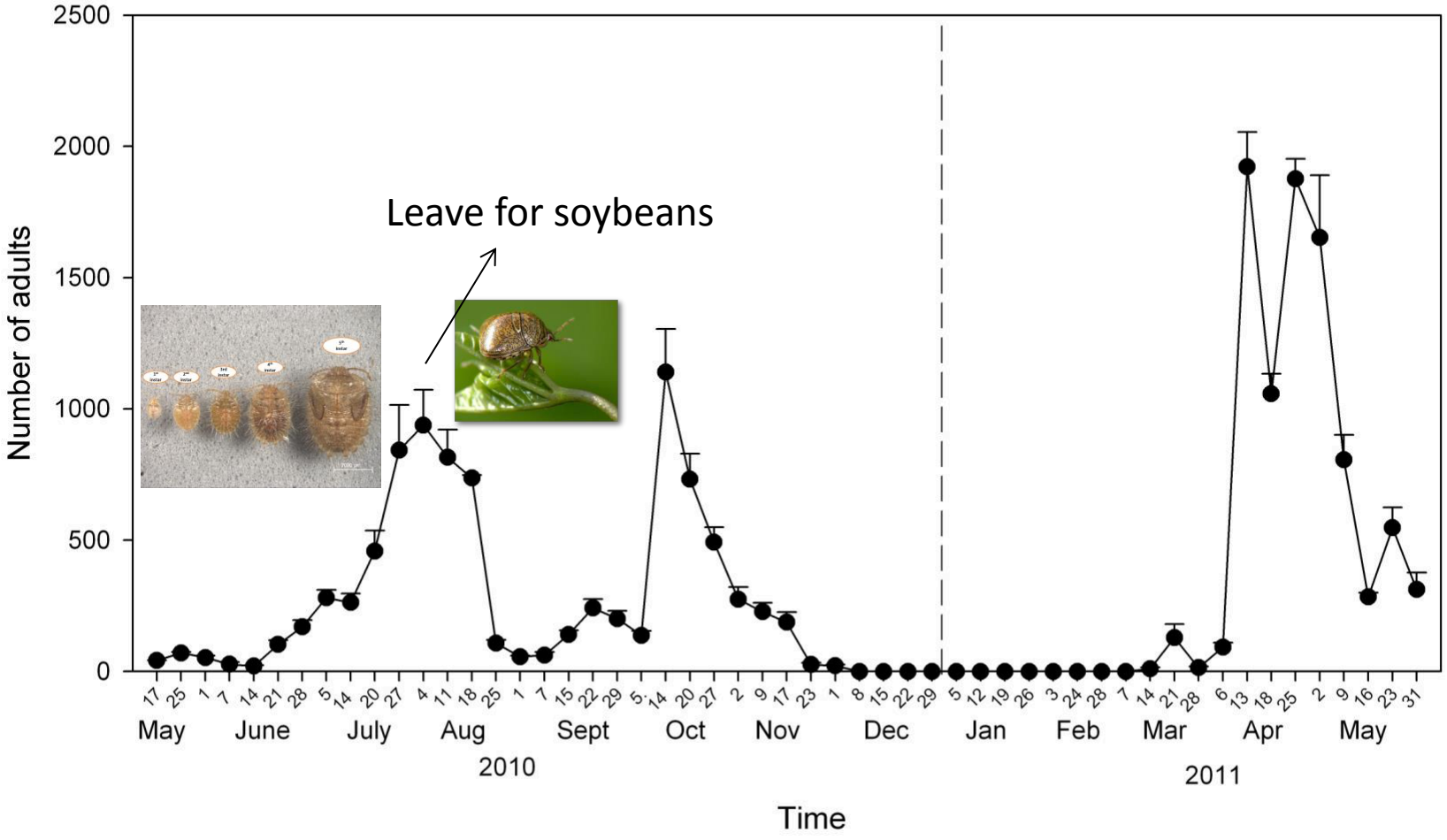

1st instar
2nd instar
3rd instar
4th instar
5th instar
2000 µm

Trapping M. Cribraria


FOR OFFICIAL USE ONLY
U.S. GOVERNMENT
FOREST SERVICE
US
DEPARTMENT OF AGRICULTURE
8600


Trapping M. cribraria
Trap Color
Mean number (SE) of M. cribraria adults
100
80
60
40
20
0
a
b
c
c
c
white
yellow
red
purple
black
Trap Color

M. cribraria trap catch over time

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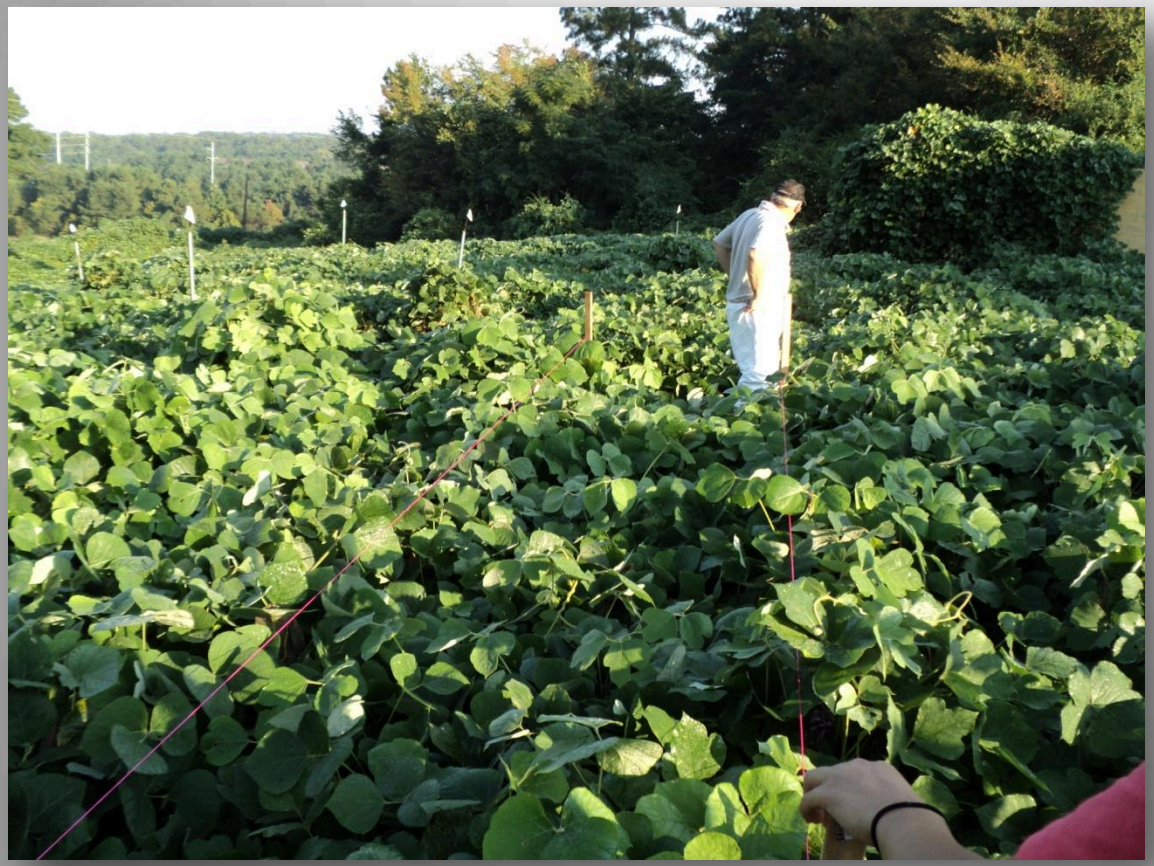
Kudzu Bug Impact on Kudzu

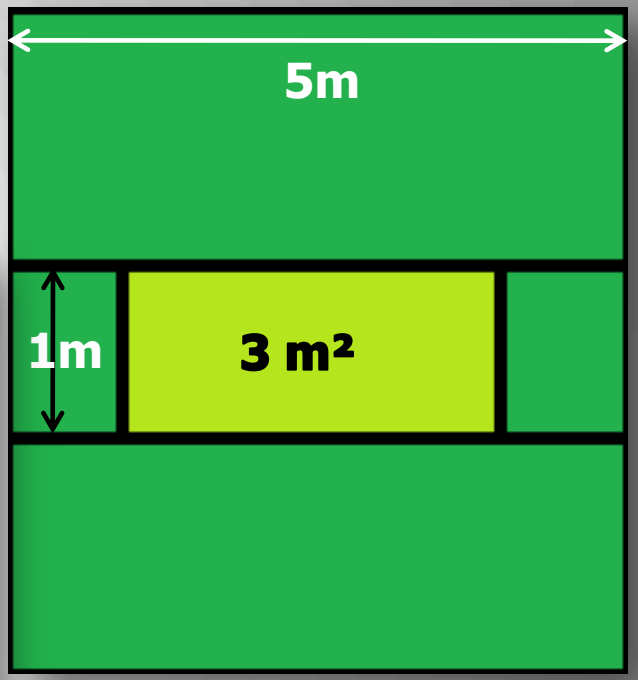
Sprayed five 5 m^2 plots biweekly with Cyonara (Lambda-cyhalothrin)

Kudzu Bug Impact on Kudzu

Weeded the border of plots

Harvested kudzu- Sept. 20th





Kudzu Bug Impact on Kudzu

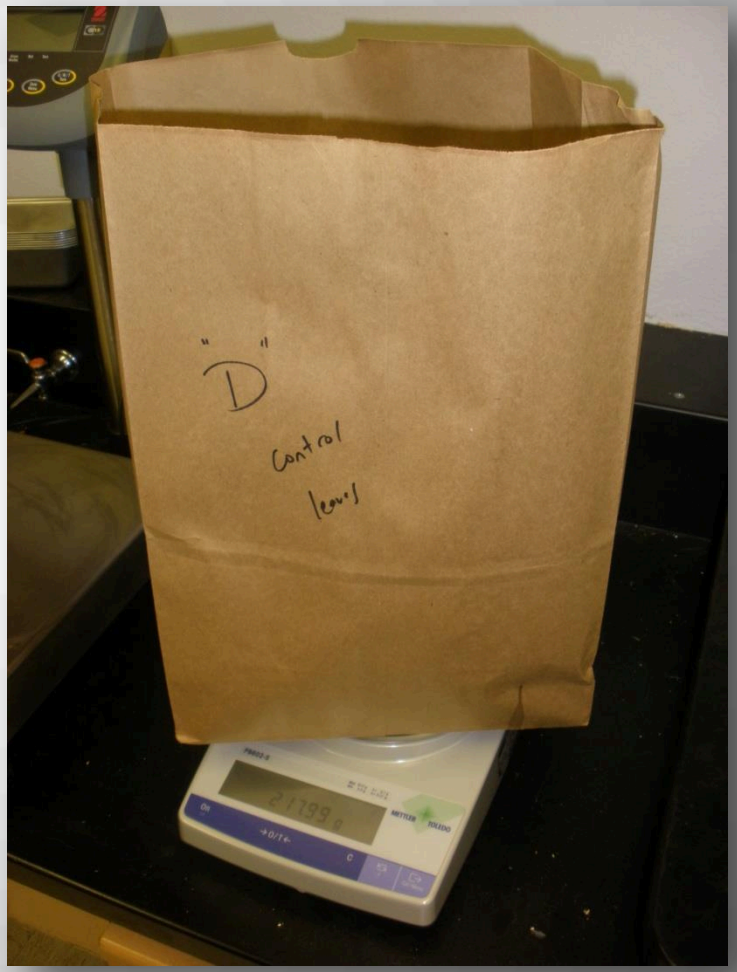
Harvesting Kudzu

Kudzu Bug Impact on Kudzu

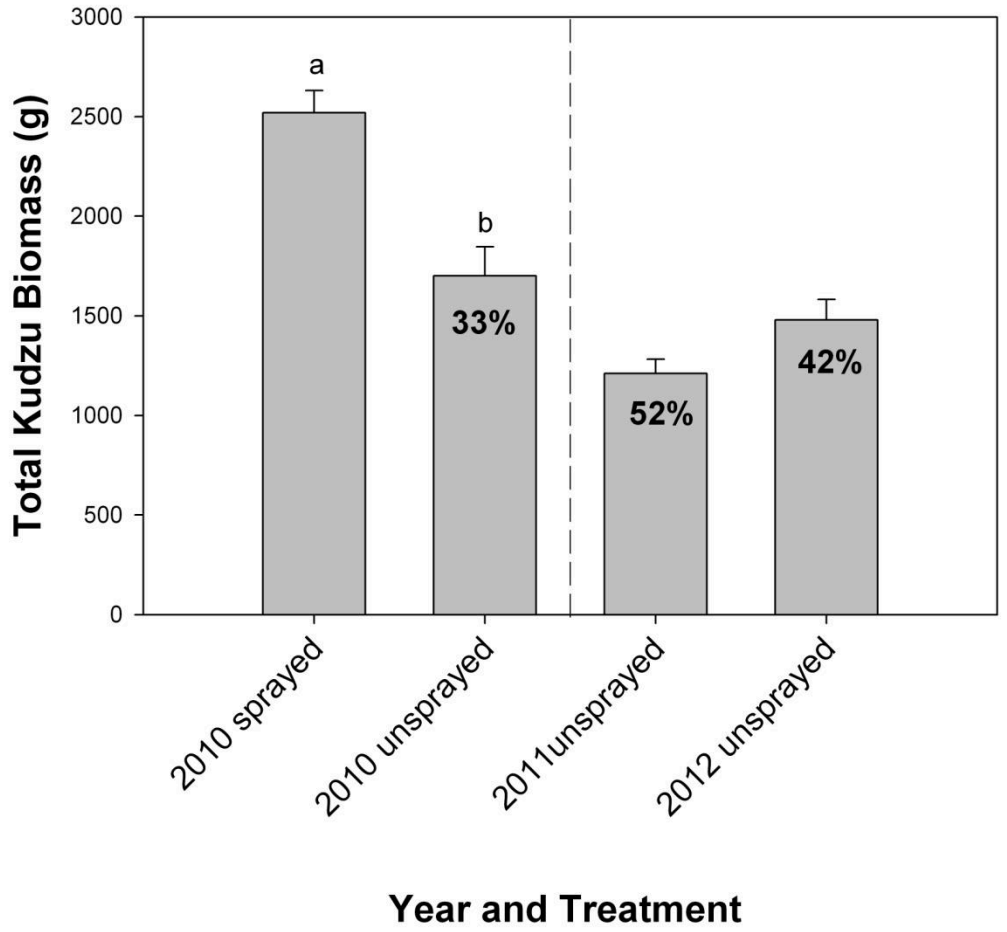
Separate leaves and stems

Kudzu Bug Impact on Kudzu

Dried and weighed leaves and stems



Kudzu Bug Impact on Kudzu



In 2010, M. cribraria reduced kudzu biomass 33%.

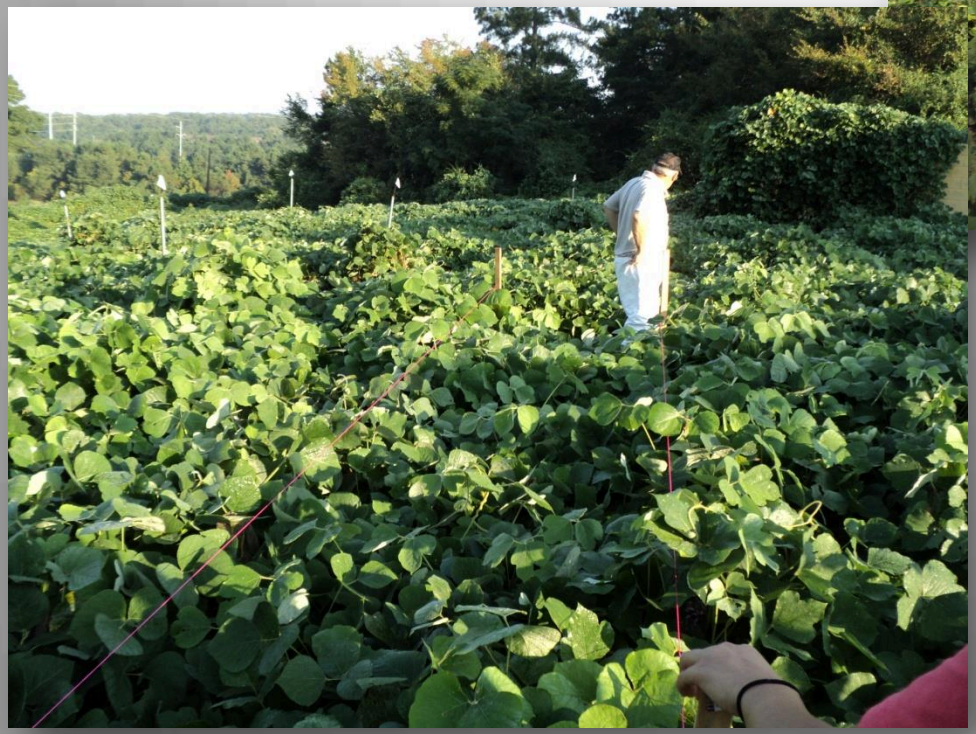
In 2011, biomass was 52% lower than the 2010 sprayed plots.

In 2012 the difference was about 40%.

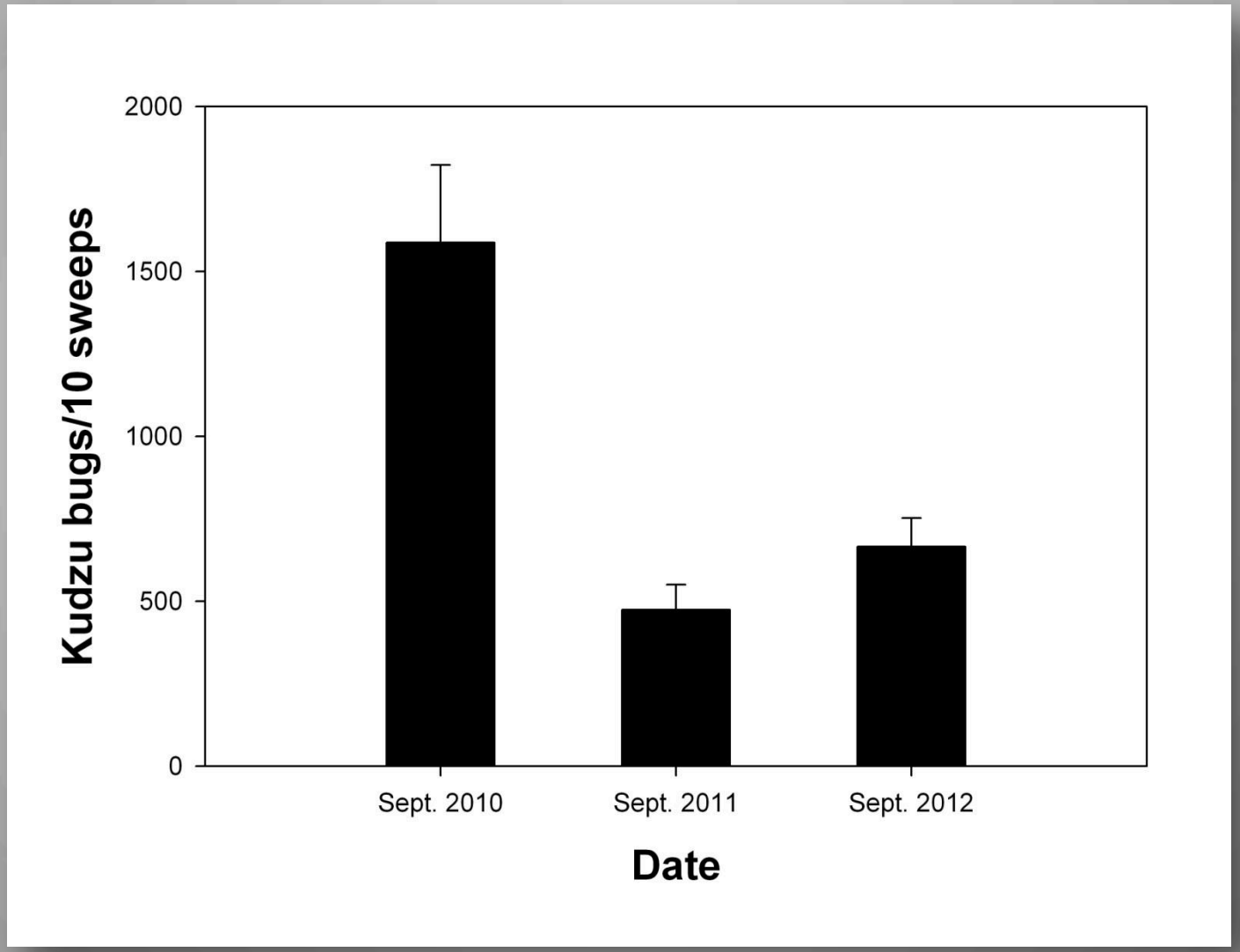
Kudzu Bug Impact on Kudzu

September 2012

September 2010



Kudzu Bug Population Trend?



Host Range

Common Name [Tribe (subtribe)]	Number of adults	Number of eggs	Number of adults developed from eggs
Kudzu [Phaseoleae (Glycininae)]	75.0 ± 15.5 ab	528.8 ± 57.4 a	N/A
Soybean [Phaseoleae (Glycininae)]	0.4 ± 0.2 c	320.0 ± 135.2 b	14.2 ± 5.7
Hairy lespedeza [Desmodieae]	0.6 ± 0.6 c	122.2 ± 12.6 c	0
Sericea lespedeza [Desmodieae]	0.8 ± 0.6 c	108.4 ± 57.0 c	0
American wisteria [Millettieae]	0.8 ± 0.5 c	18.8 ± 11.8 c	0
Yellowwood [Sophoreae]	105.2 ± 23.5 a	5.0 ± 3.5 c	0
Blackeyed pea [Phaseoleae (Phaseolinae)]	0	2.2 ± 2.2 c	0
Lablab [Phaseoleae (Glycininae)]	0	1.6 ± 1.6 c	0
Black locust [Robinieae]	72.2 ± 19.2 b	0	0
Red bud [Cercideae]	0.2 ± 0.2 c	0	0
Mimosa [Ingeae]	0.4 ± 0.4 c	0	0
Wild indigo [Thermopsideae]	0.4 ± 0.2 c	0	0

The Economics of the Kudzu Bug

- The kudzu bug has caused a 33% reduction in kudzu growth in one year and possibly up to 40-50% after two to three years of feeding.
- It also attacks soybeans reducing yield 19-25%.
- It is attracted to white houses and many homeowners are having their houses treated.
- It enters shipping containers and airplanes and has been intercepted in other countries and Guatemala placed a quarantine on 3 states for a short time.

The Annual Cost of Kudzu

Grebner, D.L. et al. 2011. Kudzu control and impact on monetary returns to non-industrial private forest landowners in Mississippi. J. Sus. For. 30: 204-223.

- Eradicating kudzu and replacing it with pines will result in an annual land expectation value (LEV) of $84/acre/yr.
- If this were applied to the estimated 7 million acres of kudzu the annual LEV would be $590,000,000. Much lower for hardwoods ($115 million/year).
- Estimated cost of controlling kudzu bug on soybeans in the south on 9.5 million acres is $95 million/insecticide application.

Large Scale Kudzu Control
A Win – Win – Win – Win

- Benefits
  - Forestry
  - Municipalities and homeowners
  - Reduces risk of exportation
  - Reduces cost of power line maintenance
  - Reduces cost of rail and highway right-of-way maintenance
  - Reduces damage to soybeans

Questions?


KUDZU
Kudzu (kŭd-zōō) n.
AN ORIENTAL VINE INTRODUCED INTO THE SOUTHERN U.S. TO CURB SOIL EROSION. ITS UNCONTROLLABLE GROWTH SOME CONSIDER A MENACE...
PATENT PT
MAMA, WHY IN THE WORLD DID YOU AND DADDY NAME ME AFTER A WEED, A PEST, A NUISANCE TO THE ENVIRONMENT?...
MARGETTE
NEVER MIND.