Seed Protection and Emerging IPM Issues

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Yield Increase from an Neonic IST

Compared with non-treated plots (Mid-South)

Crop	Average Increase	Number of Trials	Gross Value
Cotton	101 Lbs. Lint/Acre	67	$70
Corn	11.8 Bushels/Acre*	91	$47
Soybean	2.0 Bushels/Acre	170	$20

Meta-analysis of replicated insecticide trials done from 2005-2014 (AR, LA, MS, TN)

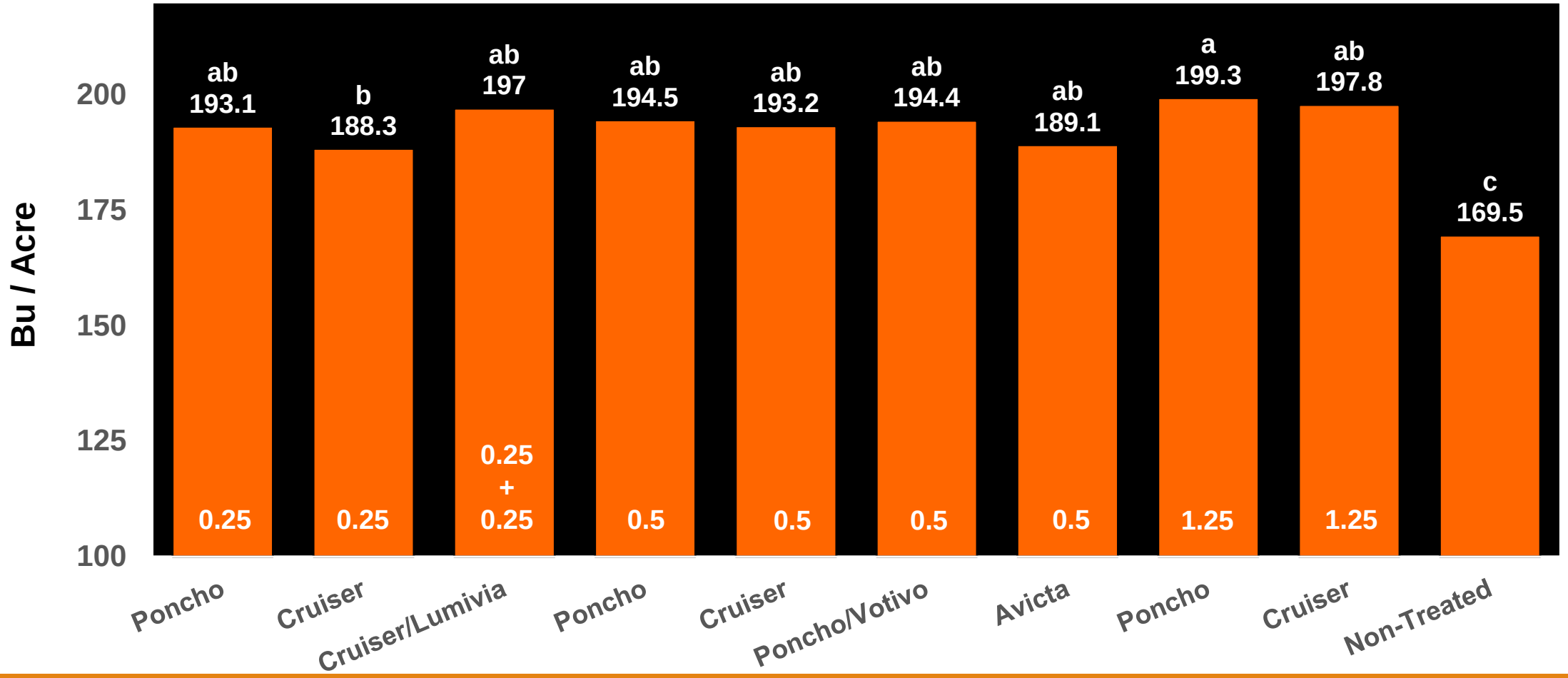
North et al., Mississippi State University

*Long term average of about 5 bushels per acre in Tennessee

Impact of Corn Seed Treatments on Yield

Average from TN, MS, LA, AR (3)

Wireworms and
Southern Corn Rootworms

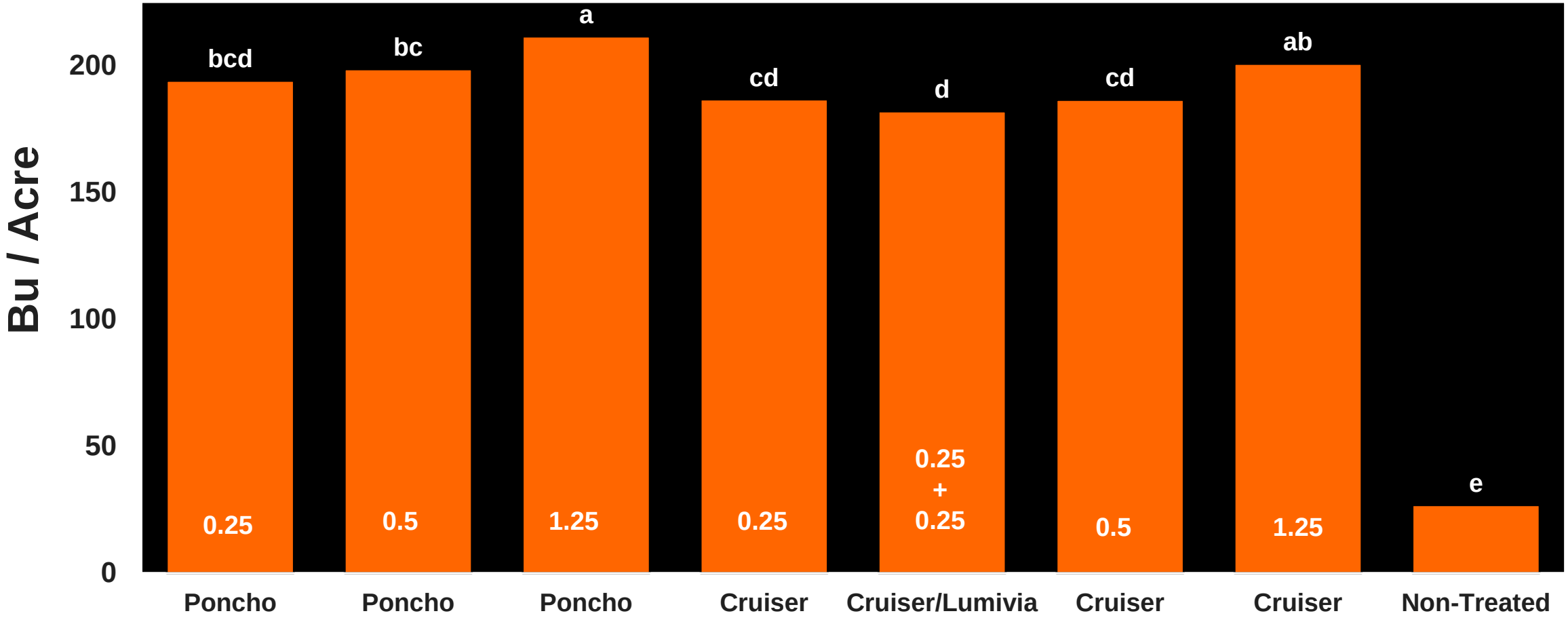


Poncho 1250

Not Treated

Impact of Corn Seed Treatments on Yield

Don Cook, 2017



Corn Foliar PGRs and Root Biostimulants

Angela McClure, 2017

Foliar

- Nutri K (foliar potassium)
- Radiate (IBA* + kinetin, Loveland product)

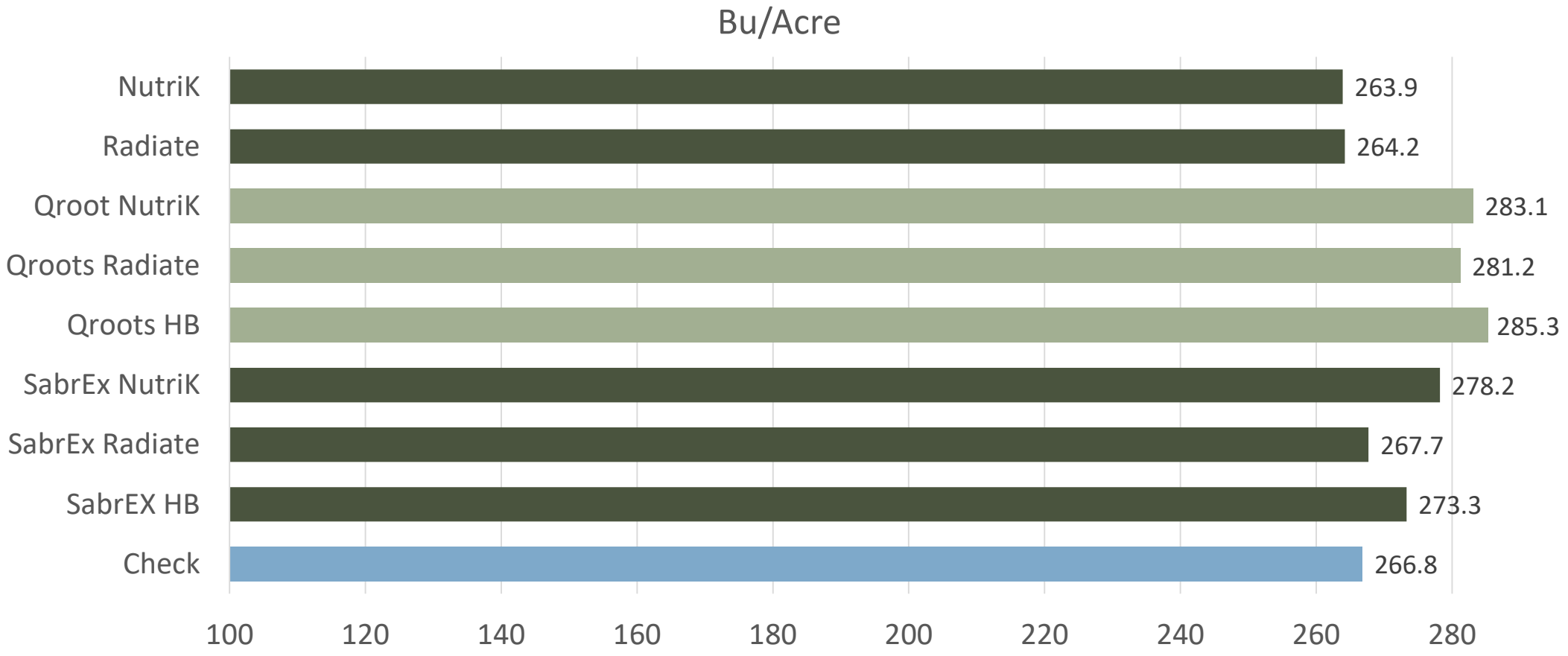
Hopper Box

- Quick Roots: *Bacillus amyloliquefaciens* (bacteria), *Trichoderma virens* (fungus)
  - Ability to release phosphate in the soil not readily available to the plant. Improved phosphate availability can lead to expanded root volume, which enhances nitrogen and potassium uptake
- SabrEx: patent pending biologicals
  - Bigger roots, reduced plant stress improved water and nutrient uptake.

* 3-indolebutyric acid

2017 Hopper Box / Foliar PGRs in Corn

Angela McClure, 2017



Corn Seed Protection – Take Home

It’s important

Standard insecticide treatments are satisfactory in most situations

Use higher seed treatment rates or supplemental in-furrow insecticides for high risk scenarios

- New fields coming into production
- Cover crop scenarios
- In-furrow pyrethroids are a cheap option if running pop-up already fertilizer

Other Corn Issues

Insecticide resistance

- Bt / Corn earworm (bollworm)
  - Cry1 and Cry2 Proteins

New Bt corn technologies

- Viptera - Optimum Leptra, Genuity Trecepta, etc.
- Refuge requirements - YES

Growing Non-Bt Corn

- Need to scout, use pheromone traps, and spray for corn borers

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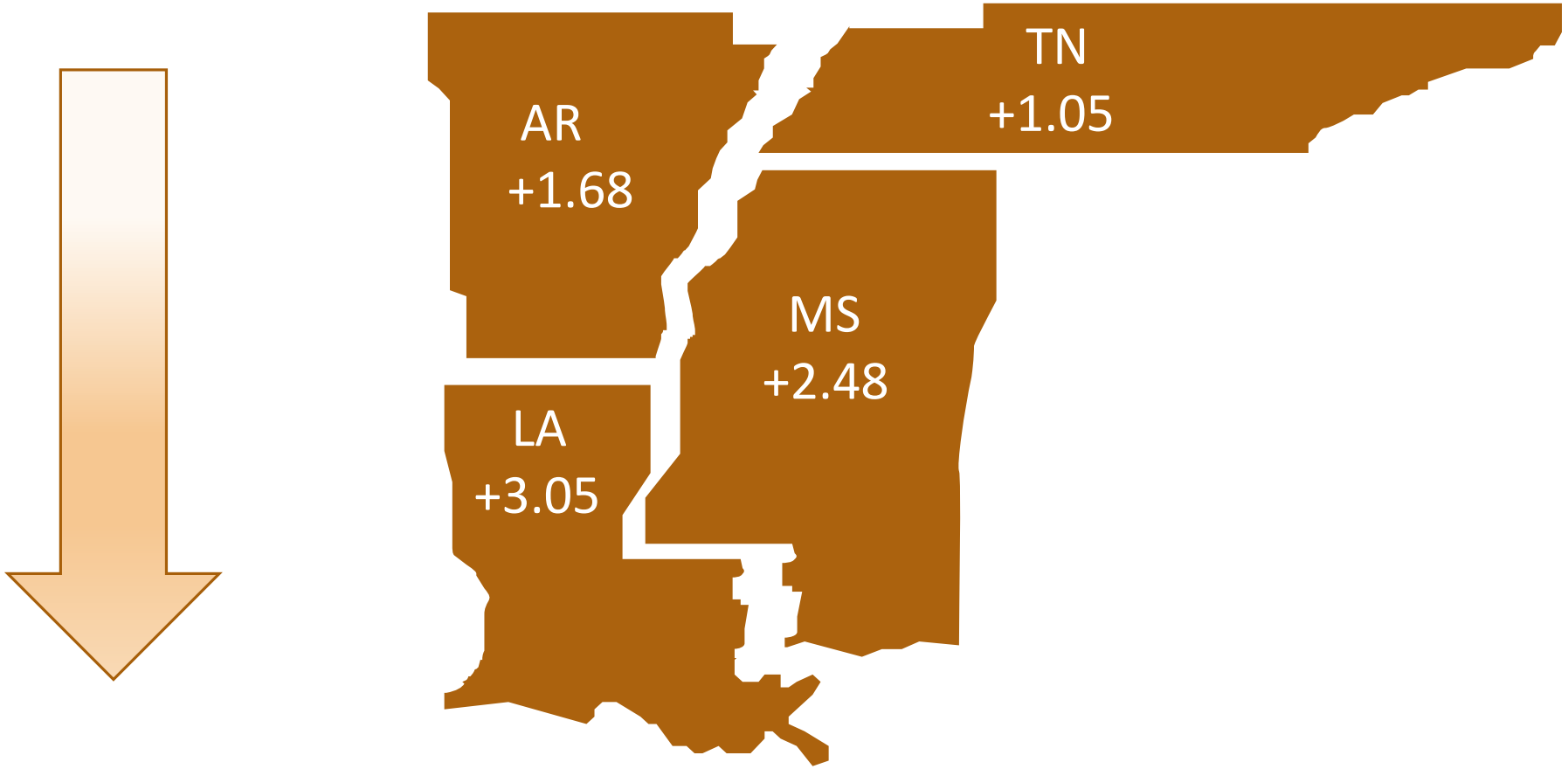
Soybean Response to Insecticide Seed Treatment

Bushels/Acre (2005 – 2014, N = 170)



Bean Leaf Beetles and Insecticide Seed Treatments

Jackson, 2017

Cover Crops can have positive attributes that you are all well aware of including …

- Erosion control
  - Prevention of water / nutrient / pesticide runoff
- Soil health (organic matter, fertility)
- Weed control and/or a reduction in herbicide use
- Resources for pollinators
- A nursery for natural enemies
- Payments to growers

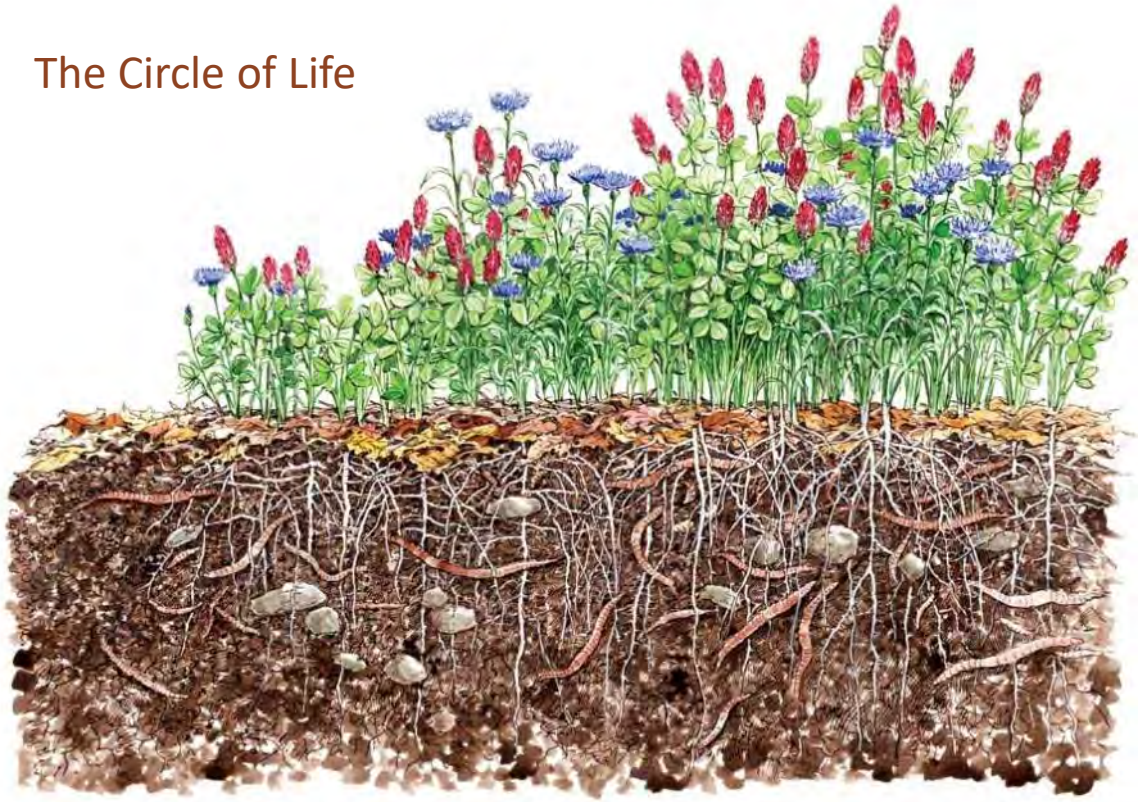
The type of cover crop and when it is controlled (killed) relative to the planting date can have a huge impacts on the risks and benefits

It’s not all peaches and cream
(diversity is not always a good thing)

There are potential problems with cover crops, particularly in the South, where they may serve as a nursery for insect pests

- Reduced tillage and cover crops provide a great environment for insects … they just love hiding in there … and also some non-insect pests like spider mites, slugs and voles

The Circle of Life



Observations on Pea Leaf Weevil in Soybean

Often abundant in fields behind Austrian winter field pea (Austrian peas)

- In some cases, it's been a BIG PROBLEM
- They can also be a problem after vetch and probably clover

Larvae feed on nodules, and adults feed on foliage

Can be controlled with labeled insecticides but they continue to come out of cover crop residue for an extended period, resulting in multiple applications

Wheat and Vetch Cover Crop

Pea Leaf Weevil in Tennessee, 2017

No Insecticide Seed Treatment

Imidacloprid

Cover Crops and Insecticide Seed Treatment

Jackson, 2017

Imidacloprid

Untreated

Untreated

Imidacloprid

Seed Treatments Help (e.g., Don Cook, MSU)

Tennessee, 2015

TCAH behind legume or legume/grass cover

Threecornered alfalfa hopper

Brown
stink bug

Corn Behind Austrian Winter Field Peas Cover Crop, Arkansas, 2013

Planted Green

Gus Lorenz (University of Arkansas)

Cover Crops

Threecornered alfalfa hopper in soybean following vetch or Austrian winter peas

Slugs, slugs, slugs in no-till fields with high residue and where cover crops were used

Etc.

What About Slugs in Cover Crops?

- Residue and a food source is the problem
  - Will be worse behind high residue crops
  - Cover crops often keep the soil cool and moist
- Scout intensely before planting and the first 2 weeks after planting
- Baits are effective
  - Metaldehyde (Deadline MP), Iron phosphate
  - Insecticides <u>don't</u> work
  - Baits are not cheap and require some planning
  - Can you use row cleaners?

Will an IST make slugs worse … and should I care?


You can scout for them

Job Security







There's a lot of potential for weird stuff

We don't really know enough about how cover crops will change IPM

Other Soybean Issues

Insecticide resistance

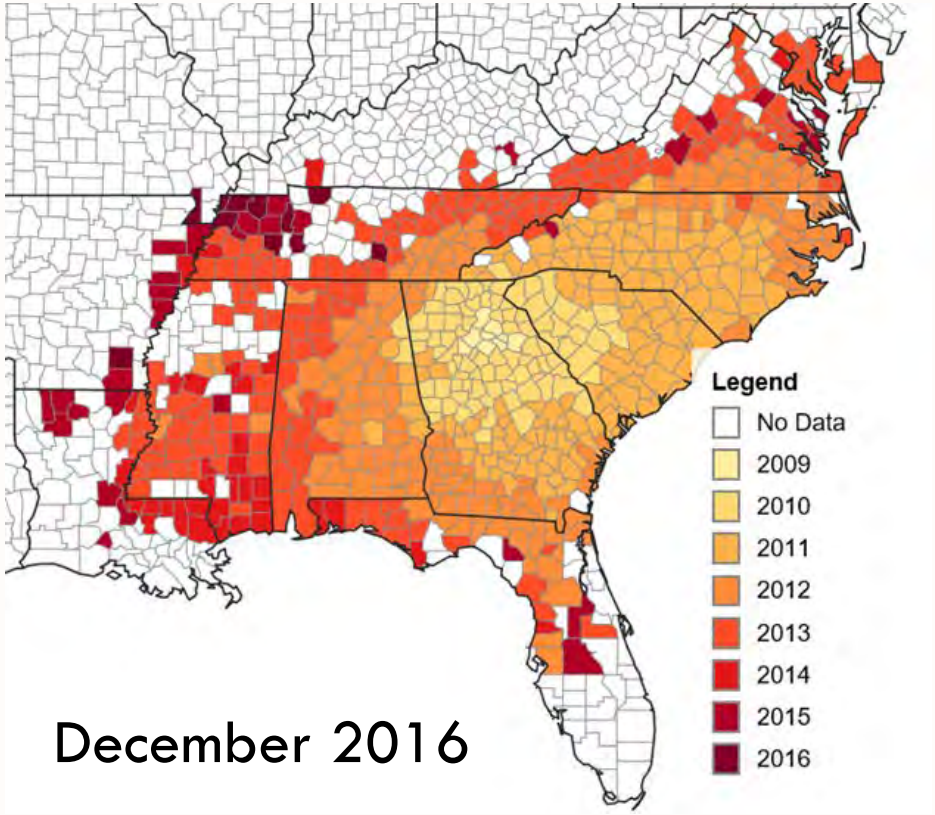
- Soybean looper / diamides
  - Alternative chemistries such as Intrepid, Intrepid edge, etc.
- Bollworm / pyrethroids
  - Alternative chemistries such as diamides (Prevathon, Besiege), Intrepid edge, NPV viruses, etc.

Invasive insects

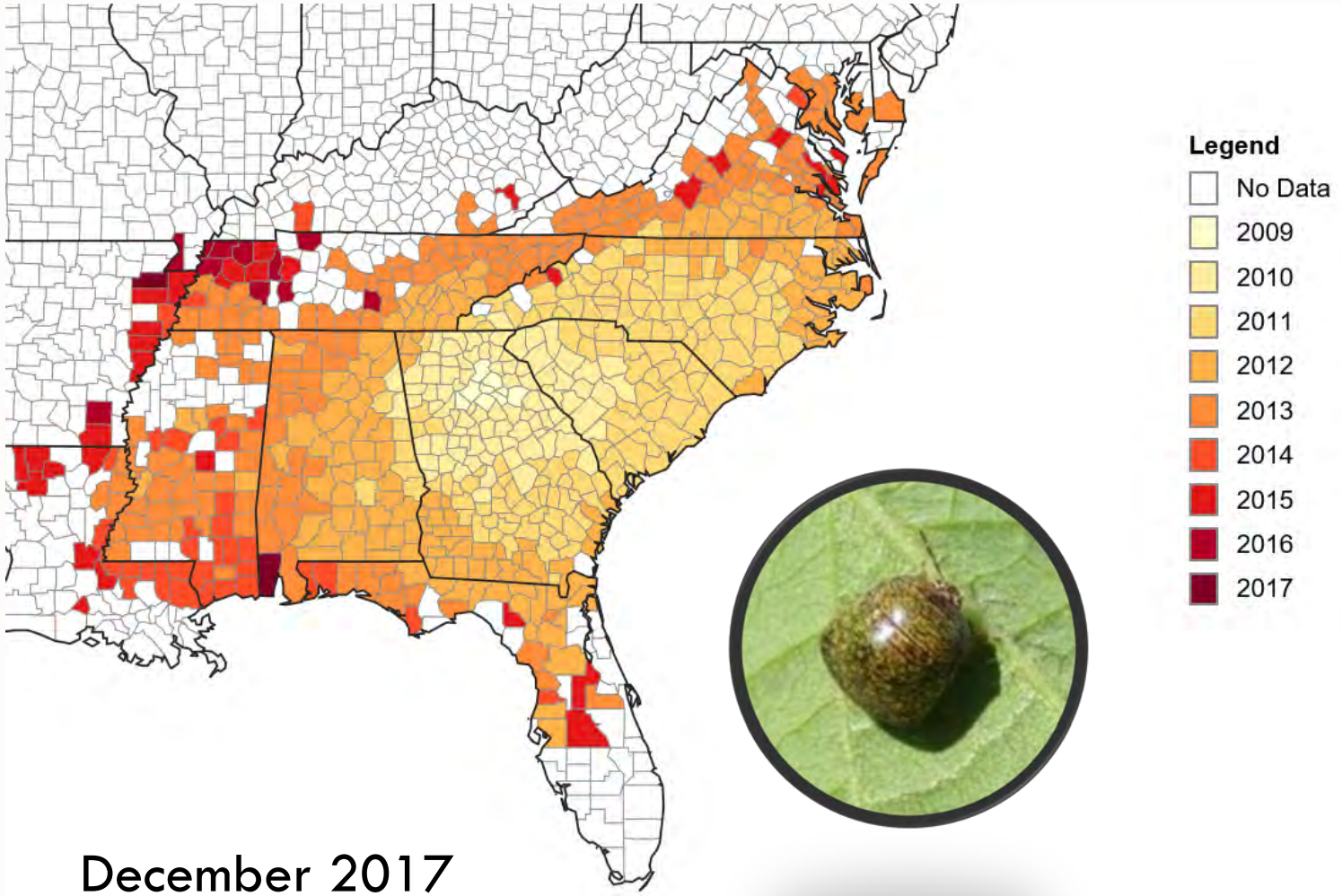
- Kudzu bug
- Brown marmorated stink bug
- ~~Redbanded stink bug~~

Kudzu Bug Distribution

EddMaps
(www.kudzubug.org)



December 2016

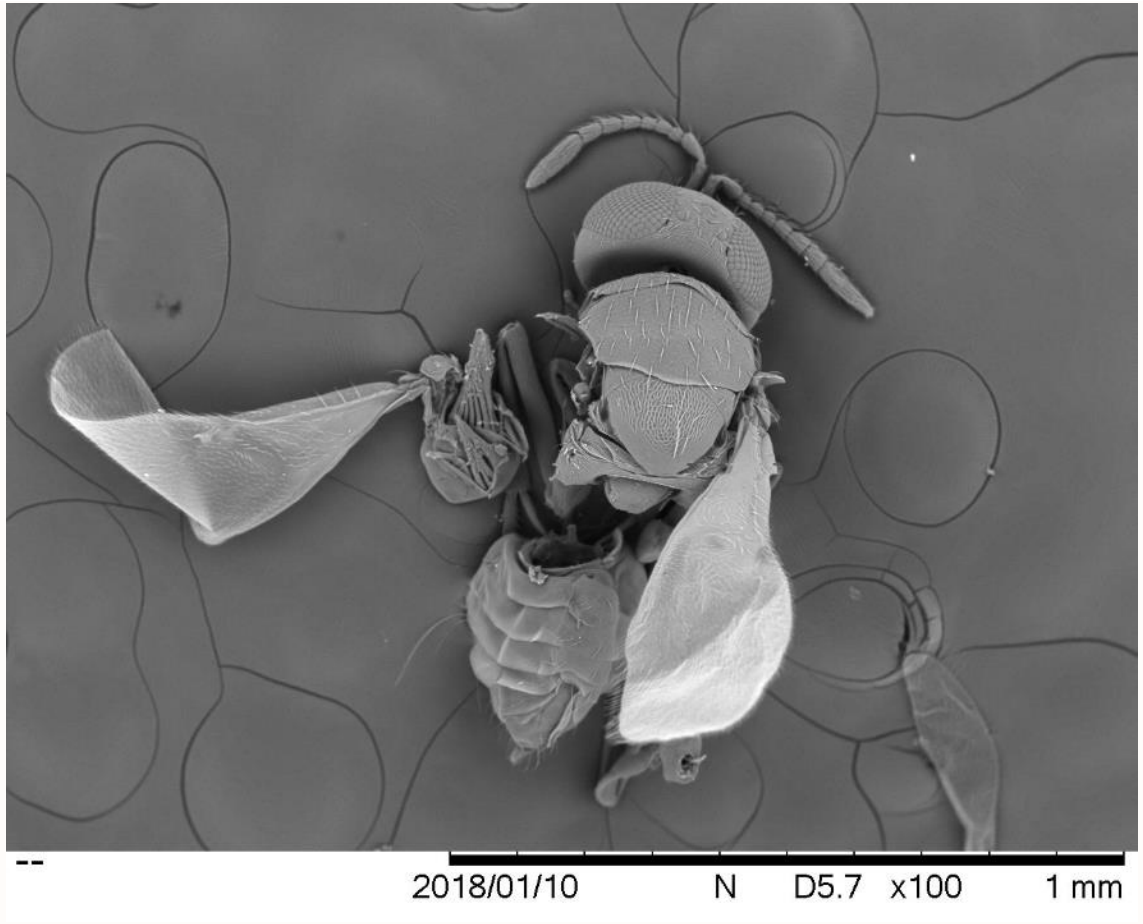


December 2017

Kudzu bugs killed by *Beauveria*

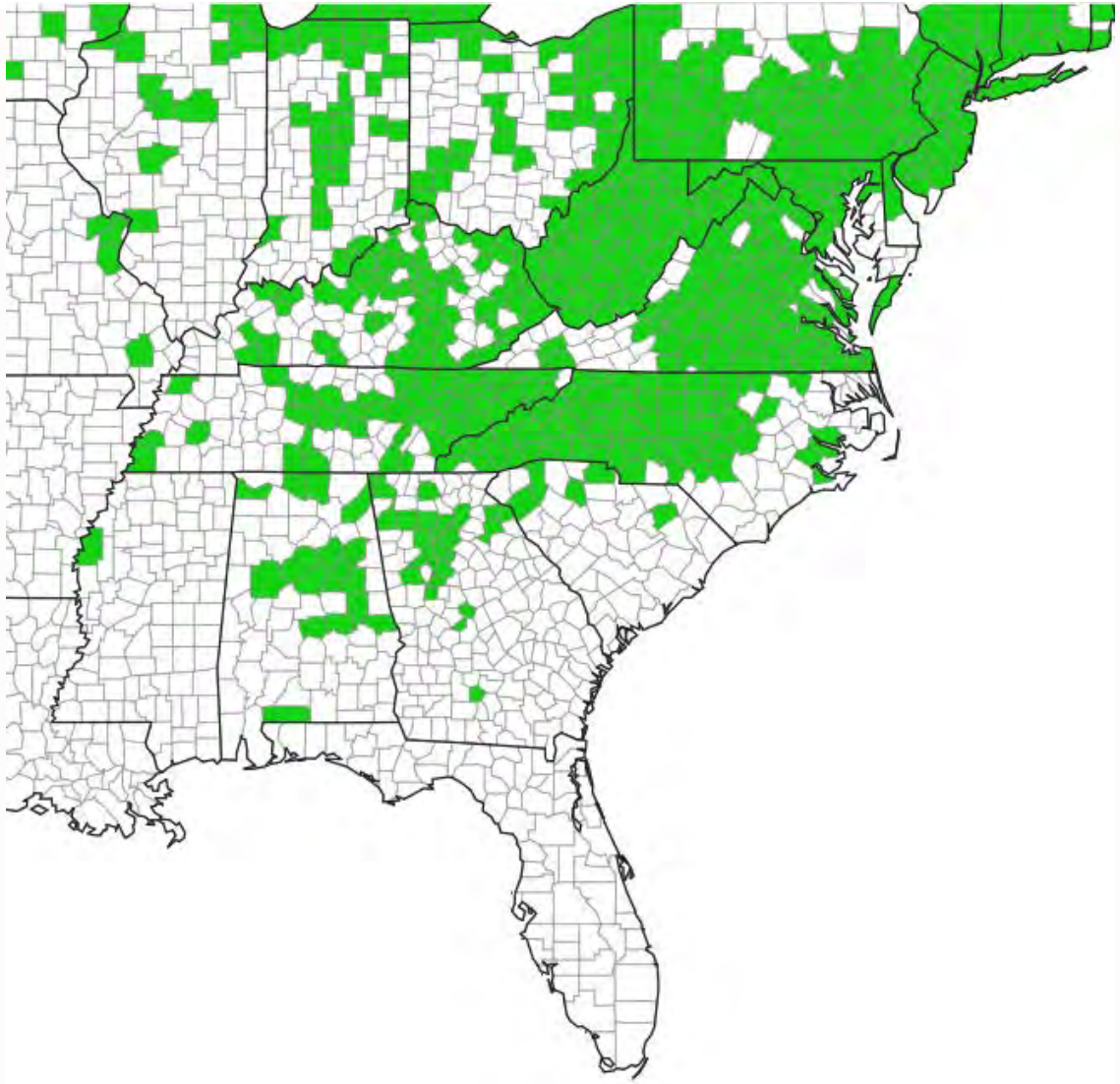
Beauveria bassiana

Egg Parasitoid



Brown Marmorated Stink Bug

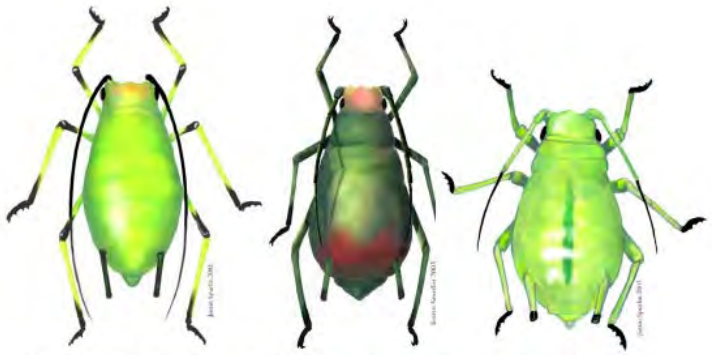
Brown Marmorated Stink Bug Distribution (2017)



Wheat

Aphids and Barley Yellow Dwarf

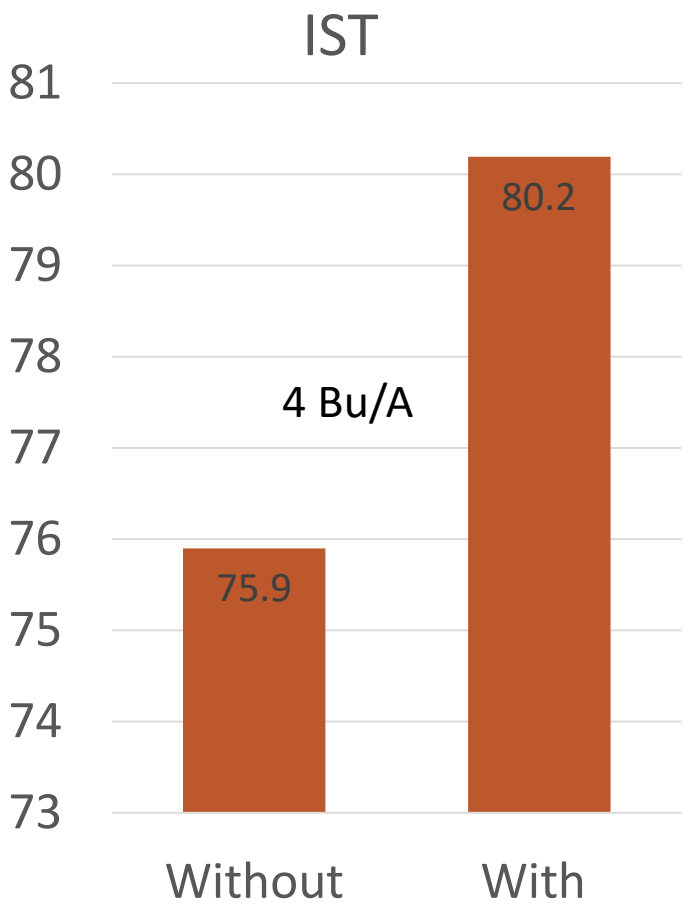
- Fly-free date
- Seed treatments
- Foliar insecticides
  - Typically pyrethroids

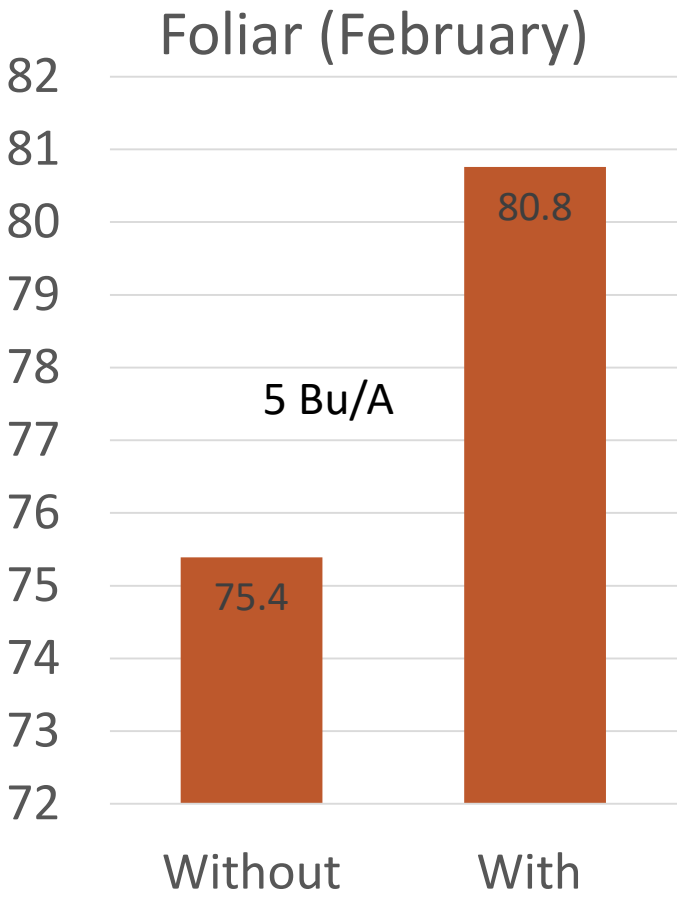


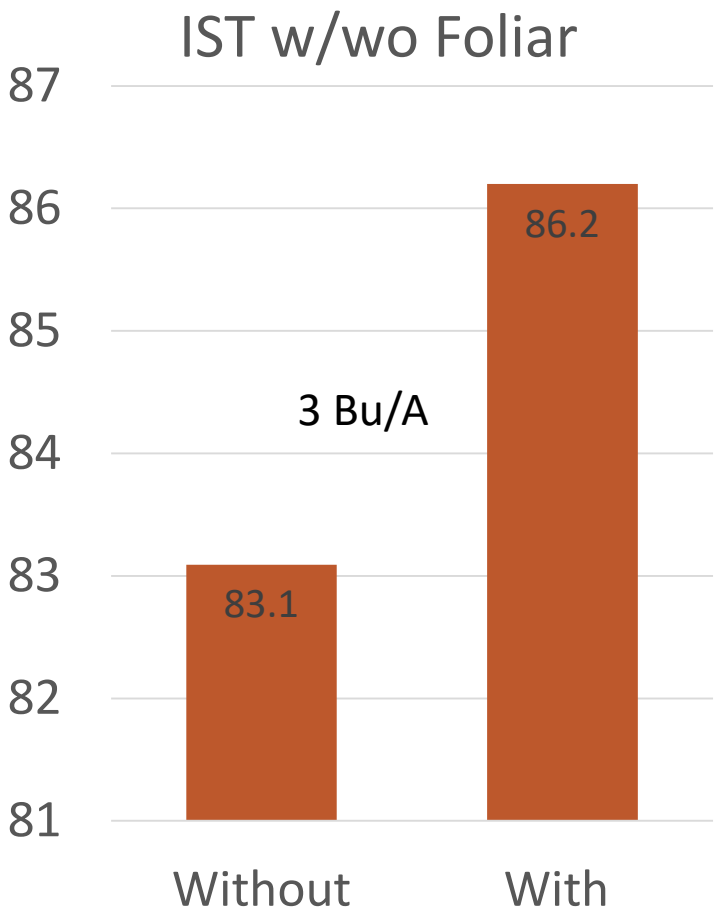
English Grain Aphid Bird Cherry-Oat Aphid Greenbug

Wheat YIELD (Bu/Acre)

Meta-analysis of 11 years of data in TN







P = 0.0012 (N=22, 0/11)

P < 0.0001 (N=19, 3/18)

P = 0.053 (N=8, 3/8)

Sorghum spp.

Sugarcane aphid

- Sivanto
- Other management options

Corn earworm

- Resistance to pyrethroids
- Use alternative chemistries
  - Heligen (NPV), Diamides (Prevathon, Besiege), Blackhawk, etc.

UTcrops News

- UTcrops.com
- UT Variety Trials
- Soy Search
- UT Pest Guides
  - Demo