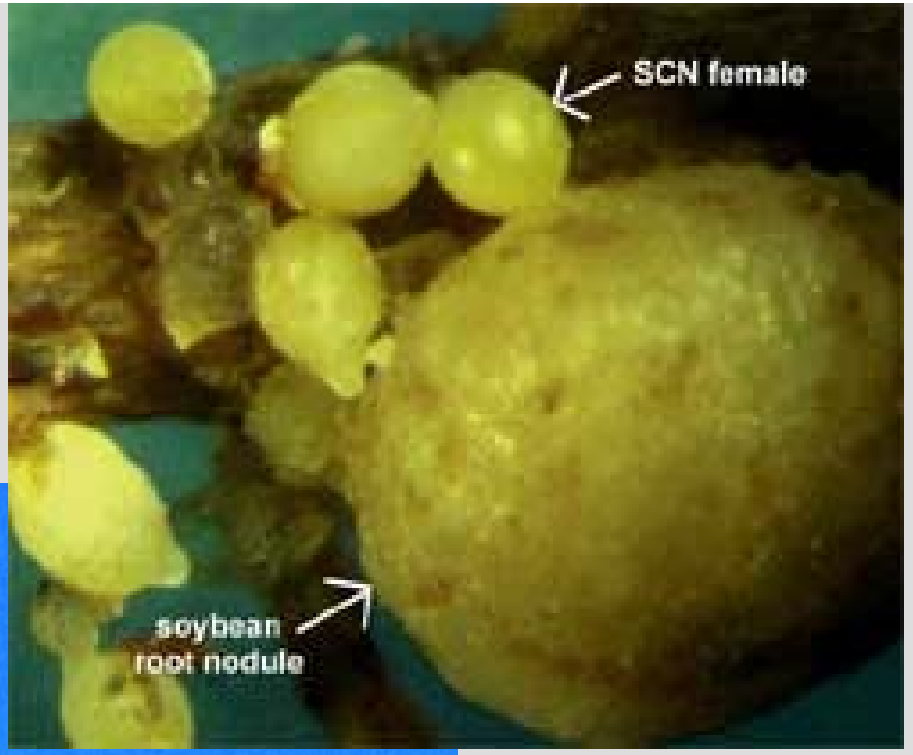
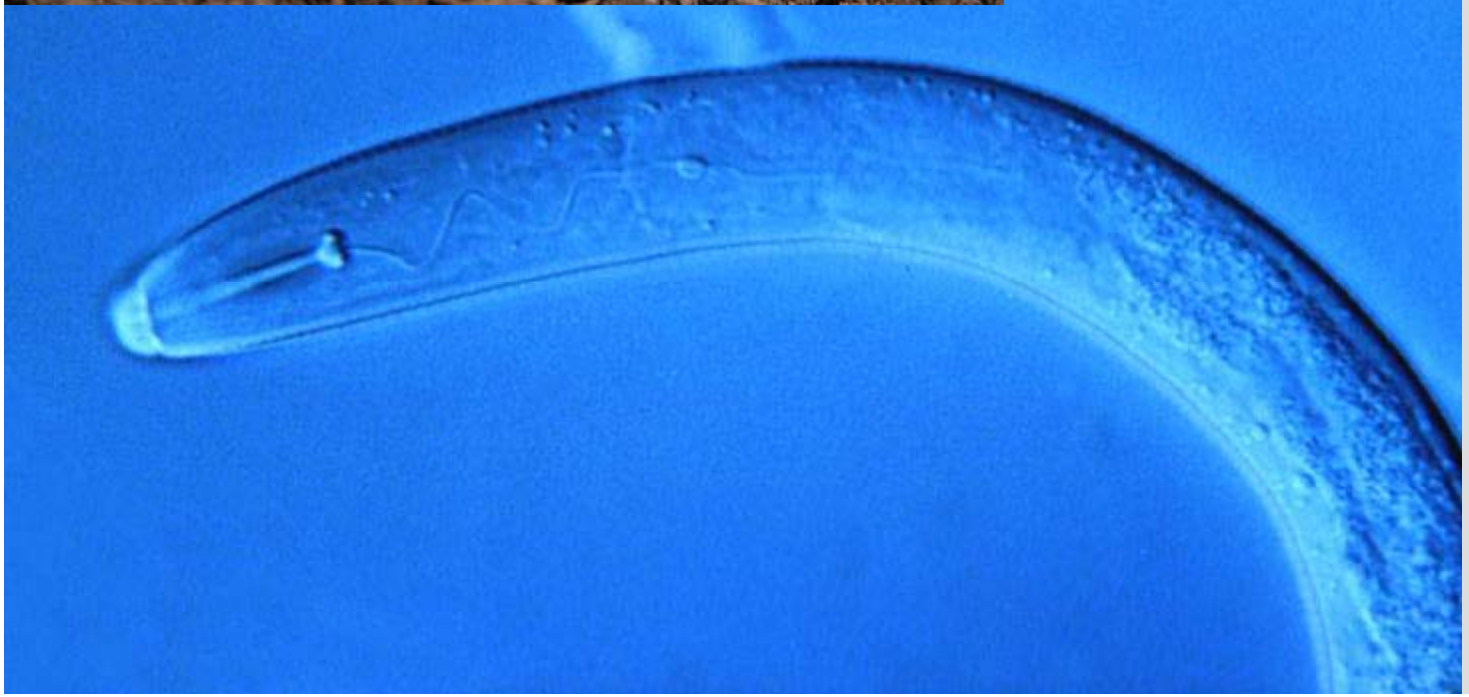
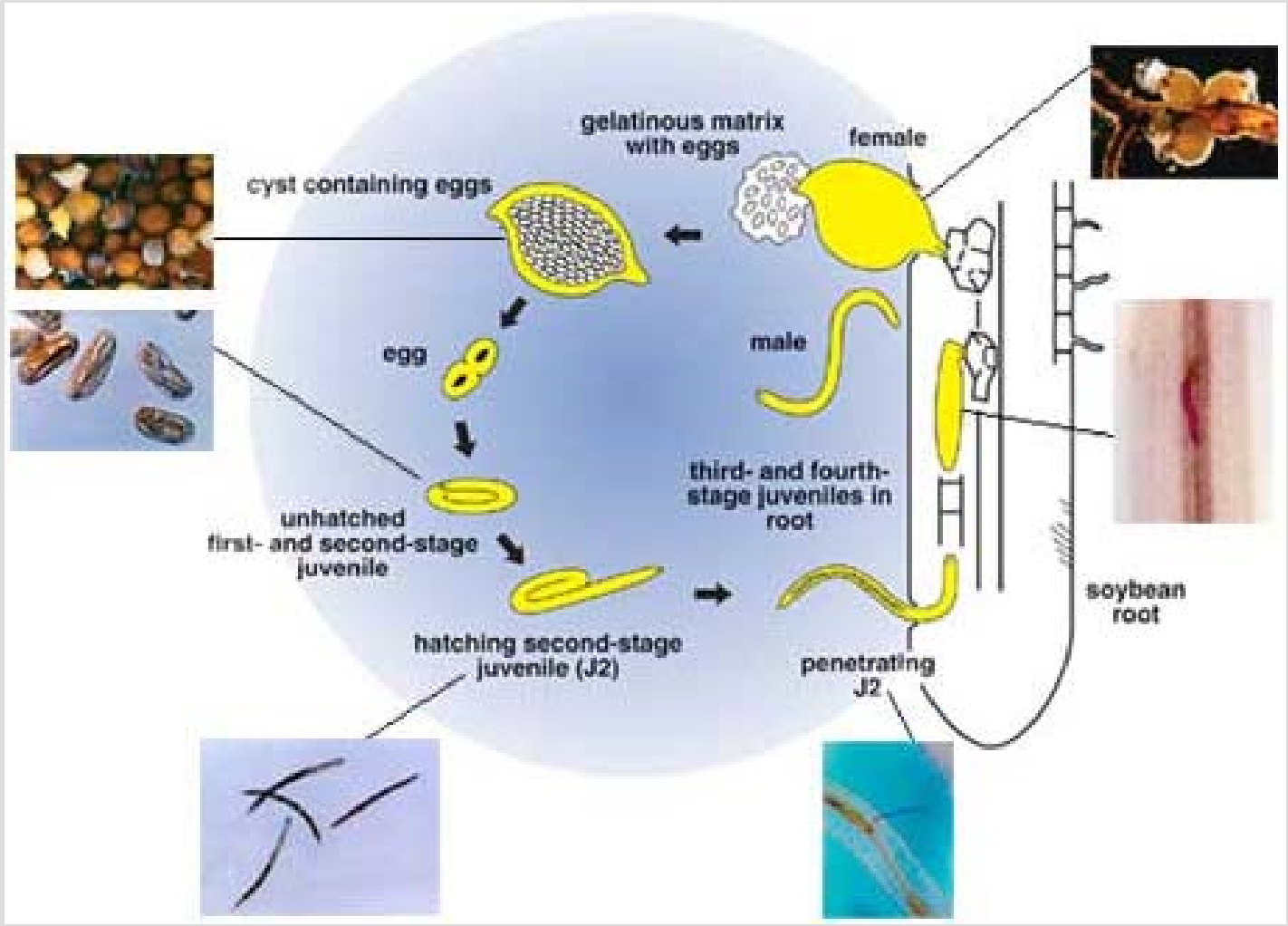
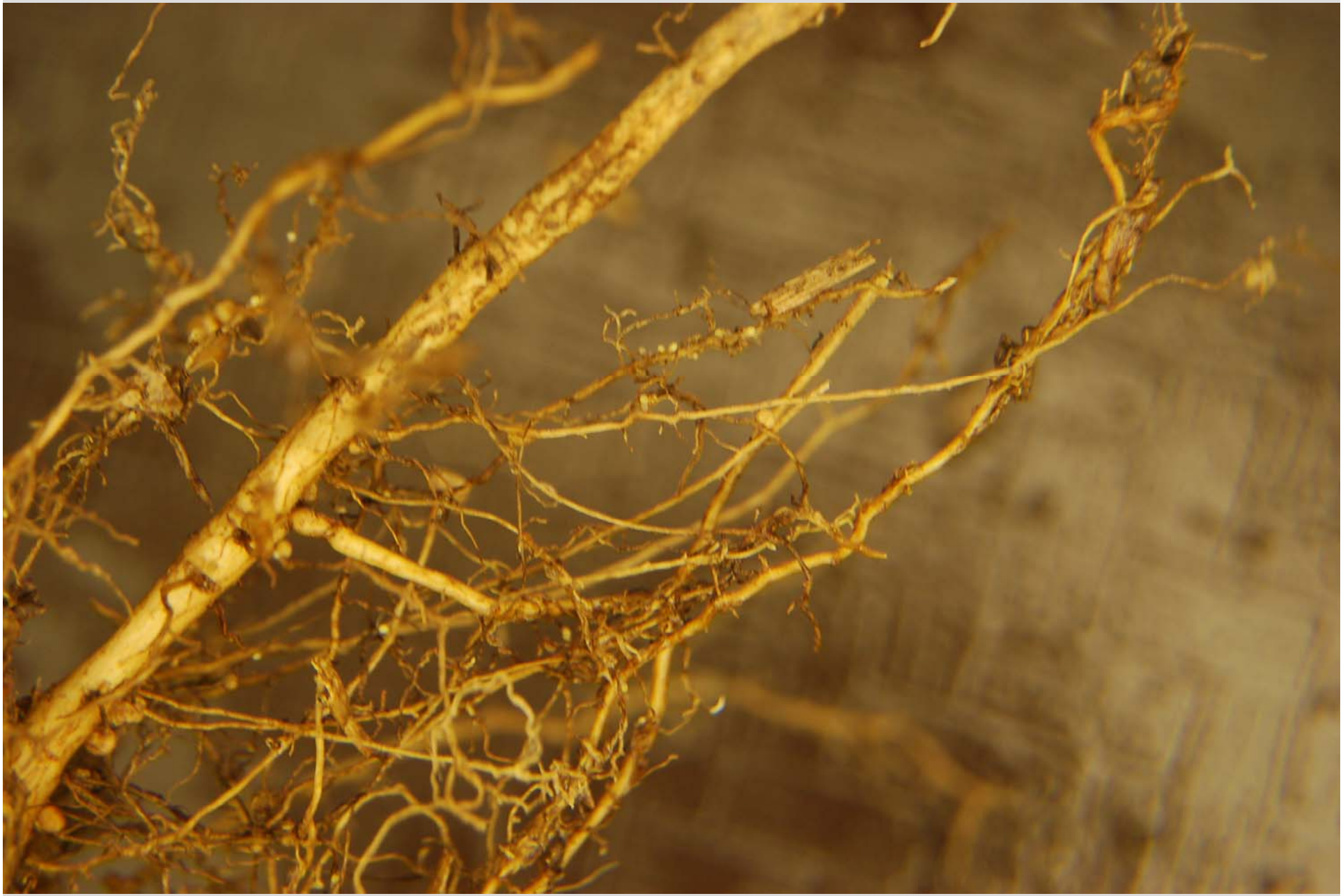
Soybean Disease Control

John Damicone, Extension Plant Pathologist


SCN female
soybean
root nodule




gelatinous matrix
with eggs
female
cyst containing eggs
egg
male
third- and fourth-
stage juveniles in
root
unhatched
first- and second-stage
juvenile
soybean
root
hatching second-stage
juvenile (J2)
penetrating
J2

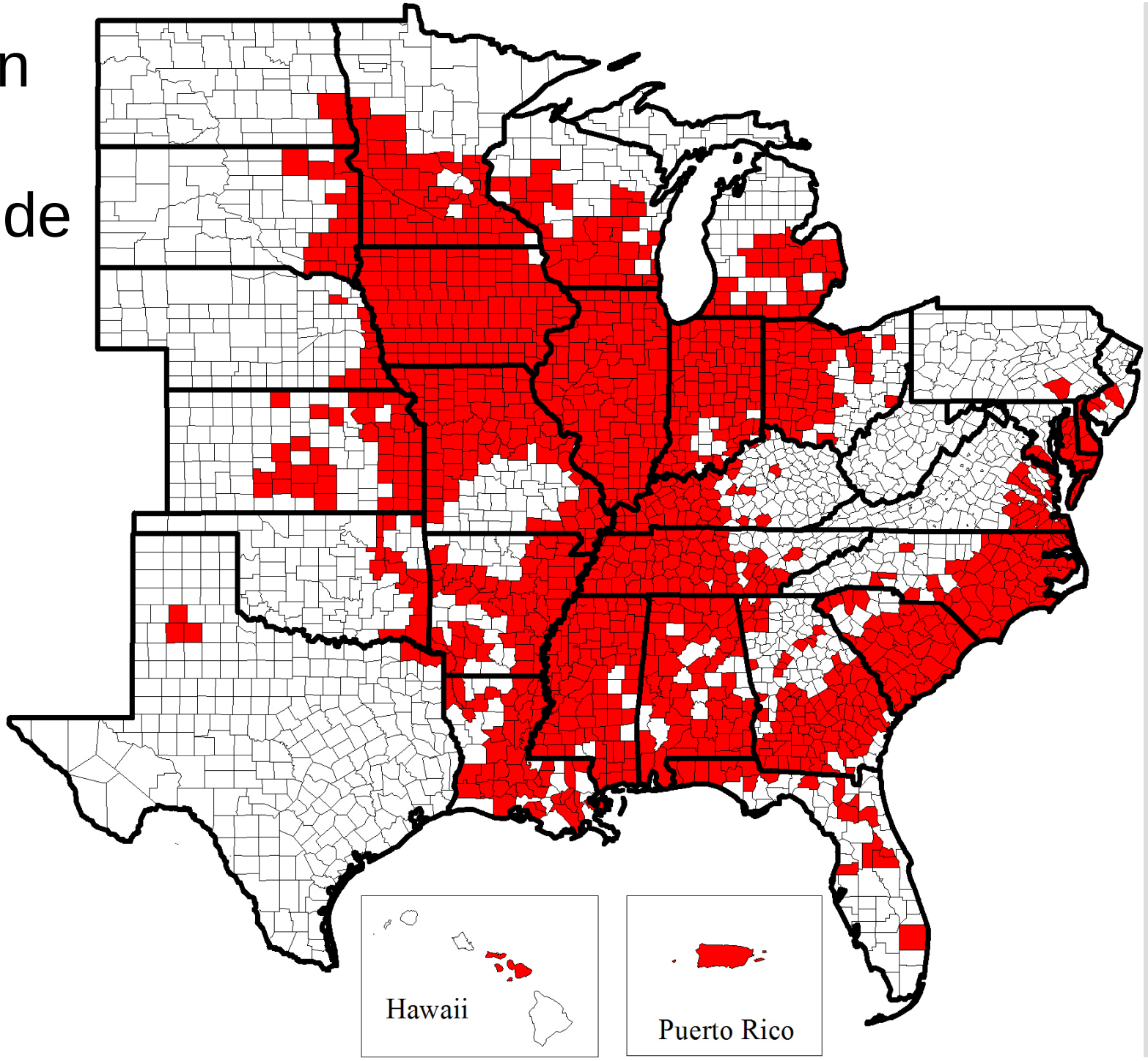


2009 Soybean Cyst Nematode Survey

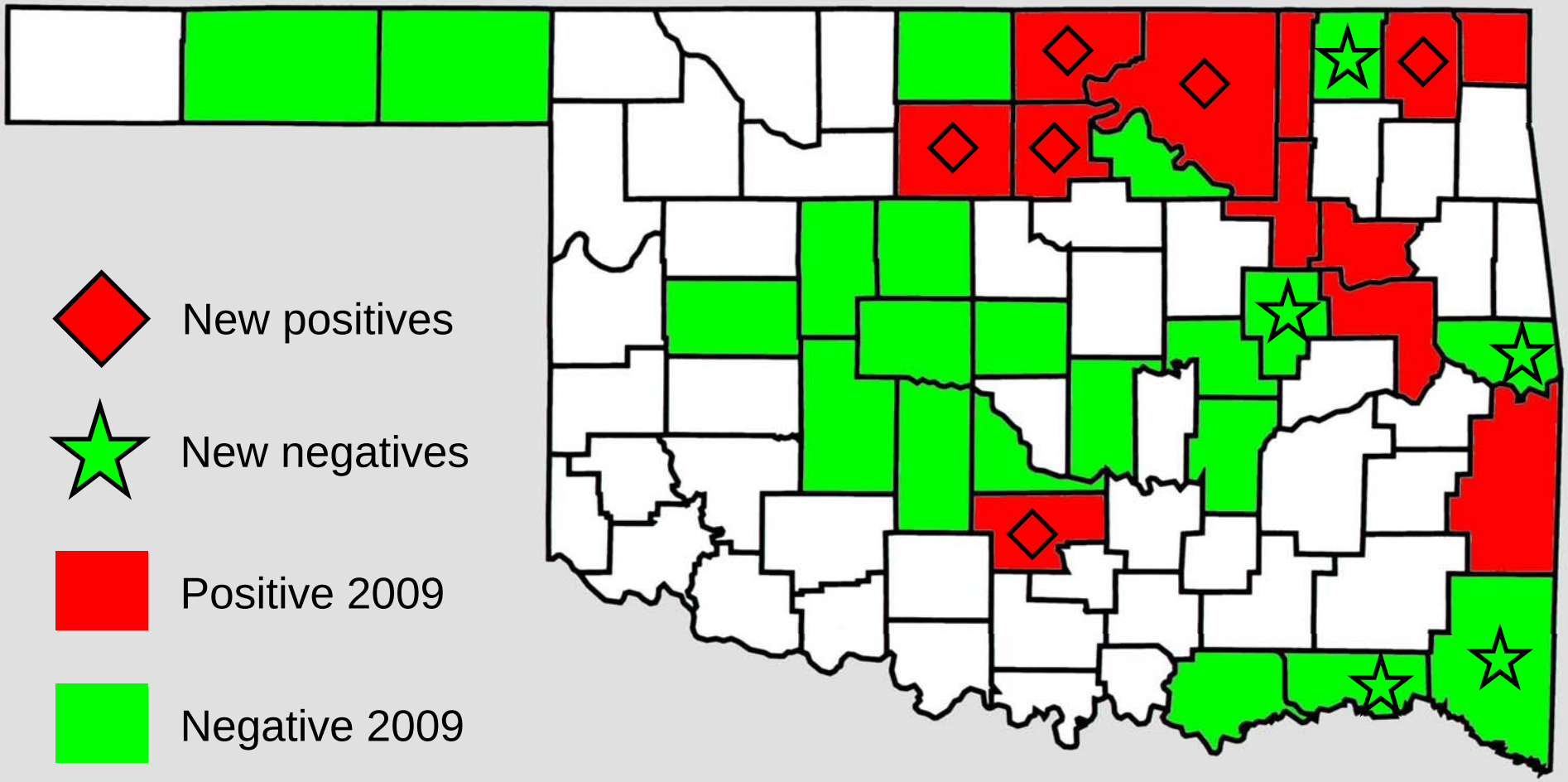
- JJ Stoekel undergrad ag business major
- Sampled 1 field/1000 acres
- Walked w-shaped pattern
- Took 6 to 8-inch soil cores from root zone
- Extracted, stained, and counted SCN eggs
- 265 fields
- 33 counties

Soybean Cyst Nematode

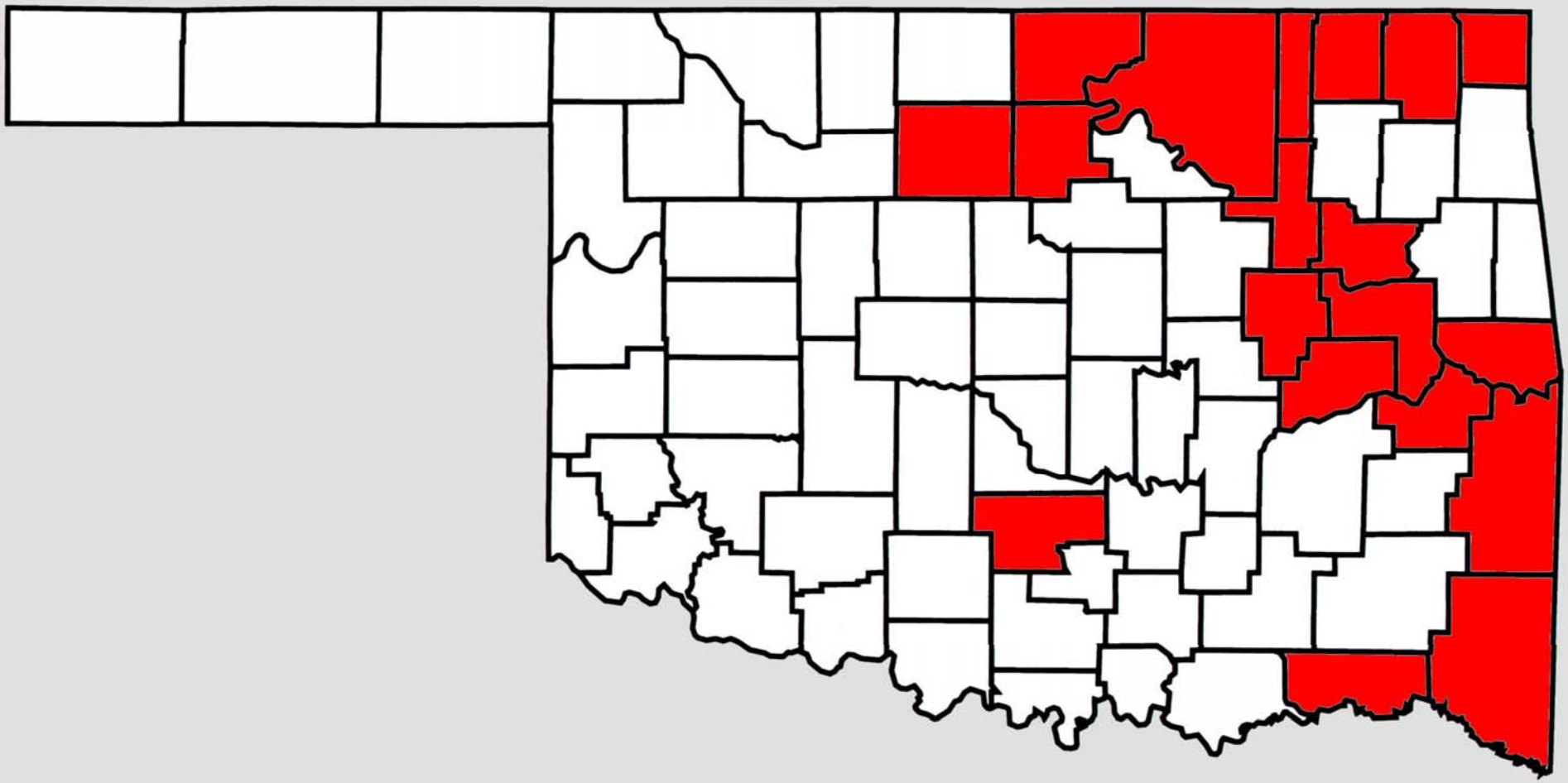
Sep 08



Soybean Cyst Nematode Distribution - 2009



Current SCN Distribution



Soybean Cyst Nematode Survey

- 45 of 265 fields positive = 17%
- 60 to 2603 eggs per ½ pt soil
- Six new positive counties
- Present in 19 counties

SCN Damage Thresholds for Susceptible Variety

SCN eggs per ½ pt soil	Yield loss (%)
0	0
1-500	0-5
501-1000	5-15
1000-3000	15-20
3001-5000	20-40
5000+	25-60

Soybean Cyst Nematode Management

- Crop rotation
- Resistant varieties
- Most RR varieties have resistance
- Rotate sources of resistance
  - PI 88788 most common
  - PI 548402 ‘Peking’
  - PI 437654 ‘Hartwig’

Stand establishment

- Temp and soil moisture
- Herbicide damage
- Seed bed conditions
- Seed quality
- Damping off / seedling disease

Effects of Seed Treatments and Planting Dates on Stand Establishment and Yield

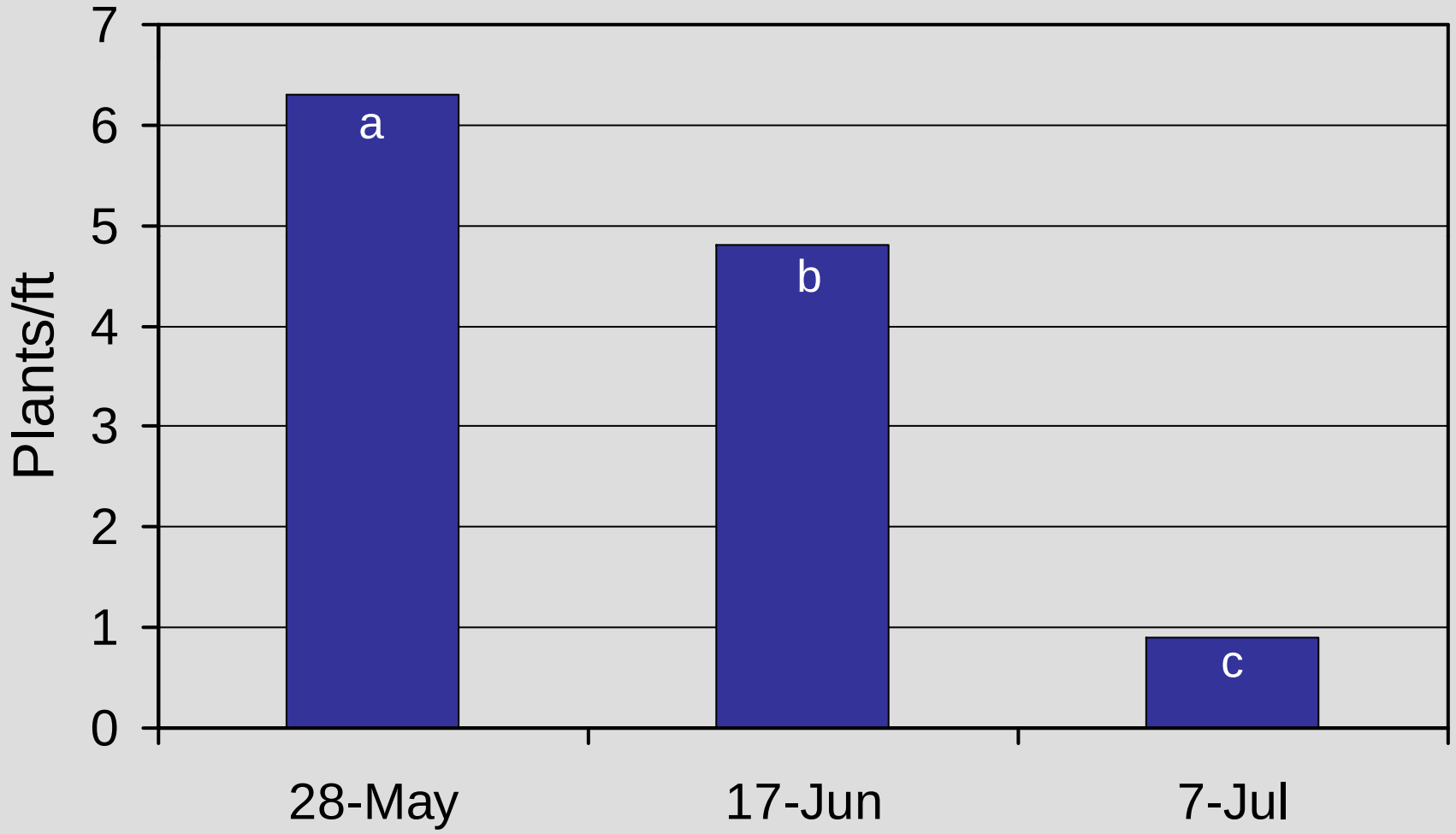
Location:	Cim Val Res Center - Perkins
Variety:	AG 5605 (MG 5.6)
Planting dates:	28 May
	17 June
	7 July
Treatments:	Untreated check
	Thiram 42S 2 fl oz
	Thiram 42S 2 fl oz + Allegiance FL 1.5 fl oz
Stand counts:	14 days after planting
Harvest:	13 Nov

Cimarron Valley Research Station - Perkins

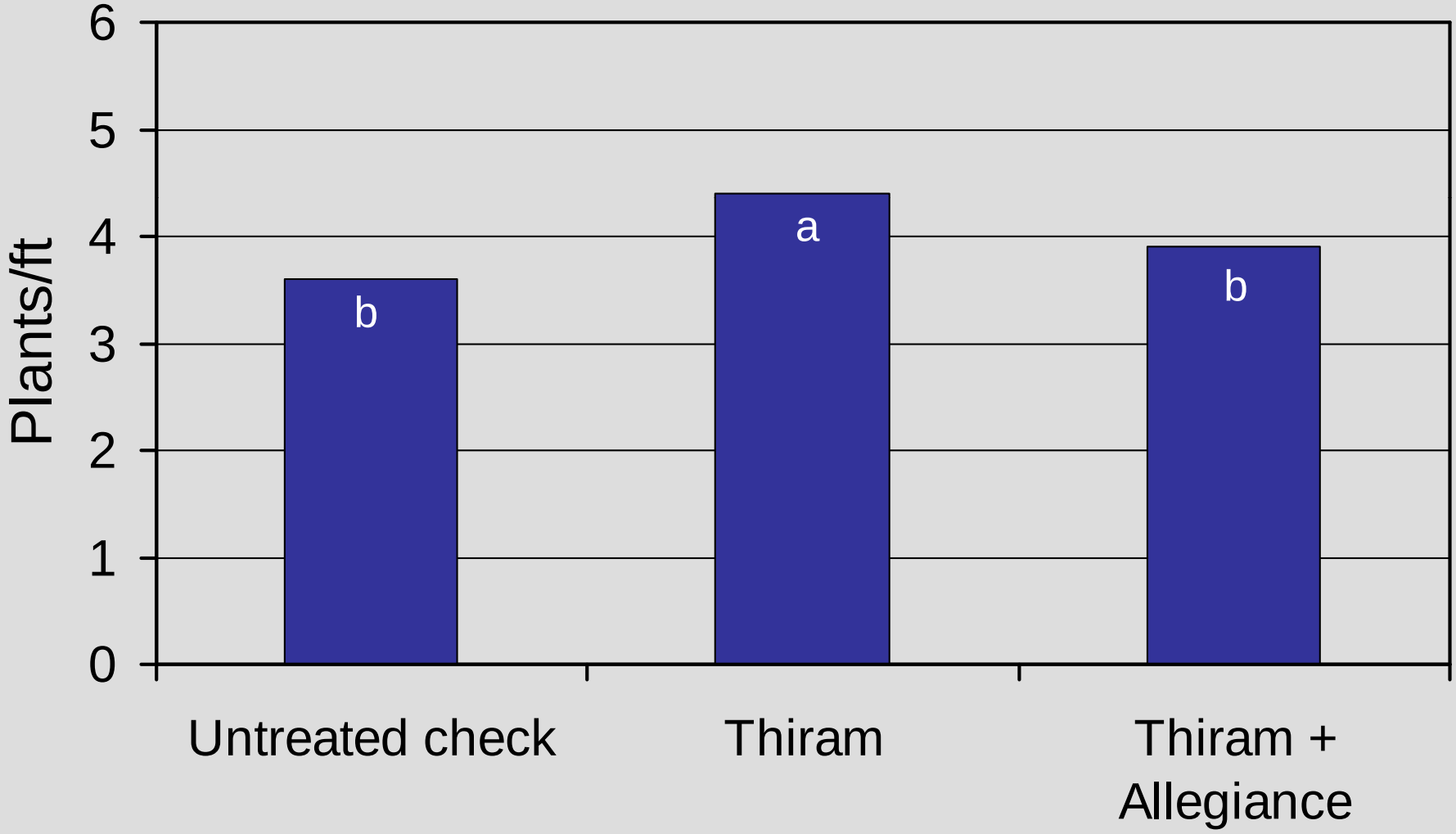
	Rain (in.)		Avg daily T (F)	
	2009	norm	2009	norm
June	1.94	5.02	80.4	77.0
July	5.15	2.61	80.6	82.3
Aug	5.19	3.12	77.5	81.7
Sep	3.43	3.76	69.4	73.3
Oct	7.19	3.58	54.5	62.2

14 days $\geq 100^{o}F$

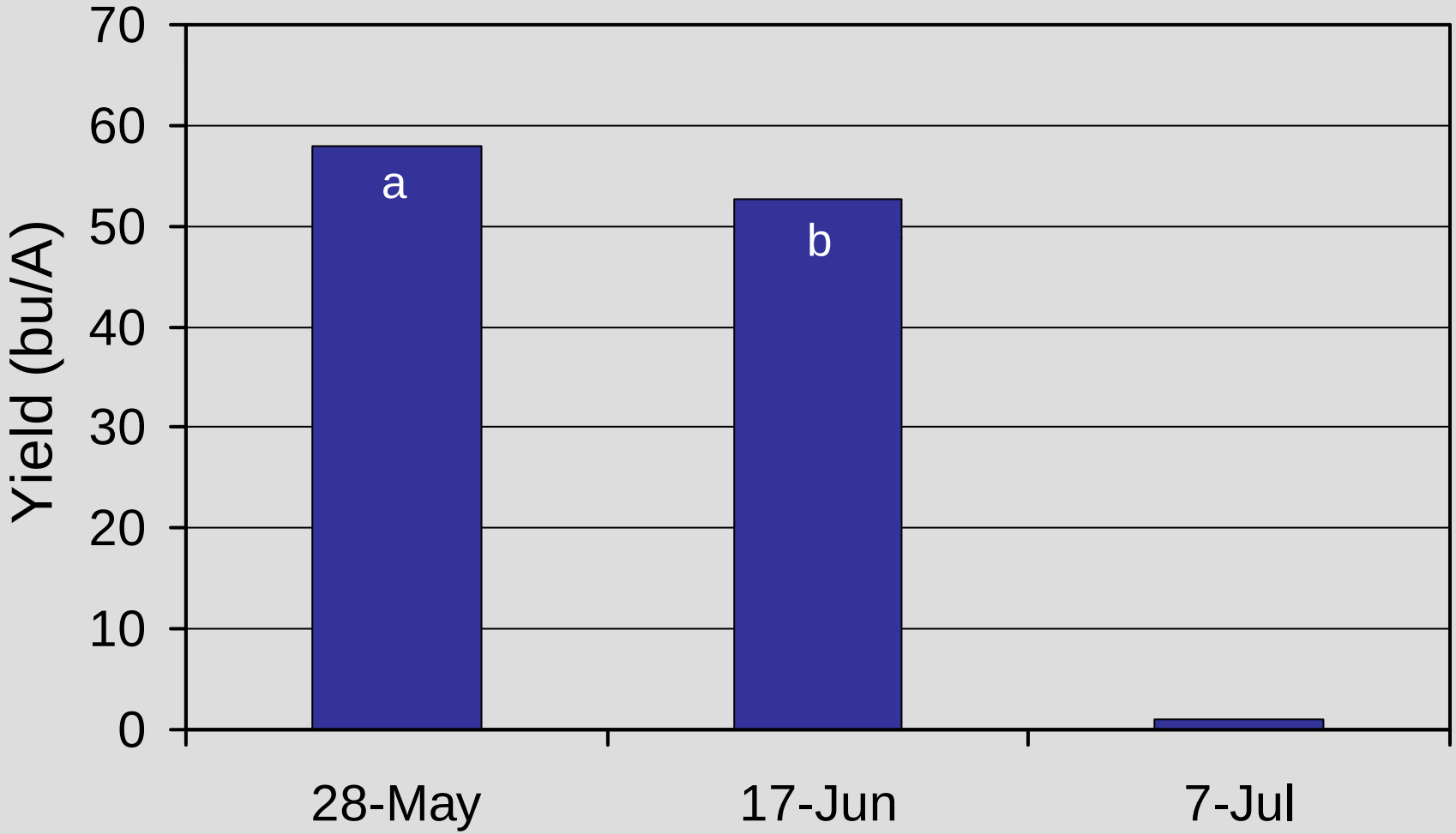
Effect of Planting Date on Soybean Stand Establishment



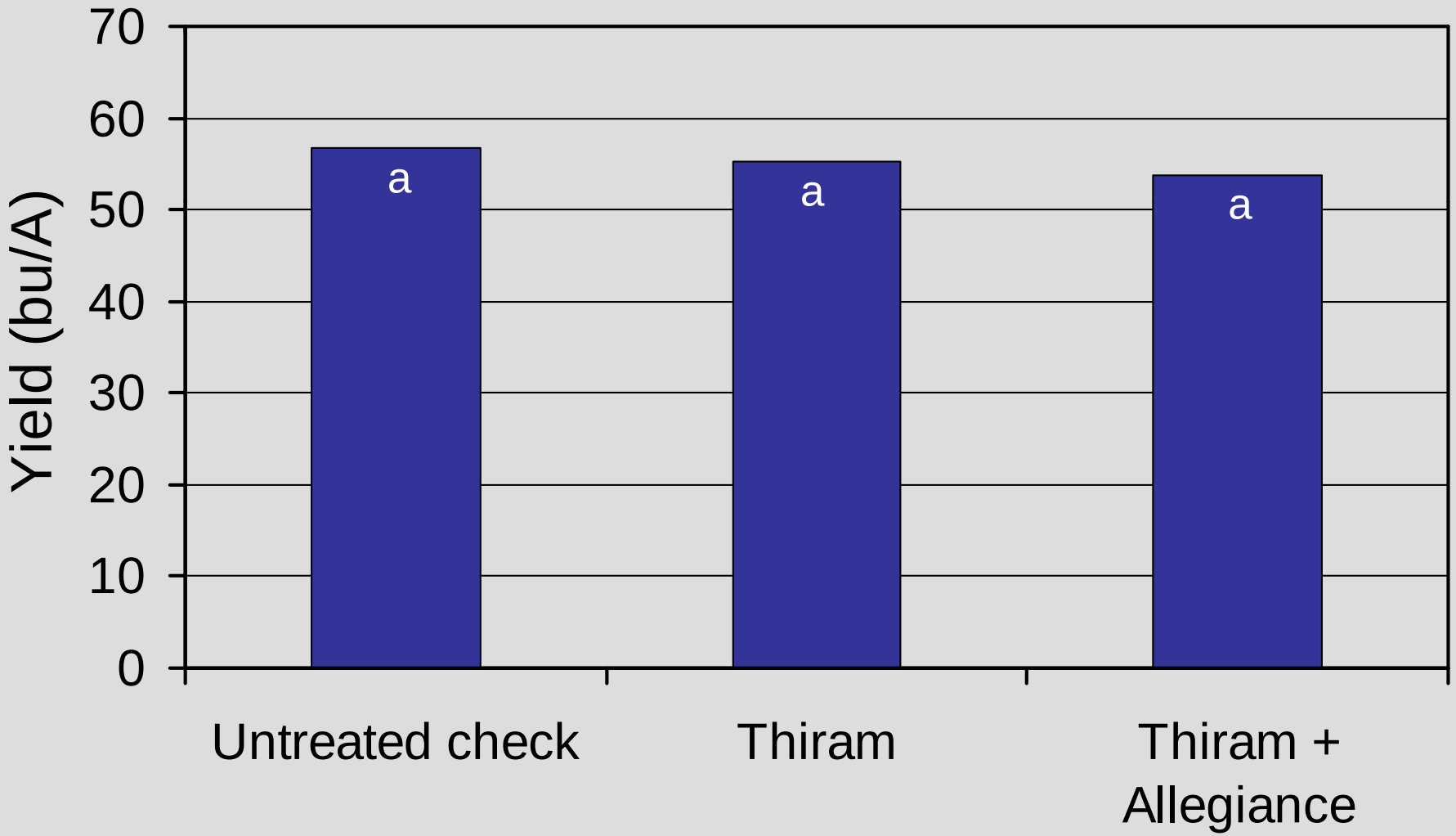
Effect of Seed Treatment on Soybean Stand Establishment



Effect of Planting Date on Soybean Yield



Effect of Seed Treatment on Soybean Yield



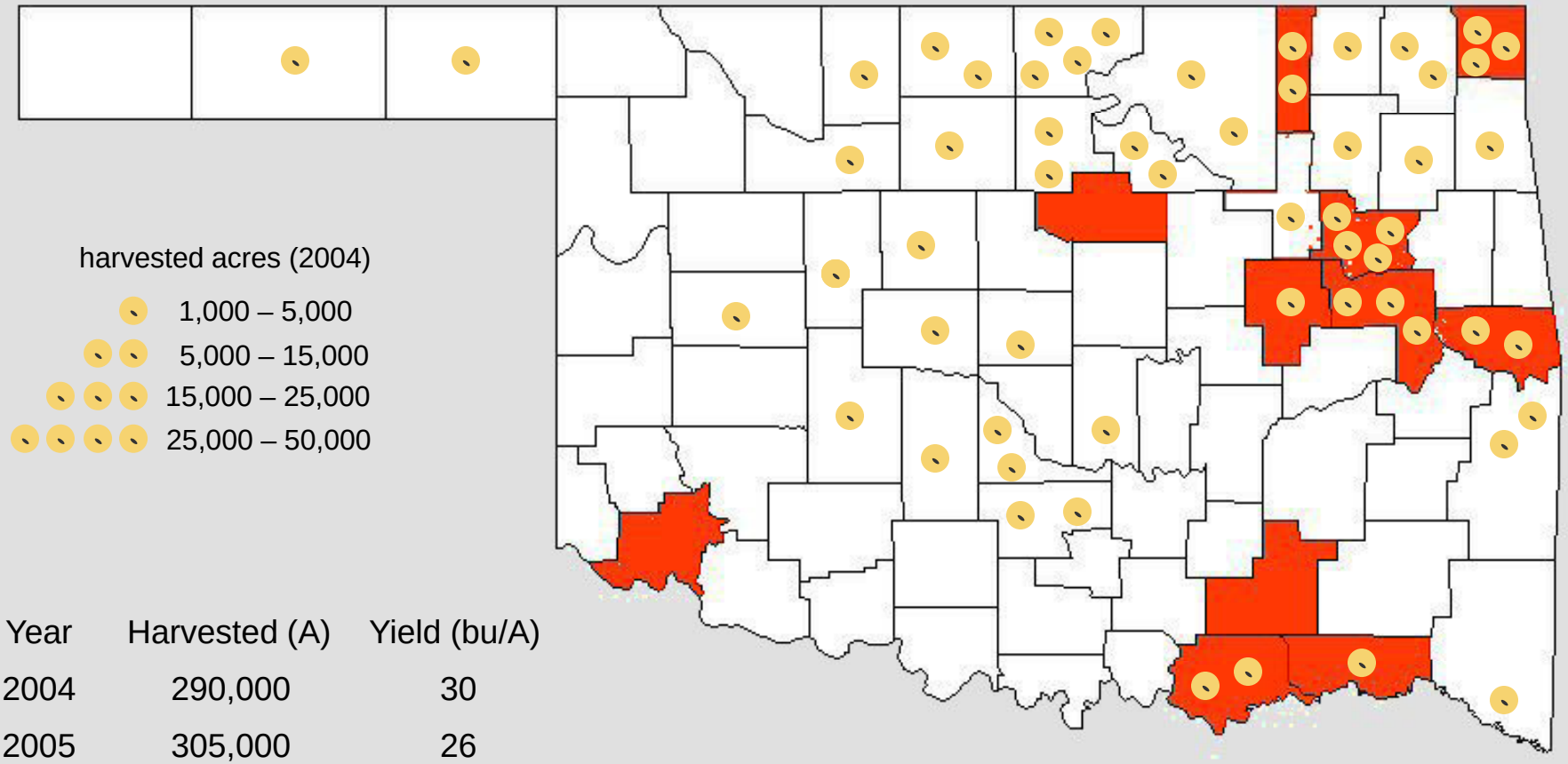
Stand establishment

- Temp and soil moisture
- Seed / soil contact
- Seed treatment when cool and wet ?

Disease Triangle

Bryan Co. Sentinel Plot

Soybean Production and Rust Monitoring

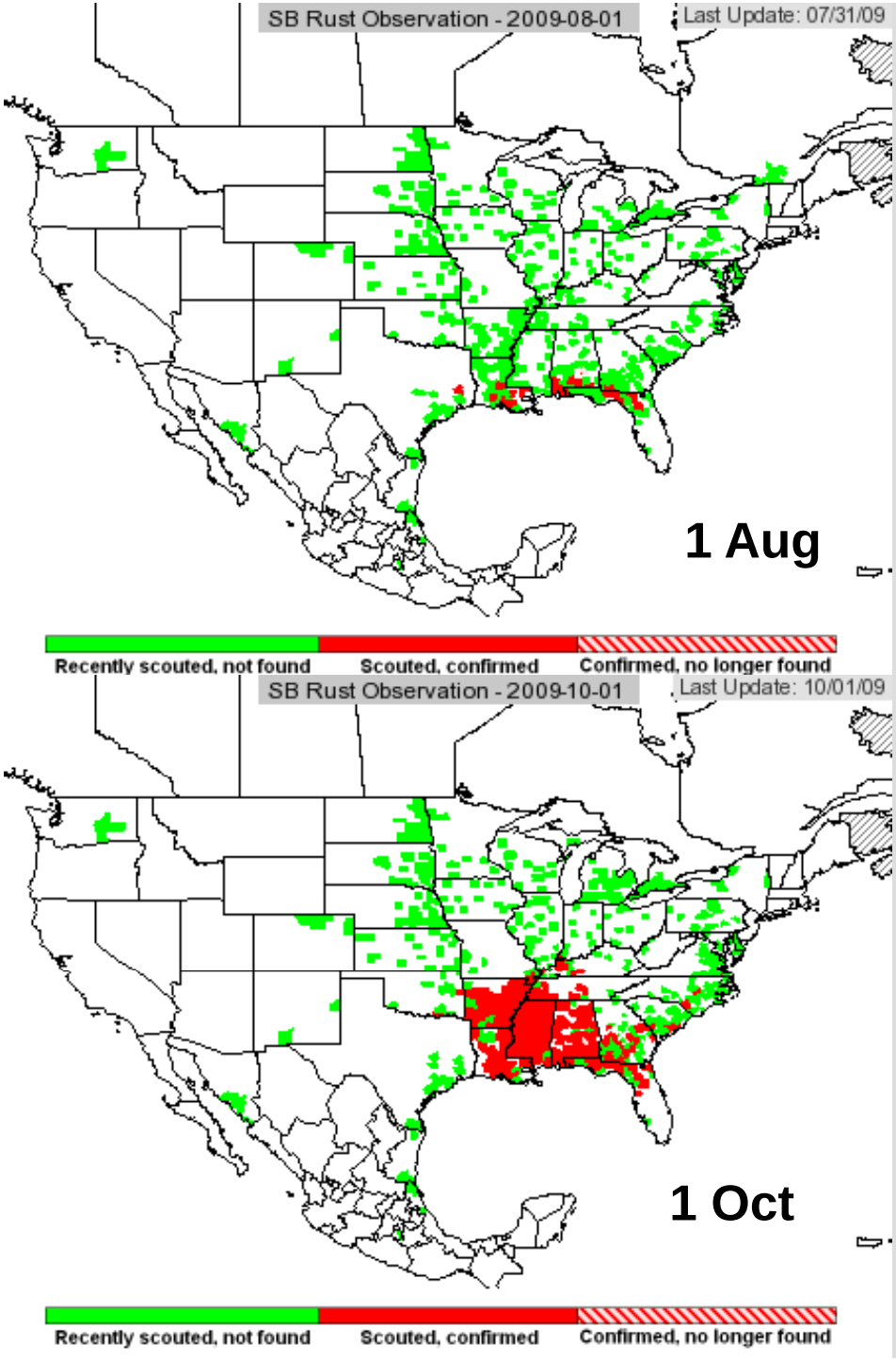


Year	Harvested (A)	Yield (bu/A)
2004	290,000	30
2005	305,000	26
2006	215,000	17
2007	180,000	26
2008	360,000	25
2008	370,000	28

ipmPIPE

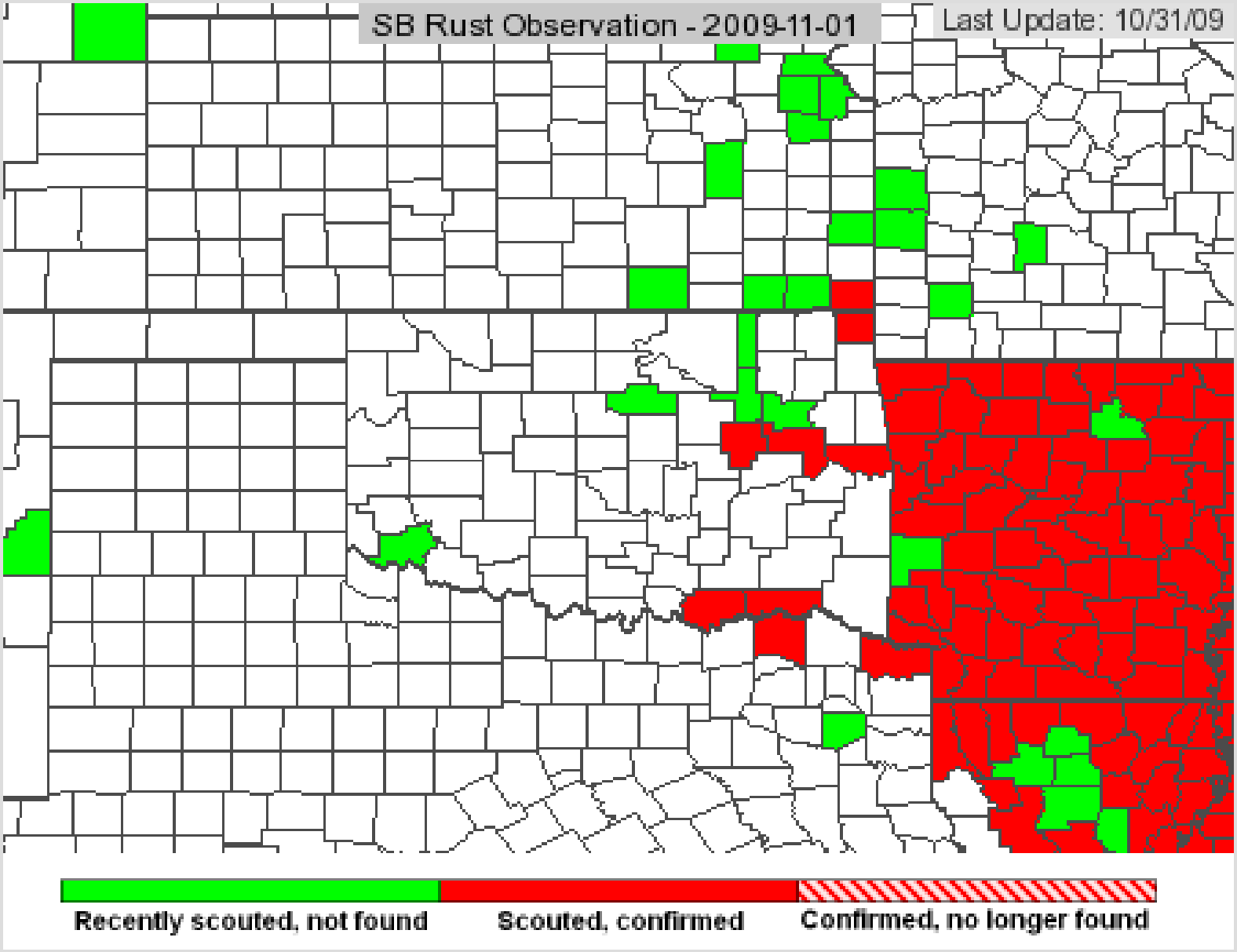
Pest Information Platform for Extension & Education

http://sbr.ipmpipe.org/


SB Rust Observation - 2009-08-01
Last Update: 07/31/09
1 Aug
Recently scouted, not found
Scouted, confirmed
Confirmed, no longer found
SB Rust Observation - 2009-09-01
Last Update: 09/01/09
1 Sep
Recently scouted, not found
Scouted, confirmed
Confirmed, no longer found
SB Rust Observation - 2009-10-01
Last Update: 10/01/09
1 Oct
Recently scouted, not found
Scouted, confirmed
Confirmed, no longer found
SB Rust Observation - 2009-11-01
Last Update: 10/31/09
1 Nov
Recently scouted, not found
Scouted, confirmed
Confirmed, no longer found

2009 SBR Outbreak

Date	County	Growth stage
22 Sep	Sequoyah	R4
23 Sep	Bryan	R4
24 Sep	Okmulgee	R5
30 Sep	Choctaw	R6
5 Oct	Ottawa	R7
12 Oct	Muskogee	R6



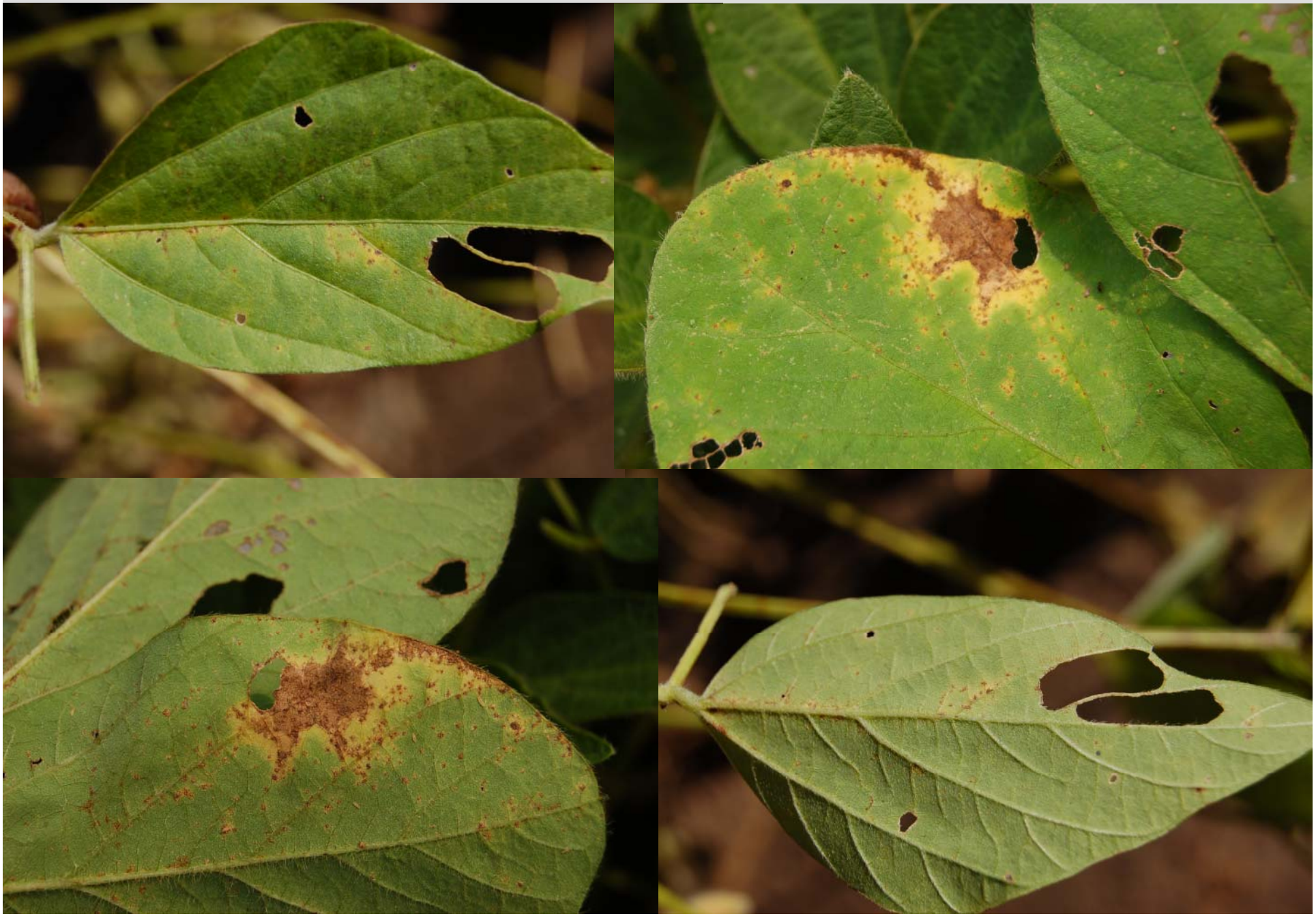
Killing freeze 25-26 Nov

Rust is difficult to identify

Rick Grantham, Director
OSU Plant Disease and Insect Diagnostic Laboratory

300 samples in 2007
141 samples in 2008
152 samples in 2009

Soybean Rust

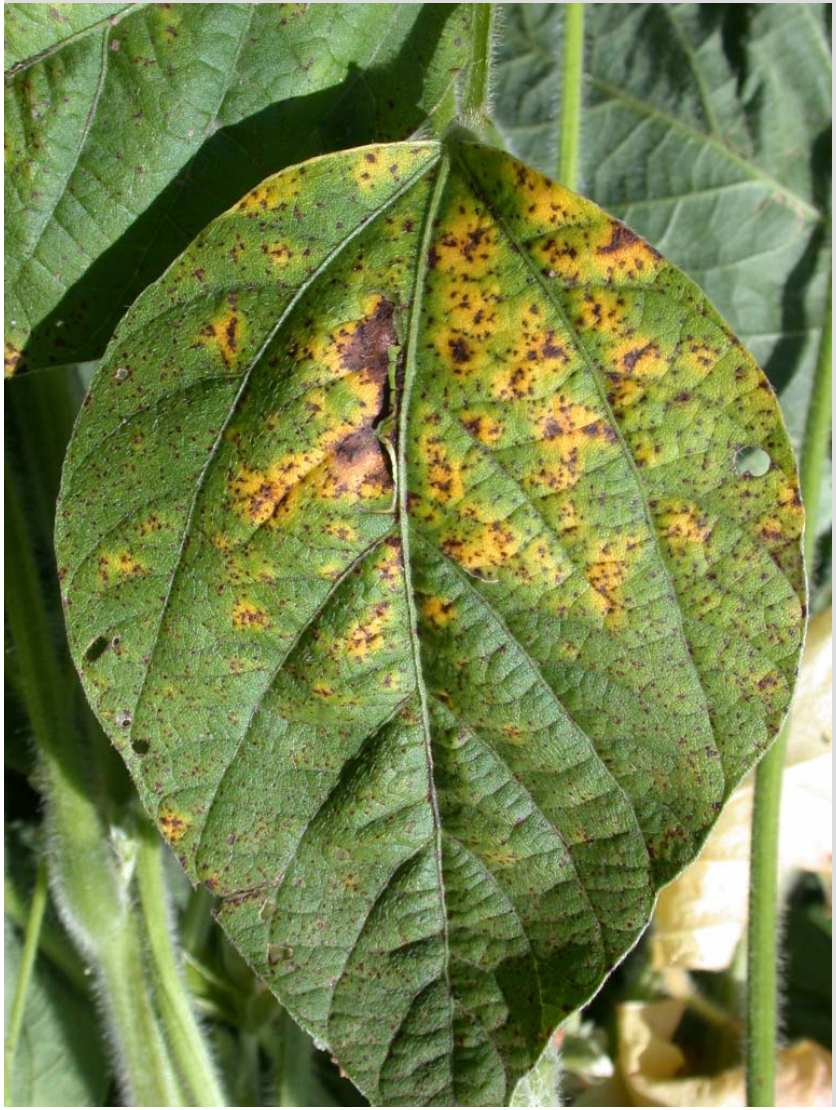


Soybean Rust

Soybean Rust

Other Common Foliar Diseases

Brown spot

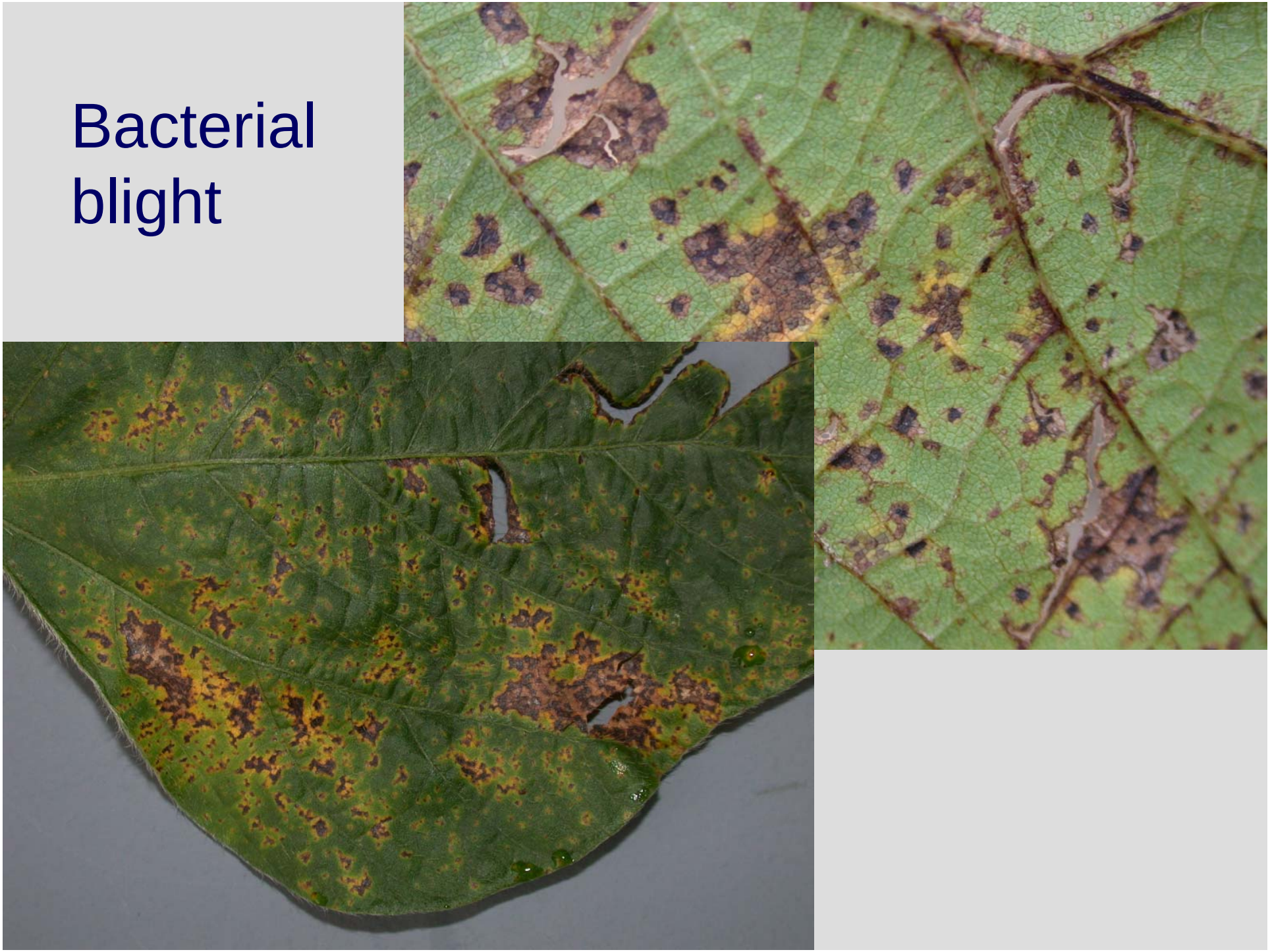


Cercospora blight
Purple seed stain

Downy mildew

Frogeye leaf spot

Bacterial blight



SBR Management Recommendation

- Growth stage R1-R5
- Good yield potential (25-30 bu/A)
- Rust identified in vicinity
- Spray!

Soybean Fungicide Trials

Fungicide Trials - 2009

Fungicide	R3	R5
Check		
Strobilurin	X	
Triazole	X	
Pre-mix	X	
Strobilurin	X	X
Strobilurin / Triazole	X	X
Triazole	X	X

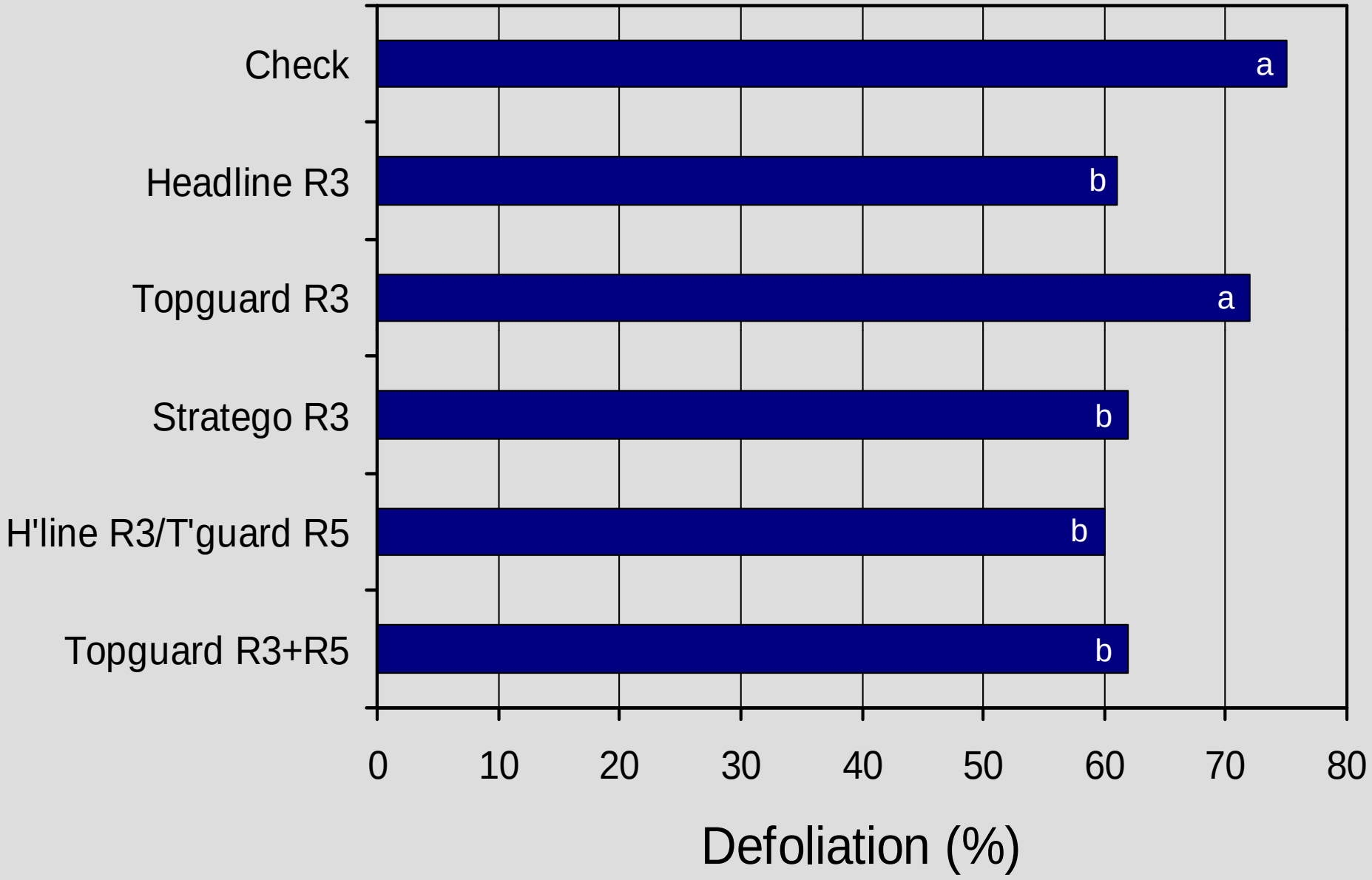
Fungicide Trials - 2009

Fungicide	Brand
Strobilurin	Headline 6 fl oz
Triazole	Topguard 6.2 fl oz
Pre-mix	Stratego 8 fl oz

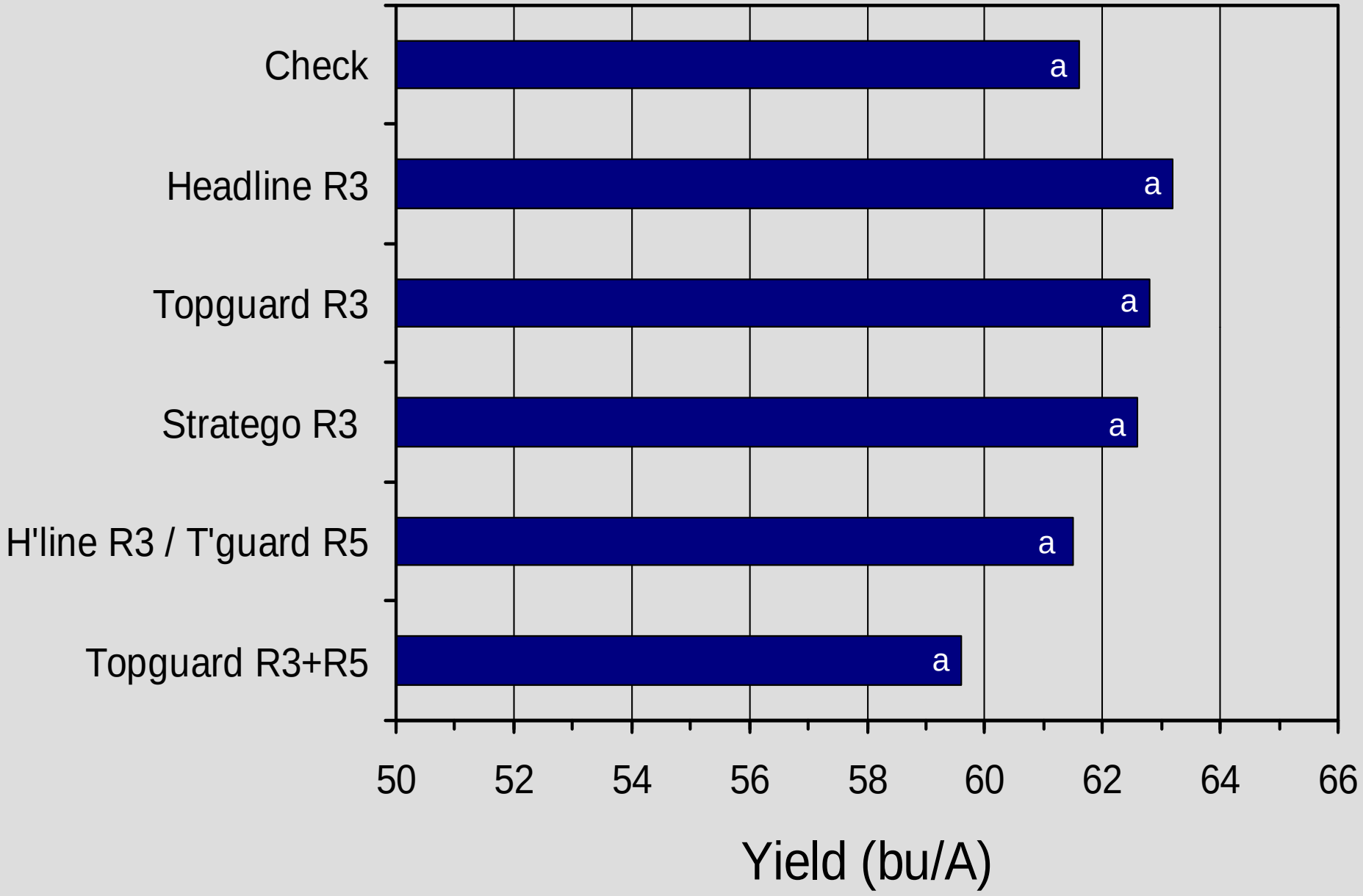
Fungicide Trials - 2008

- Bixby (Tulsa Co.)
- Perkins (Payne Co.)
- Miami (Ottawa Co)
- Planted 28 May - 2 June
- No rust or frogeye
- Bacterial blight, brown spot, Cercospora blight
- Harvested in Nov

Soybean Fungicide Trials - 2009



Soybean Fungicide Trials - 2009



Strobilurin fungicides

- Frac MOA Group 11
- Inhibit fungal respiration
- Broad spectrum
  - rusts
  - leaf spots
  - powdery mildews
- Labeled for disease control
- New label for “plant health”

Headline®
fungicide

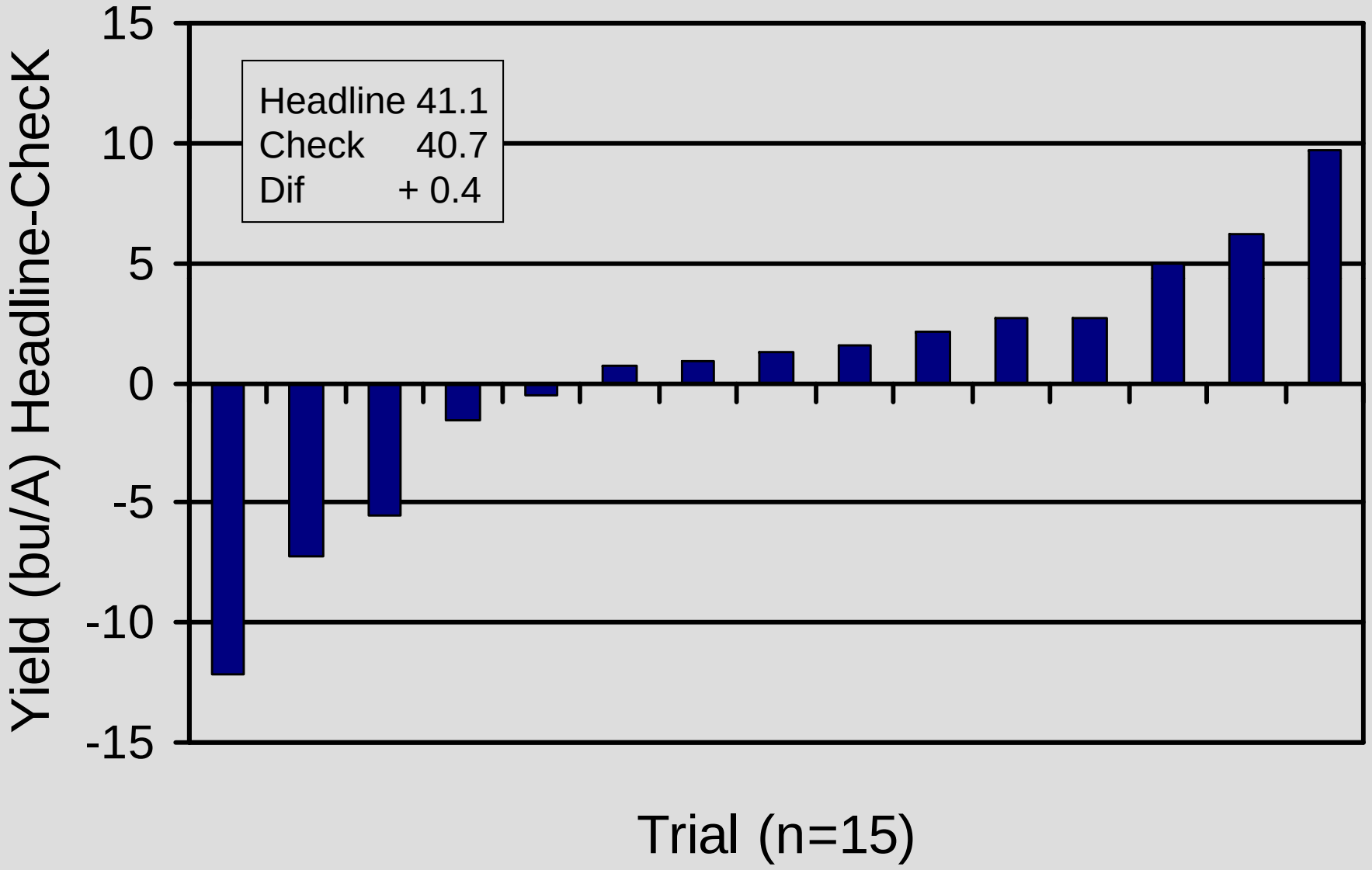
For use in disease control and plant health in the following crops:

Barley, citrus fruit, corn (all types), dried shelled peas and beans, edible podded legume vegetables, grass grown for seed, mint, peanut, pecan, rye, soybean, succulent shelled peas and beans, sugar beet, sunflower, tuberous and corm vegetables (includes potato), wheat, and triticale.

Preventive applications of **Headline** optimize disease control and provide improved plant health. The plant health benefits may include improved host plant tolerance to yield-robbing environmental stresses, such as drought, heat, cold temperatures, and ozone damage. **Headline** can improve plant utilization of nitrogen and can increase tolerance to bacterial and viral infections. These benefits often translate to healthier plants producing greater yields at harvest, especially under stressful conditions. Additional examples of specific benefits that can occur include:

Ottawa Co - 2007

Headline Yield Response - OK (2004 to 2009)



To spray or not to spray?

SBR Management Recommendation

- Growth stage R1-R5
- Good yield potential (>25-30 bu/A)
- Rust identified in vicinity
- Spray!

Also spray at R3 if frogeye leaf spot is present

Growth Stages

R3

R6

Will rust be a problem in 2010?

Monitoring program in 2010

- 8-10 sentinel plot locations
- Funded by NCSRP
- Weekly updates on sbr.ipmpipe.org
- Scouting is mostly a waste of time
- Sampling is not a waste of time
- 25 leaves from lower canopy
- Overnight mail or bring to PDIDL