

# Managing Nematodes in Cotton and Soybean

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2018 Mississippi State University Row Crops Short Course  
Starkville, MS

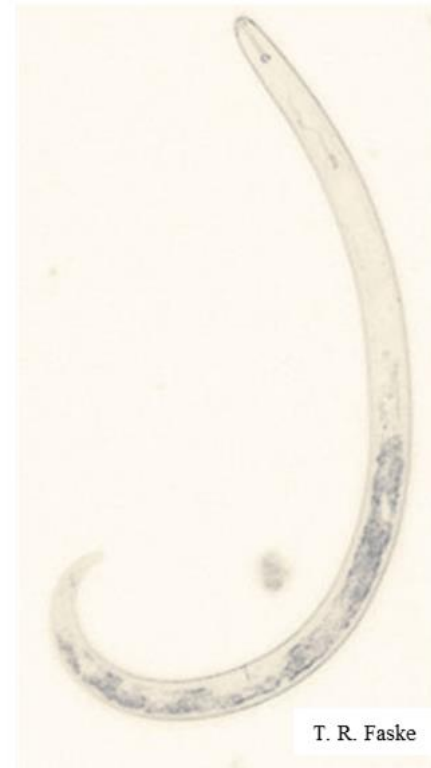
# 40 species of cotton or soybean nematodes reported in the Mid-South

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Southern root-knot nematode  
(*Meloidogyne incognita*)



Reniform nematode  
(*Rotylenchulus reniformis*)





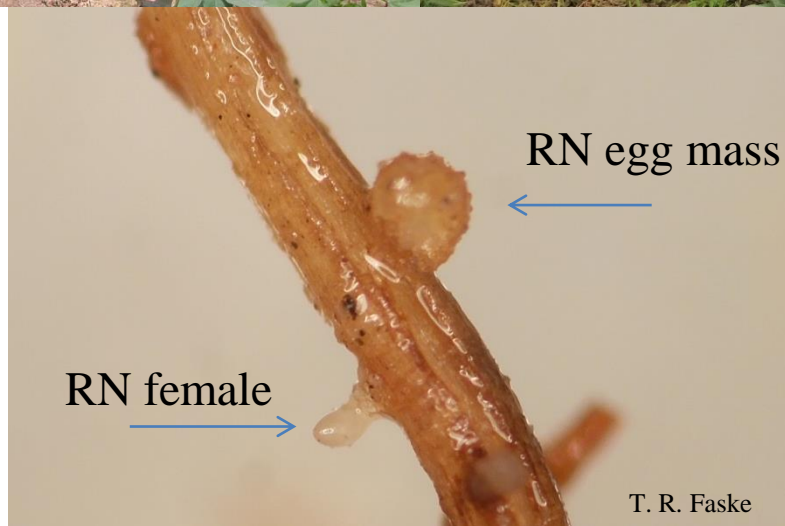
T. R. Faske



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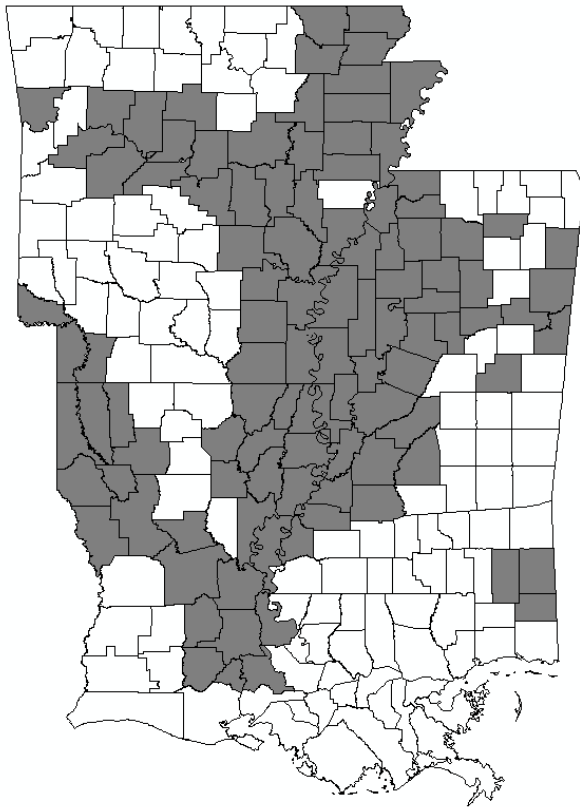


T. R. Faske

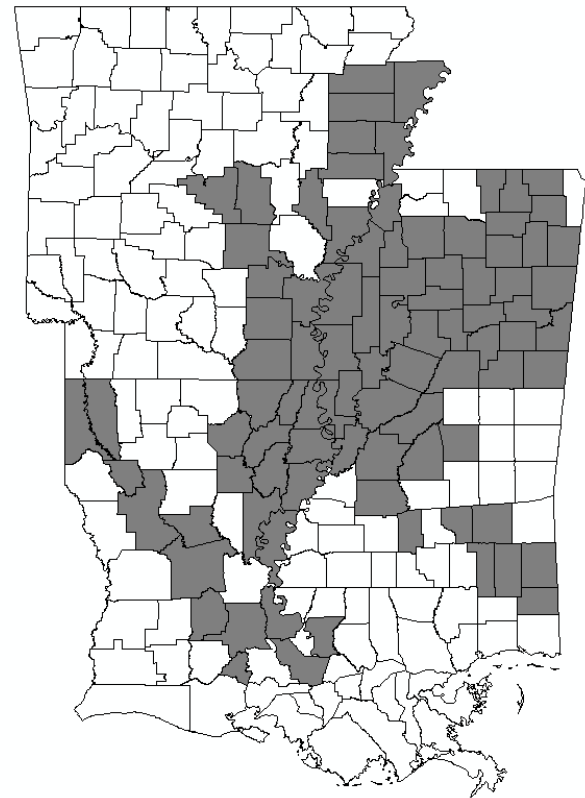


# Distribution of RKN and RN in the Mid-South

## Southern root-knot nematode (*Meloidogyne incognita*)



## Reniform nematode (*Rotylenchulus reniformis*)



# Nematode Thresholds

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**Fall** nematode population density damage thresholds

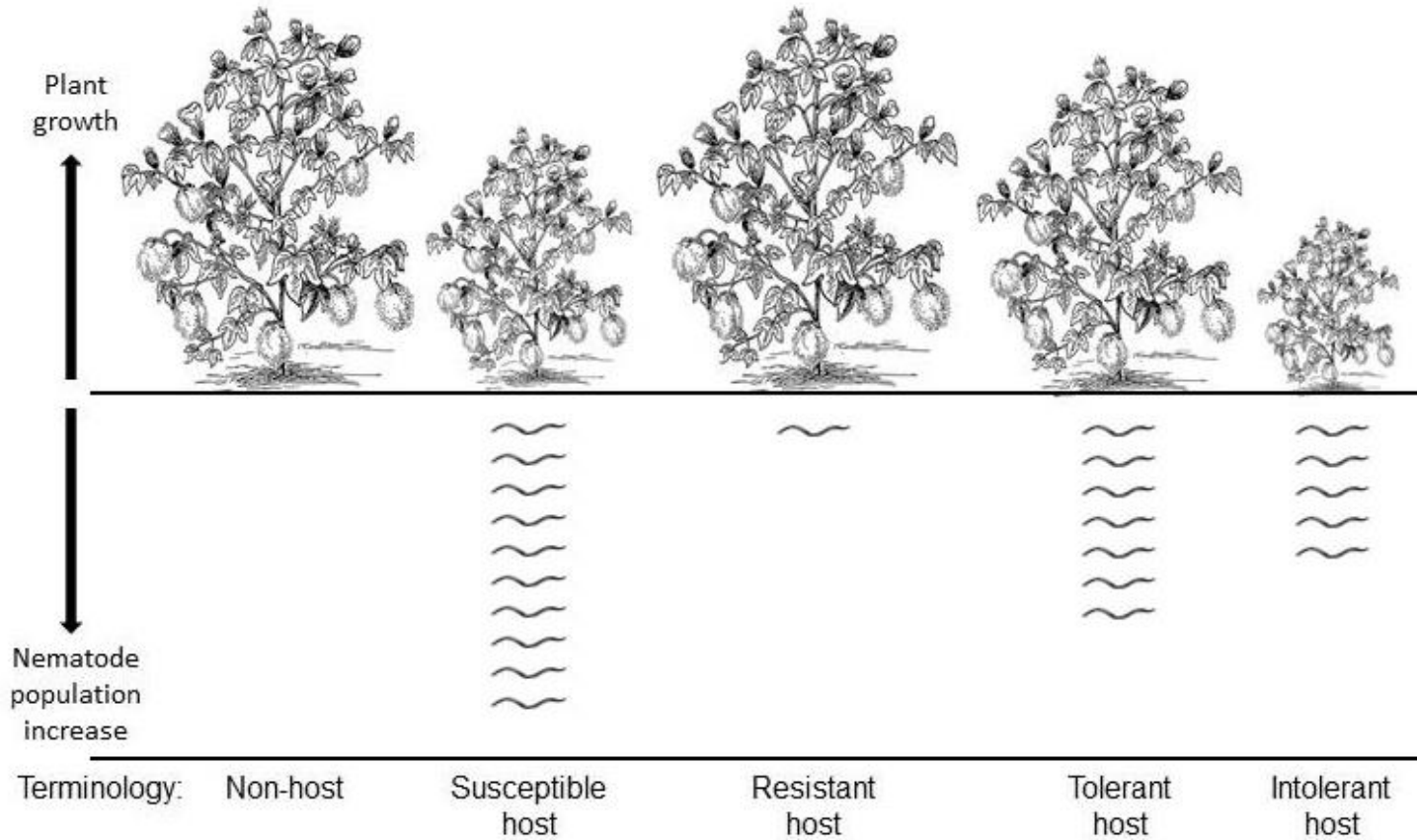
Nematode	Cotton	Soybean
Southern root-knot	50-100 <sup>a</sup>	60 <sup>a</sup>
Reniform	250-500	1000

<sup>a</sup> individuals per 100cm<sup>3</sup> soil

<http://www.cottoninc.com/fiber/AgriculturalDisciplines/Nematology/2012-Managing-Nematodes/2012-Managing-Nematodes-PDF.pdf>

<https://www.uaex.edu/publications/pdf/mp197/chapter10.pdf>

# Crop Rotation and Resistance



# Rotation with a non-host crop

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Southern root-knot nematode  
(*Meloidogyne incognita*)



Reniform nematode  
(*Rotylenchulus reniformis*)





# Some cotton cultivars with resistance to RKN

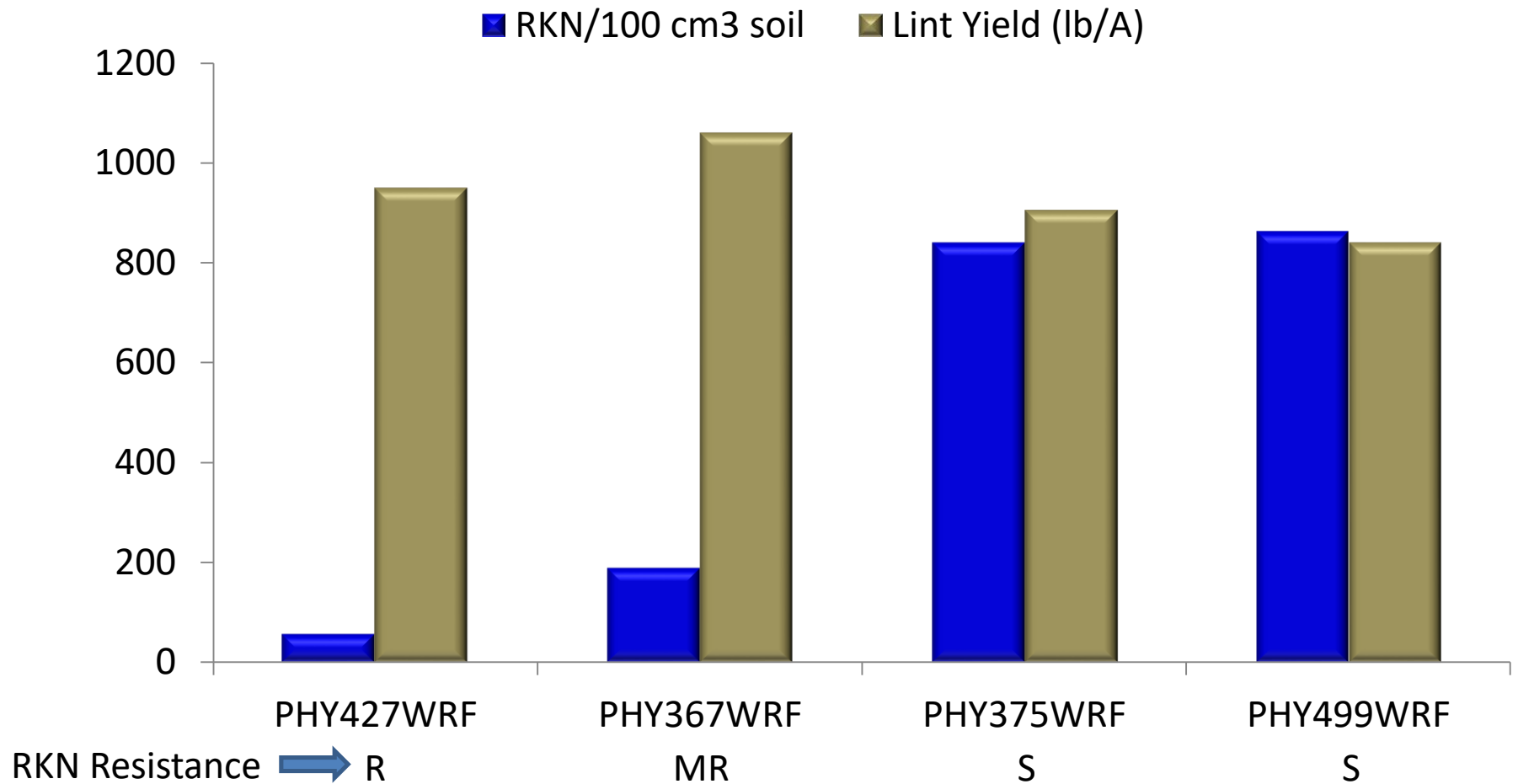
Moderately Resistant (1 gene)	Resistant (2 genes)
ST 4946 GLB2	PHY 417 WRF
PHY 320 W3FE <sup>a</sup>	PHY 427 WRF
PHY 367 WRF <sup>a</sup>	PHY 480 W3FE
PHY 430 W3FE <sup>a</sup>	DP 1354 NRB2RF
PHY 440 W3FE <sup>a</sup>	DP 1558 NRB2RF
PHY 487 WRF	DP 1747 NRB2XF

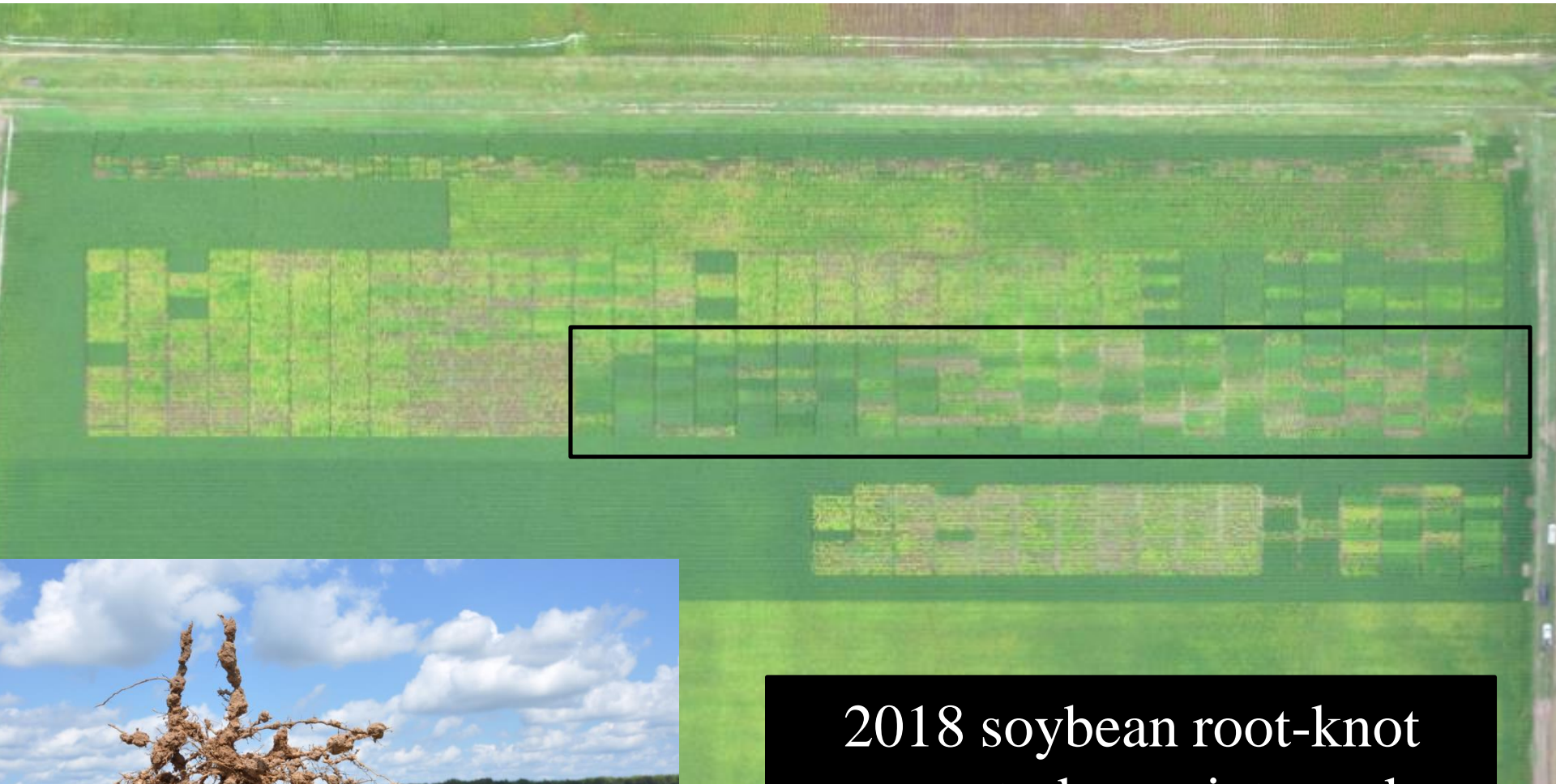
<sup>a</sup> Two genes with one segregating

**No resistant cultivars available against RN**

# Cotton Variety Trial

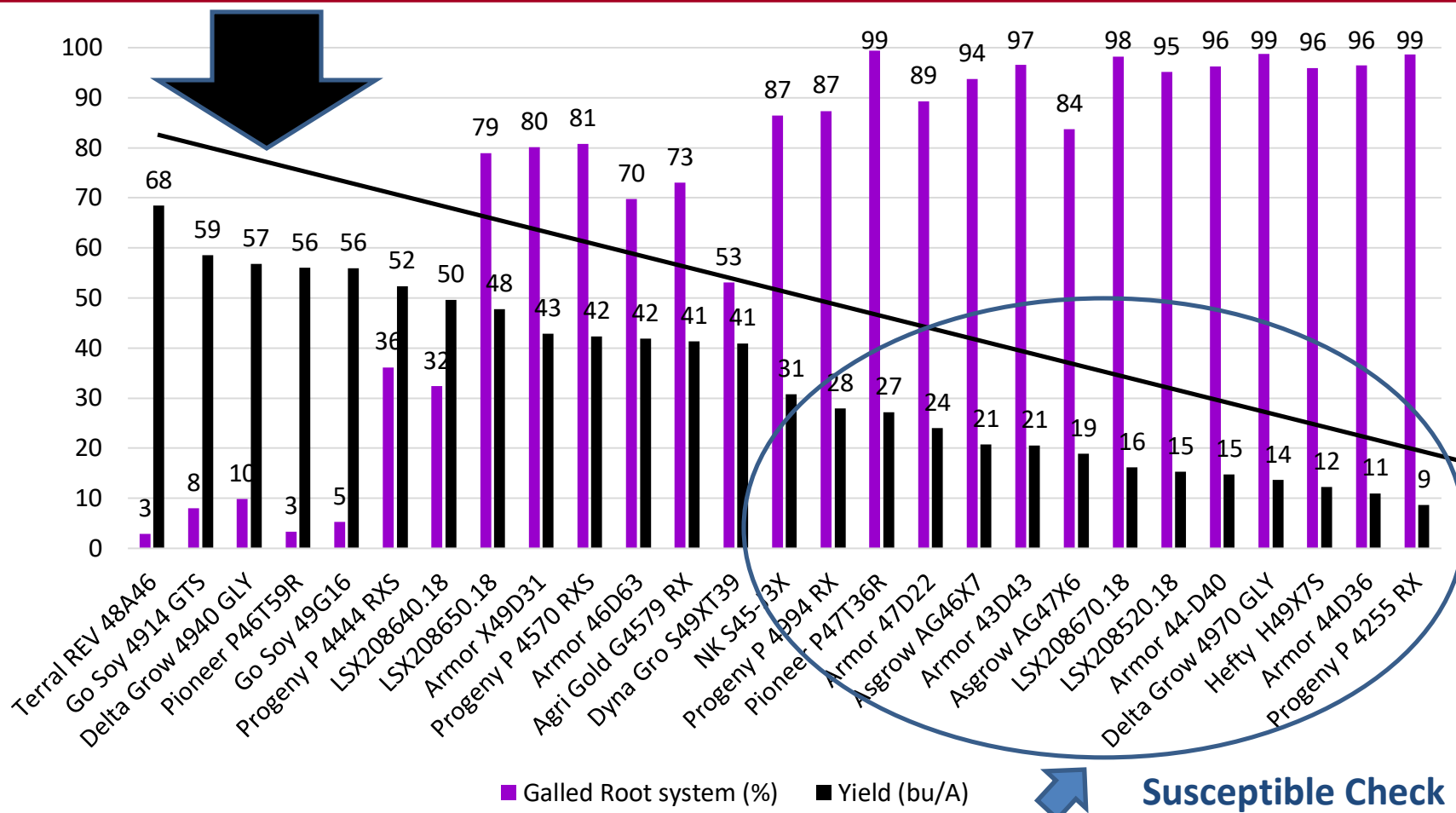
2013 - St. Joseph, LA, Clarkton, MO & Leachville, AR





2018 soybean root-knot  
nematode variety and  
nematicide trials

# Field performance of several RR and Xtend MG IV soybean cultivars in southern RKN field (2018)



Data available on [www.arkansascrops.com](http://www.arkansascrops.com)



# RN resistant soybean varieties (greenhouse test)

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MG IV	MG V
Go Soy 49G16	Go Soy 5214 GTS
Delta Grow DG 4995	Armor AR5206C
Dyna-Gro S49XS76	

Resistance similar to that of Anand and Hartwig (resistant control)  
Robbins, R. T. et al. 2017 Beltwide Cotton Proceedings

# Nematicides

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Often used when resistance and rotation options are limited or multiples nematode species present

# Soil- and seed-applied nematicides registered for use in cotton

Trade Name	Active Ingredient	Mode of Action	Signal Word
AgLogic 15GG	Aldicarb	Cholinesterase inhibition	Danger
Velum Total	Fluopyram + imidacloprid	SDHI enzyme inhibitor	Caution
Avicta	Abamectin	Inhibit nerve transmission	Danger
Aeris	Thiodicarb + imidacloprid	Cholinesterase inhibition	Caution
COPeO Prime	Fluopyram	SDHI enzyme inhibitor	Caution
NemaStrike ST	Tioxazafen	Mitochondrial translation inhibitor	Caution

- Telone II, Vapam, and K-Pam
- AgLogic, Velum Total
- Avicta, Aeris, COPeO, NemaStrike, VOTiVO, BioST
- Vydate C-LV

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<b>NemaStrike ST</b>	Tioxazafen	Mitochondrial translation inhibitor	Caution
<b>VOTiVO</b>	<i>Bacillus firmus</i> I-1582	Repels nema and affect motility	Caution
<b>BioST Nematicide</b>	<i>Burkholderia</i> spp. A496	???	Caution

Telone II, Vapam, and K-Pam

AgLogic, Velum Total

Avicta, Aeris, COPeO, NemaStrike, VOTiVO, BioST

Vydate C-LV



# National Cotton Council, Nematode Research and Education Committee, 2017

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Travis Faske, University of Arkansas

Tom Allen and Gary Lawrence, Mississippi State University

Kathy Lawrence, Auburn University

Hillary Mehl, Virginia Tech

Charles Overstreet, Louisiana State University

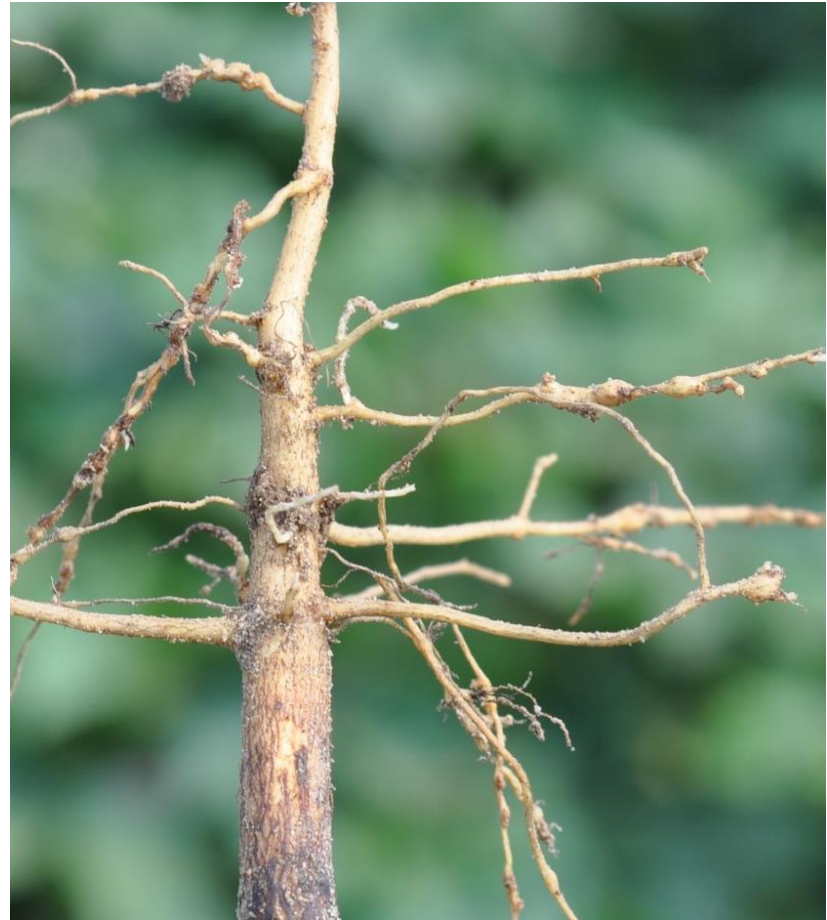
Terry Wheeler, Texas A&M University

**Objective: What is impact of seed-applied and soil-applied nematicides in cotton**

# RKN Infection

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- 45-60 days after planting
  - Gall counts per root system
  - Percent root system galled
  - Gall rating (0-9 or 0-5)
  - Eggs per g of root

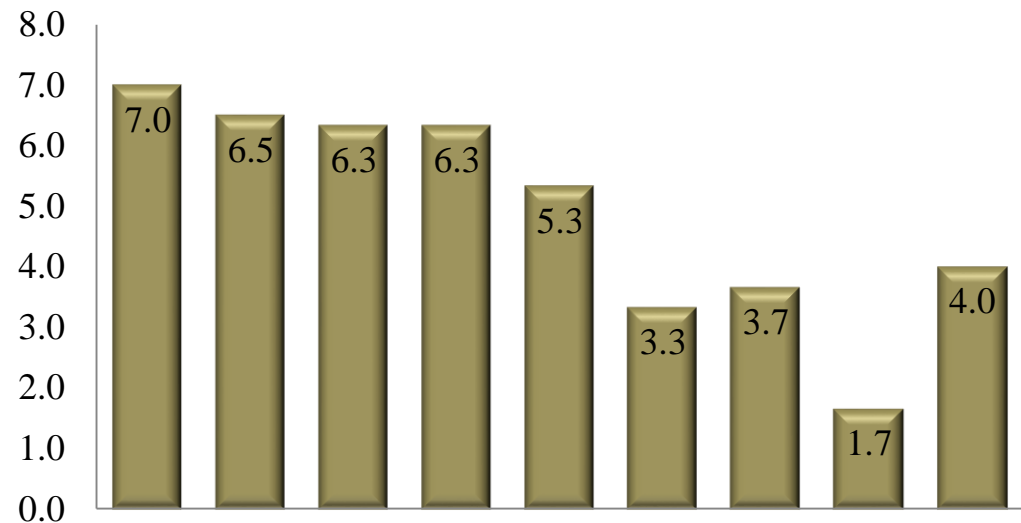


# 2017 RKN Infection Ranking

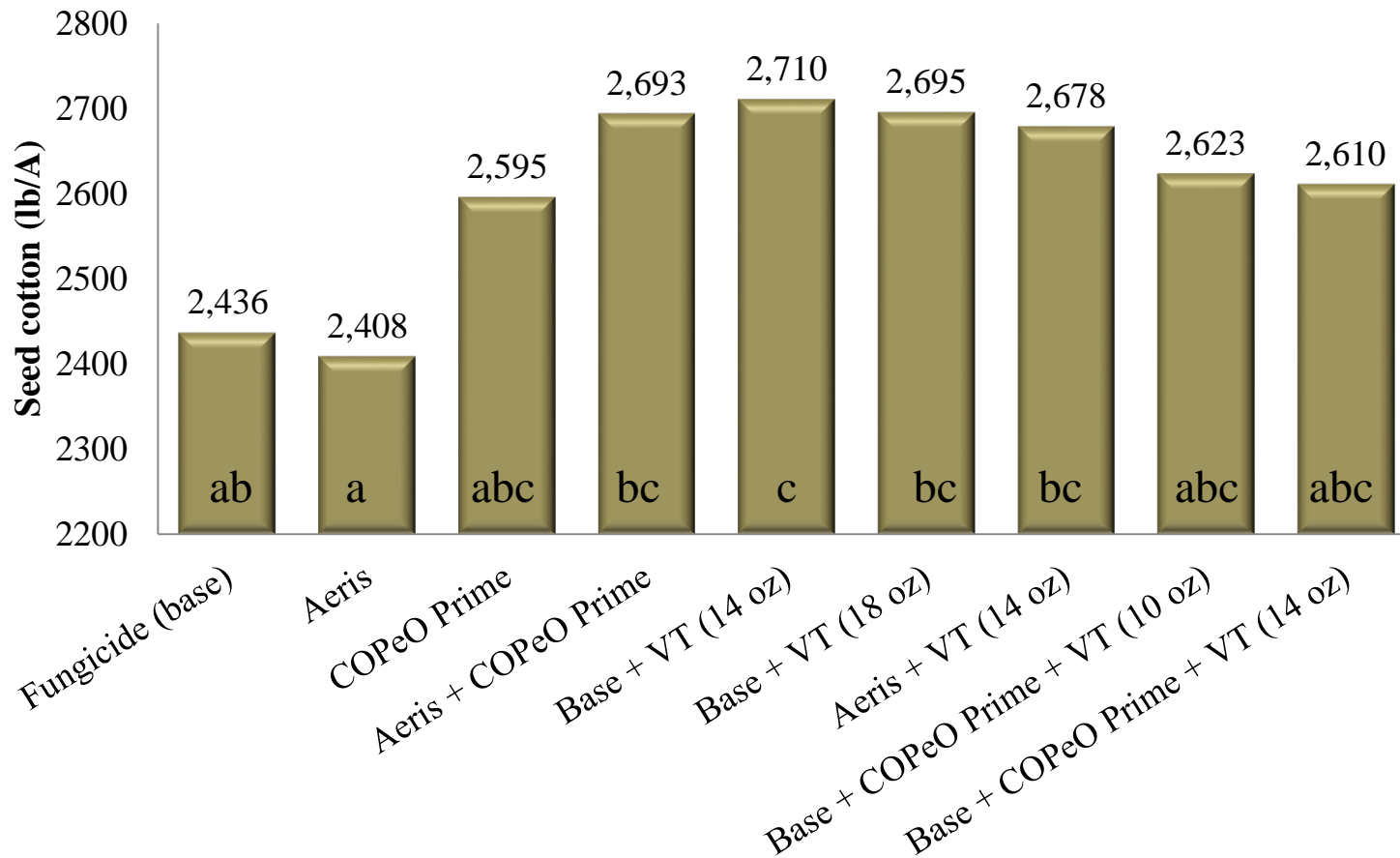
Compared to fungicide base...

- Lowest ST = COPeO
- Lowest VT rate = 18 oz
- Lowest overall = COPeO + VT (10 oz)

Rankings

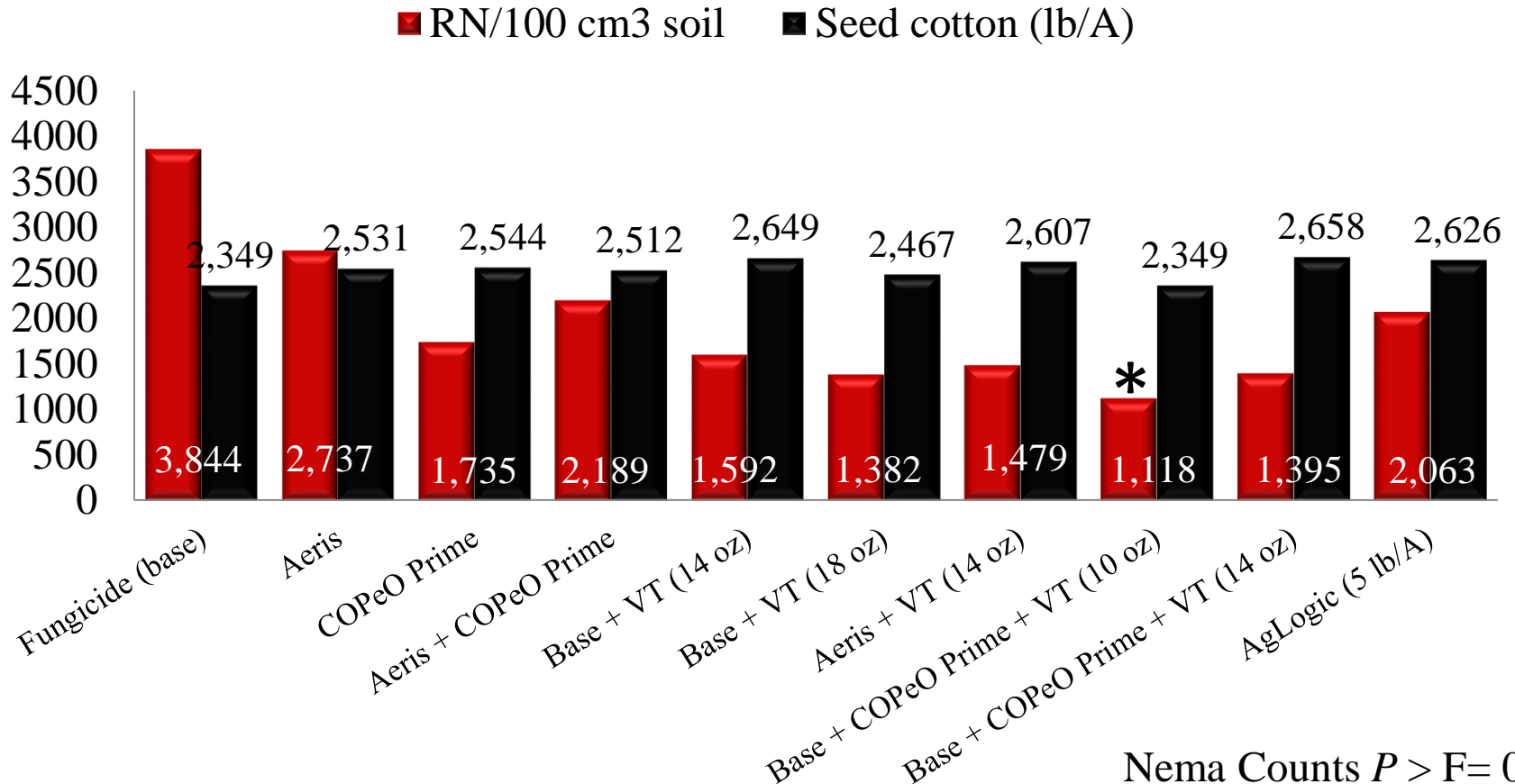


# 2017 cotton nematicides in RKN fields



$P = 0.03$

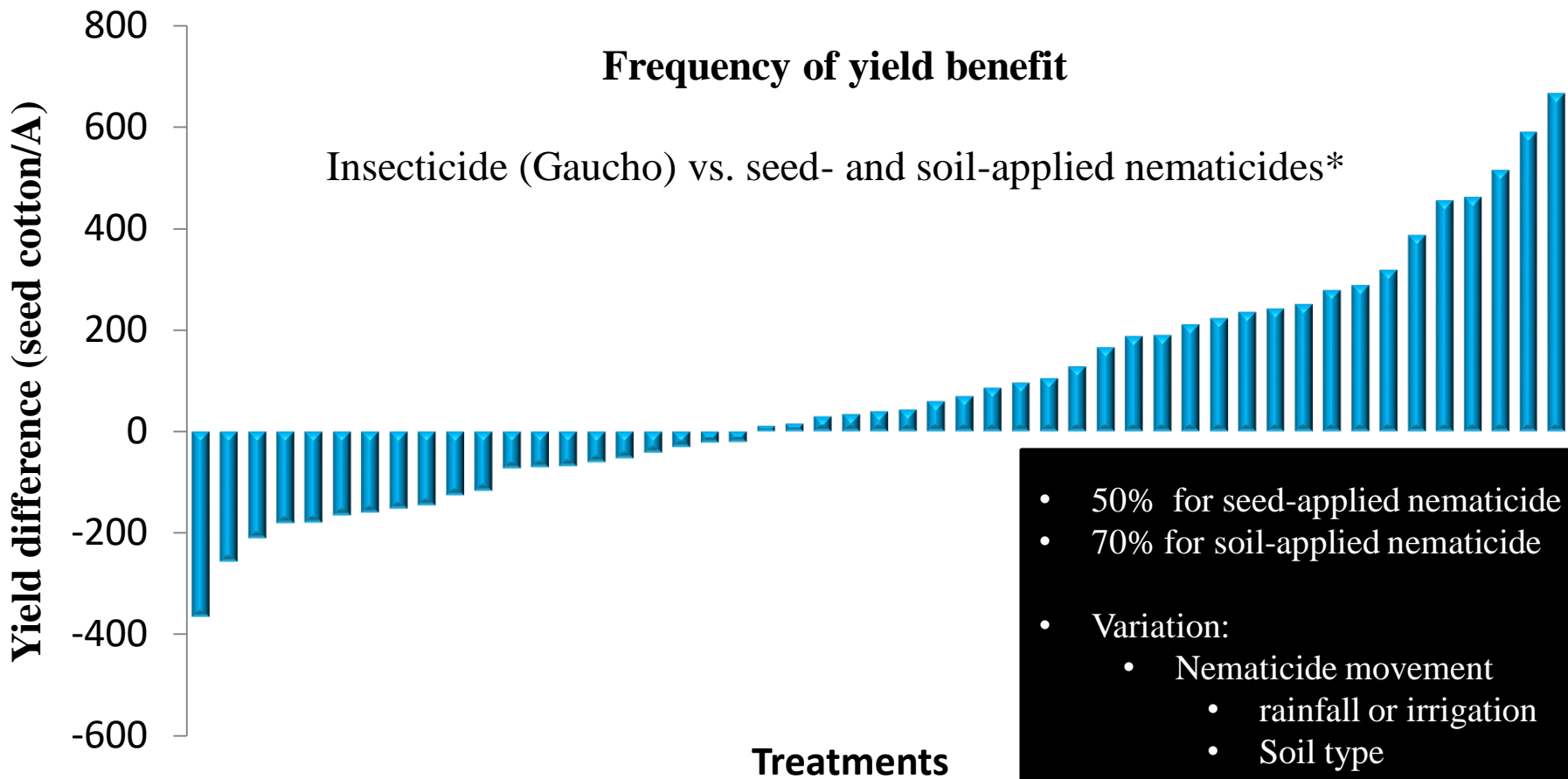
# 2017 cotton nematocides in RN fields



Nema Counts  $P > F = 0.04$   
Yield  $P > F = 0.35$

\* Indicate significant difference from fungicide base at  $\alpha = 0.10$  according to Tukey's HSD

# Collective trials from the 2017 Nematode Committee



# Soil- and seed-applied nematicides registered for use in soybean

Trade Name	Active Ingredient	Mode of Action	Signal Word
Avicta	Abamectin	Inhibit nerve transmission	Danger
ILeVO	Fluopyram	SDHI enzyme inhibitor	Caution
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Telone II, Vapam, and K-Pam

Avicta, ILeVO, NemaStrike, VOTiVO, BioST, Aveo EZ., Clariva pn

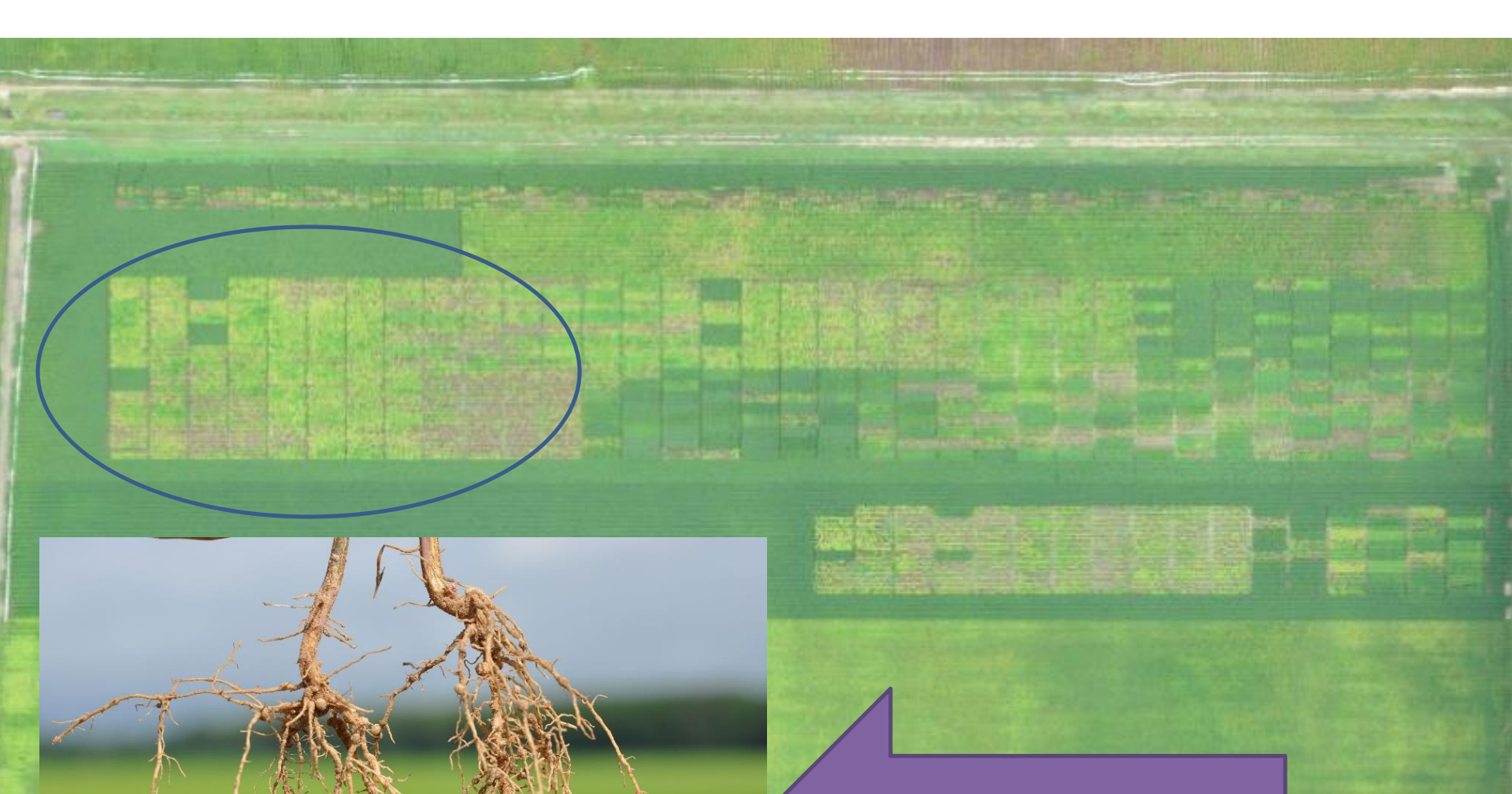
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VOTiVO	<i>Bacillus firmus</i> I-1582	Repels nema and affects motility	Caution
BioST Nematicide	<i>Burkholderia spp.</i> A496	??	Caution
AVEO EZ Nematicide	<i>B. amyloliquefaciens</i> PTA-4838	??	Caution
Clariva pn	<i>Pasteuria nischizawae</i>	Parasite to SCN only	Caution

Telone II, Vapam, and K-Pam

Avicta, ILeVO, NemaStrike, VOTiVO, BioST, Aveo EZ., Clariva pn



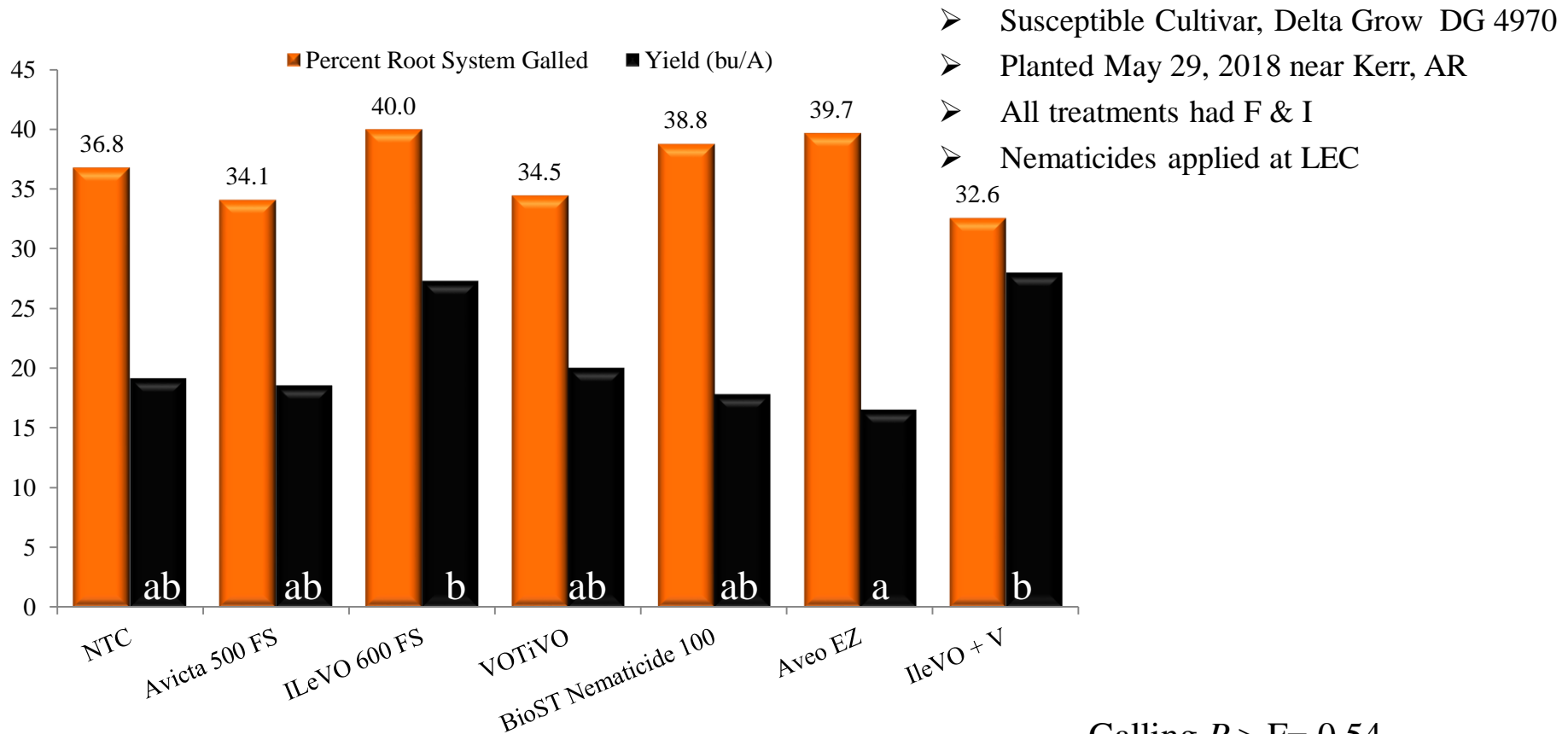


T. K. Fiske



Galling 35 DAP

# 2018 soybean seed-applied nematicides in southern RKN field

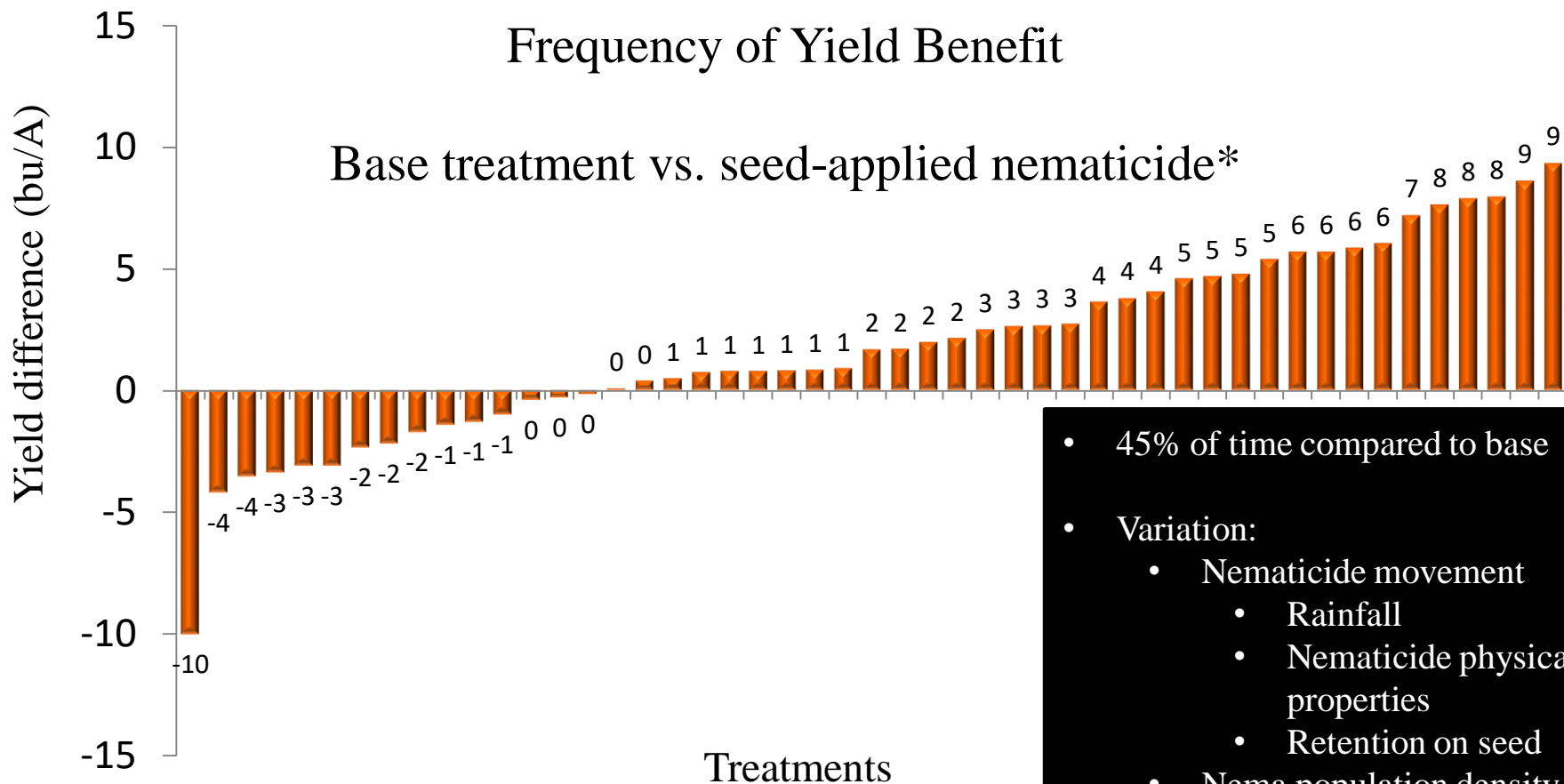


Pi = 32 and Pf = 308 J2/100 cm<sup>3</sup> soil

Galling  $P > F = 0.54$

Yield  $P > F = 0.03$

# Collective trials from 2015-2017 in Arkansas





# Thank you

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