

Soybean Nematodes: New Challenges From Old Pests

Travis Faske

Associate Professor and Extension Plant Pathologist

Lonoke Extension Center

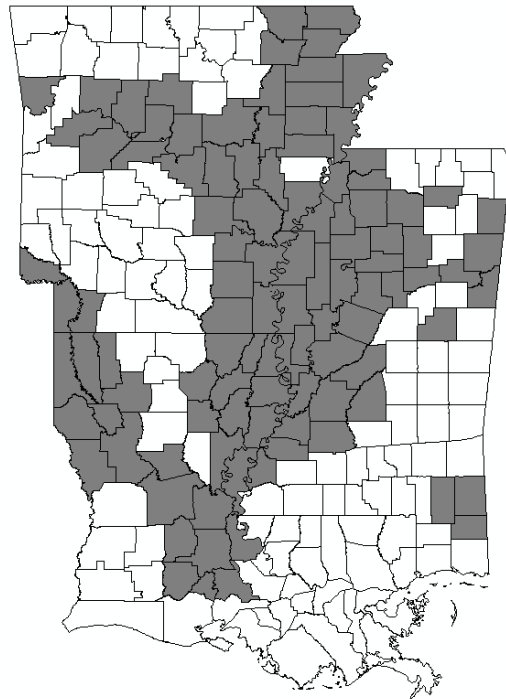
Lonoke, Arkansas

2020 Louisiana Agricultural Technology and Management Conference
Alexandria, LA

Southern root-knot nematode (*Meloidogyne incognita*)



T. R. Faske

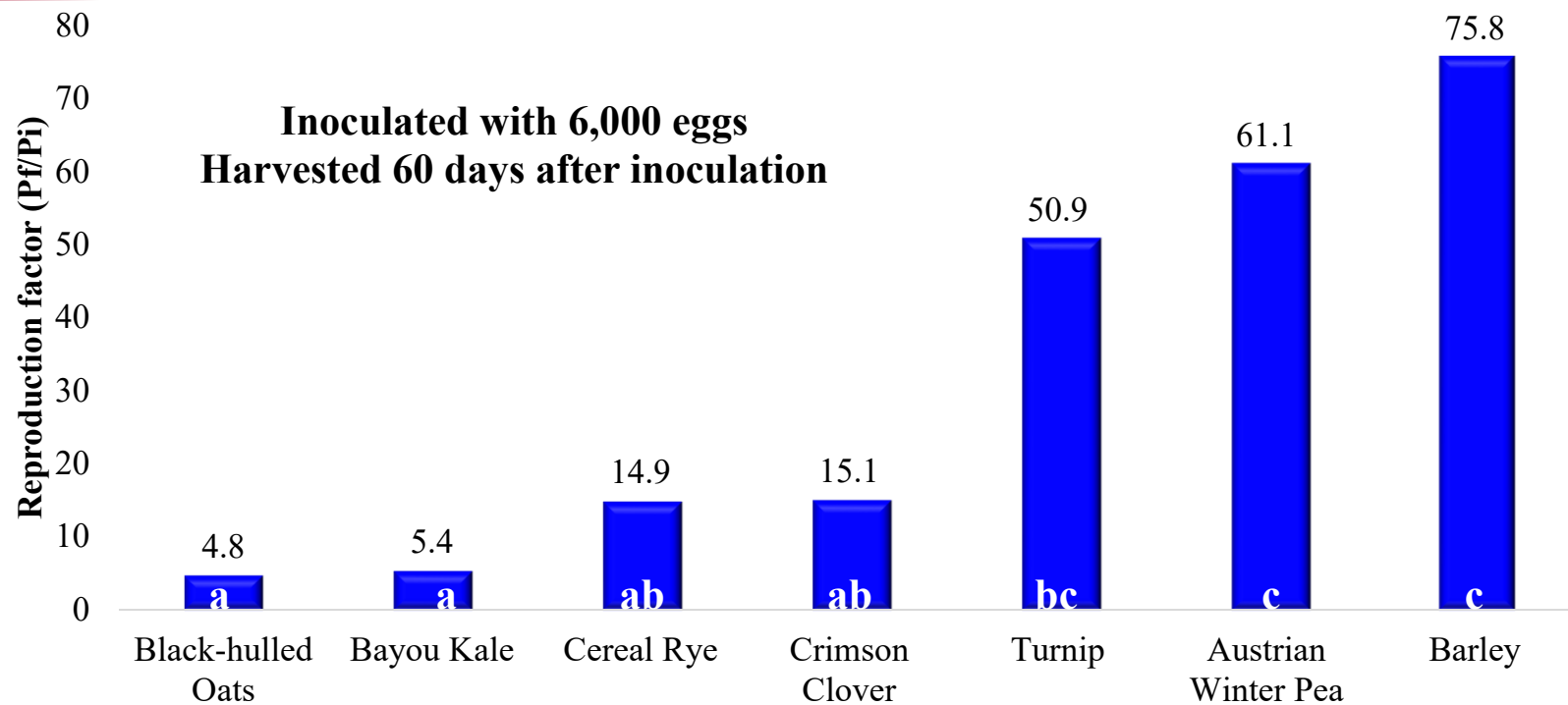


Cover crops

1. Cereal Rye: *Secale cereale*
2. Back-hulled Oats (Cosaque oat): *Avena sativa*
3. Barley: *Hordeum vulgare*
4. Austrian Winter Pea: *Pisum sativum*
5. Soybean Blend (cereal rye, crimson clover, and seven-top turnip) *S. cereale* + *Trifolium incarnatum* + *Brassica rapa*
6. Austrian winter pea, black-hulled oat, and bayou kale: *P. sativum* + *A. sativa* + *B. oleracea capitata*



Potential reproduction of Southern RKN on seven cover crops



Cover Crop Suitability to *M. incognita*

MR (Poor) host

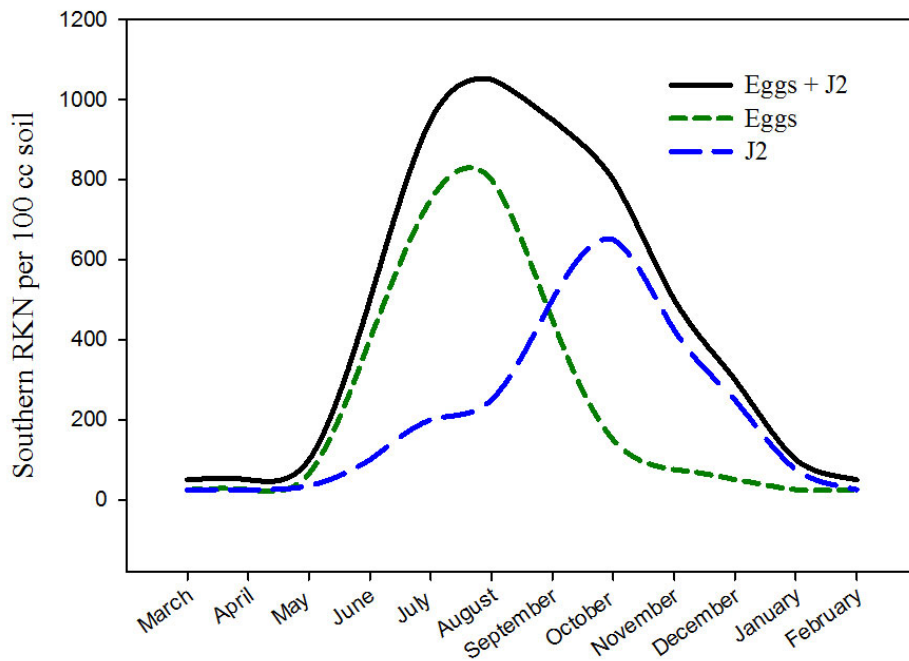
- Cereal rye (*S. cereale*)
- Black-hulled Oats
- Bayou Kale
- Cahaba White vetch (*Vicia sativa*)*
- Red clover (*T. pretense*, 'Cherokee')*

Susceptible (good) host

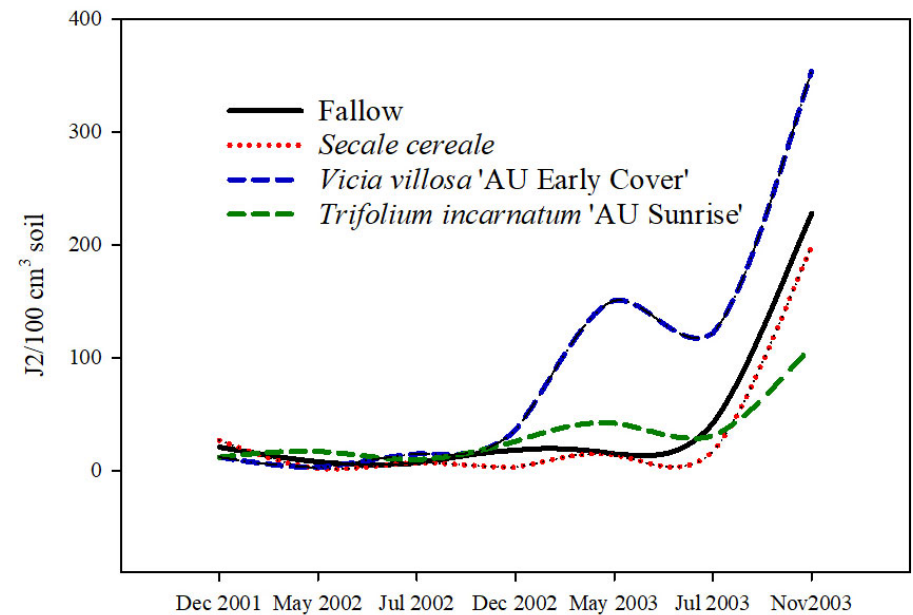
- Wheat (conflicting reports)
- Oat**
- Barley
- Crimson Clover (*T. incarnatum****)
- Austrian winter pea
- Turnip
- Hairy vetch (*V. villosa*)*
- Berseem clover (*T. alexandrinum*)*
- Balsana clover (*T. balsana*)*

General RKN population dynamics in a single cropping season

Cover Crop Experiment (GA)
DP 458BR, RCBD

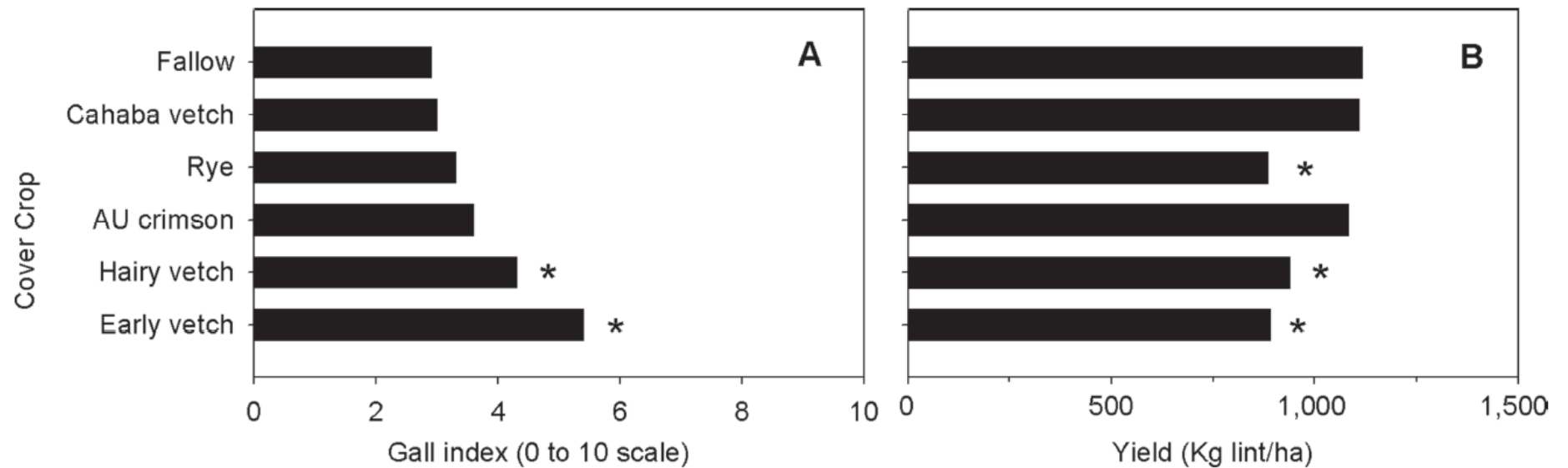


Cropping Season (Cotton)



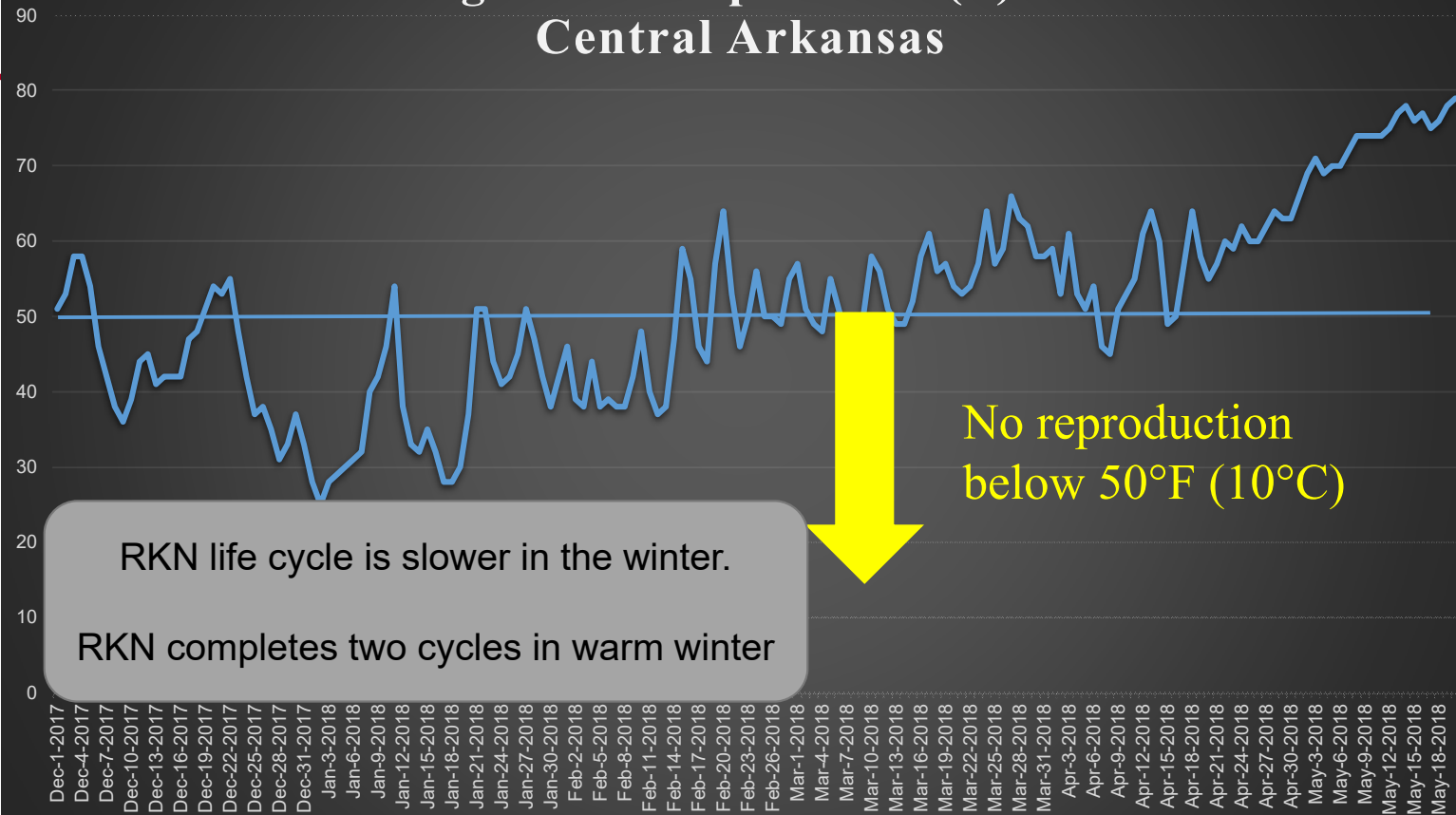
Timper et al 2006 JON

Winter Cover Crop Study in Georgia



Timper et al 2006 JON

2018 Average Soil Temperature (F) at Farm in Central Arkansas



Crop Rotation

Options?

Rotation with a non-host crop

Southern root-knot nematode
(*Meloidogyne incognita*)



**Peanut is the only non-host crop
grown in Mid-South**

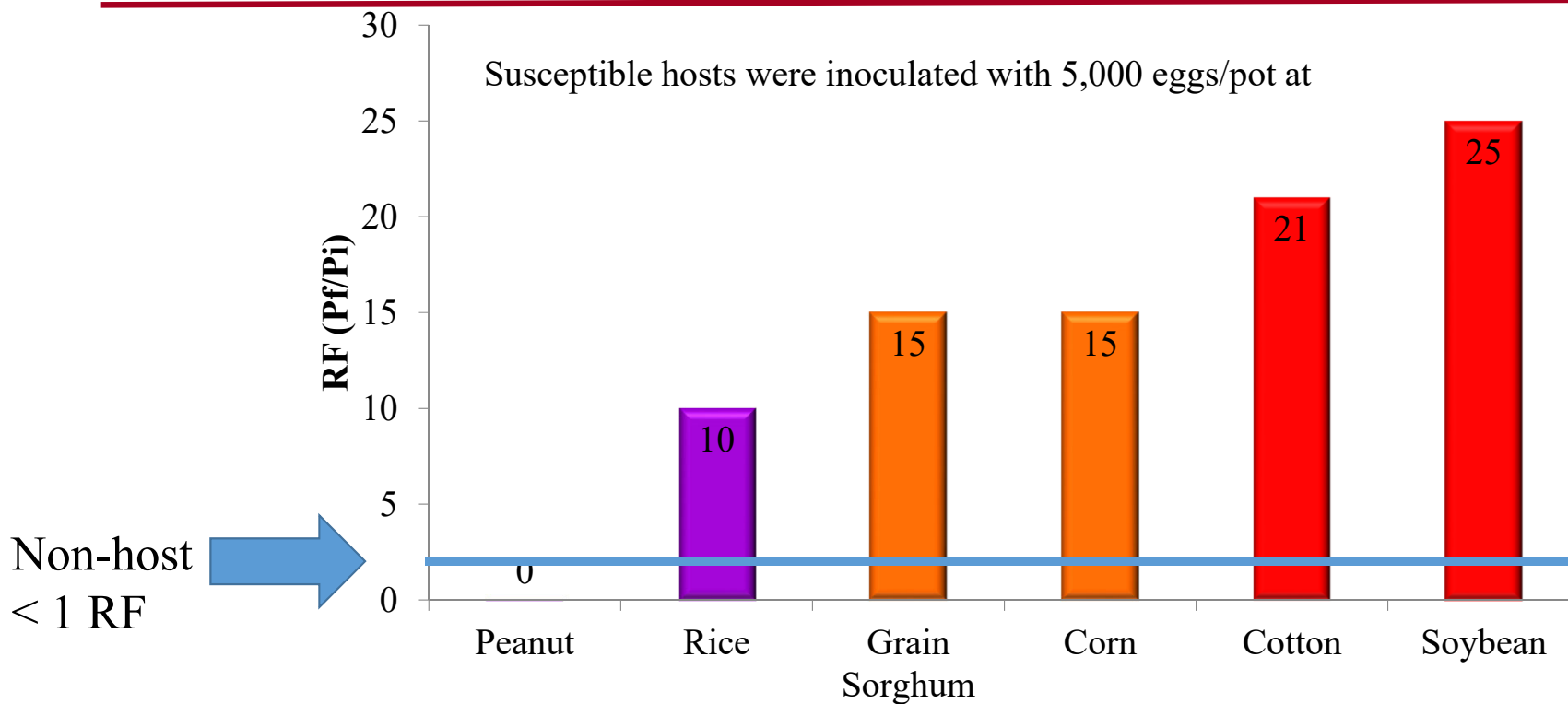
Hybrid Rice Trial



All rice is susceptible to
Southern Root-knot
nematode



Host Suitability of row crops to RKN (greenhouse – Lonoke)



How can Southern RKN survive in a field planted in peanut?



Weeds that can maintain *M. incognita*

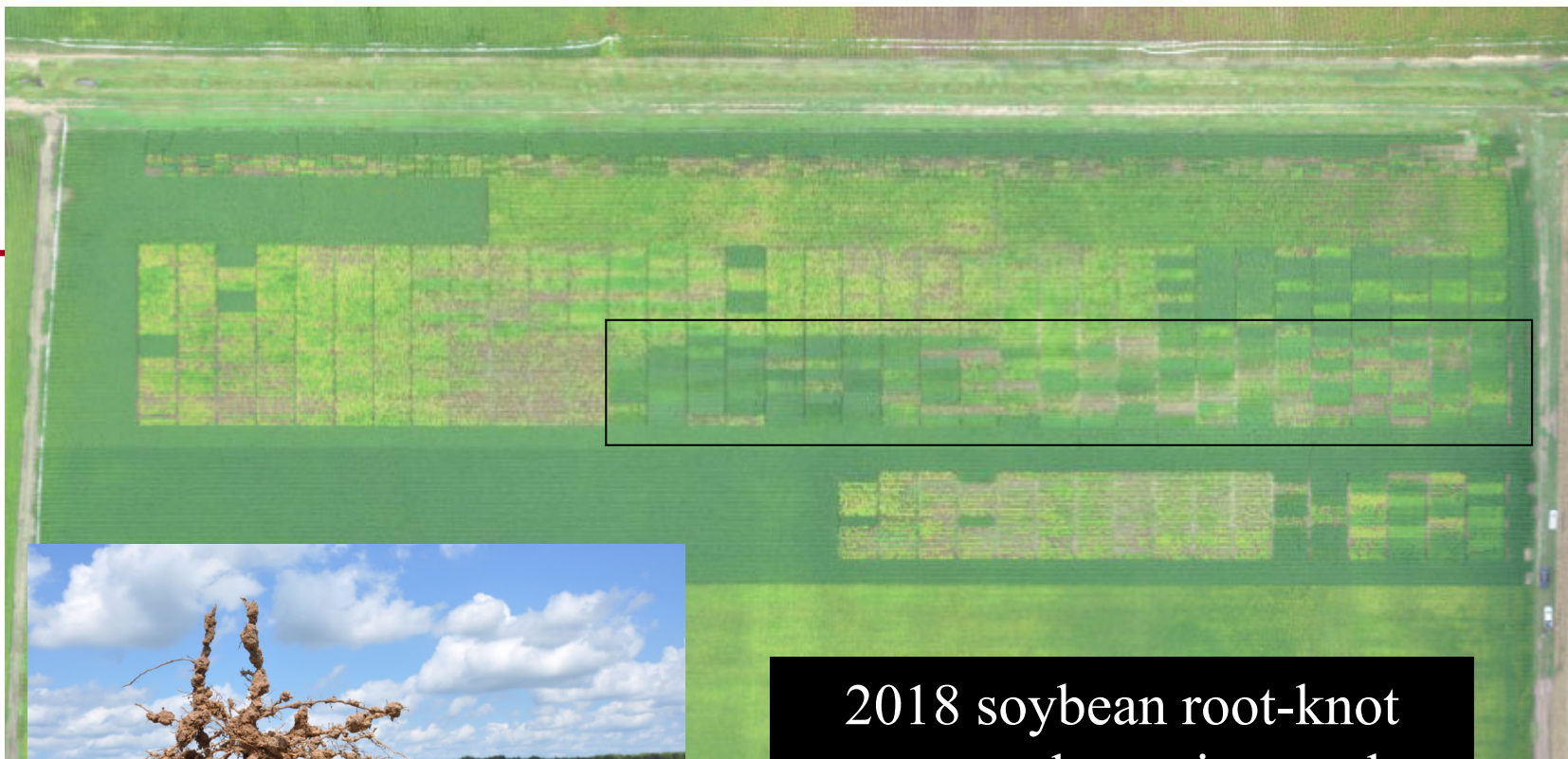
- Palmer Pigweed
- Redroot Pigweed
- Spiny pigweed
- Sicklepod
- Common lambsquarters
- Field bindweed
- Yellow nutsedge
- Purple nutsedge
- Morning glory
- Henbit
- Nightshade
- Common ragweed
- Barnyard grass
- Goosegrass

Utilize lease susceptible soybean cultivar

Are we gaining ground?

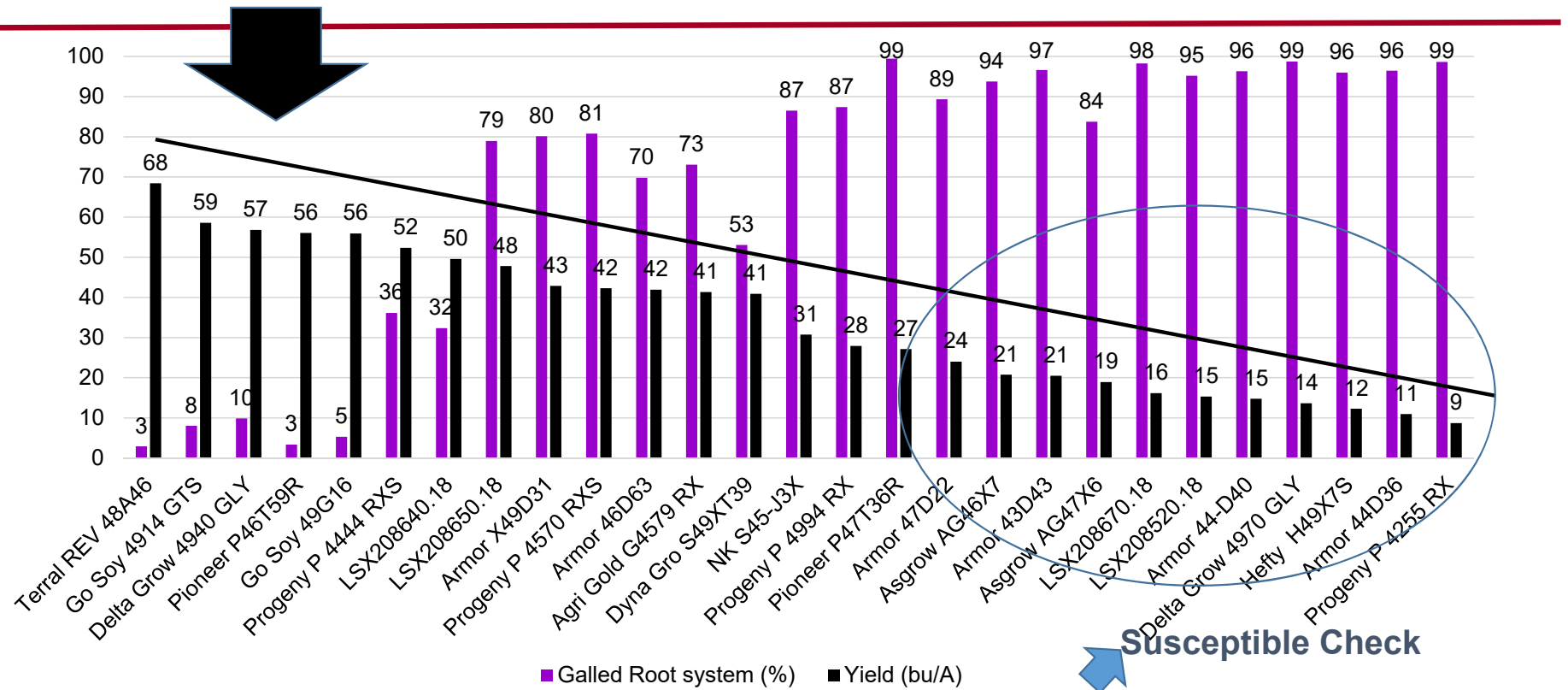
Soybean Variety Response to RKN is on the www.arkansascrops.com website

The screenshot shows a web browser window displaying the Arkansas Row Crops website. The search bar at the top right contains the text 'Faske' and a 'Go' button. A blue arrow points to this search bar. Below the search bar, a navigation menu includes 'AR Crops Home', 'UAEX Home', 'Publications', 'Events', 'Contact', and 'Employment'. The main content area is titled 'Search Results for Faske' and displays two search results. The first result is dated '13 NOV 2018' and is titled 'Field Performance of Selected Soybean Varieties in a Southern Root-knot Nematode Infested Field, 2018'. A red arrow points to this title. The author is listed as 'Travis Faske, Extension Plant Pathologist'. The second result is dated '18 OCT 2018' and is titled 'Avoiding Cold Injury in Peanut'. The author is also 'Travis Faske, Extension Plant Pathologist'. On the left side of the page, there is a 'FIND IT HERE' section with a 'TWITTER UPDATE' and a 'SUBSCRIBE' button.



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)

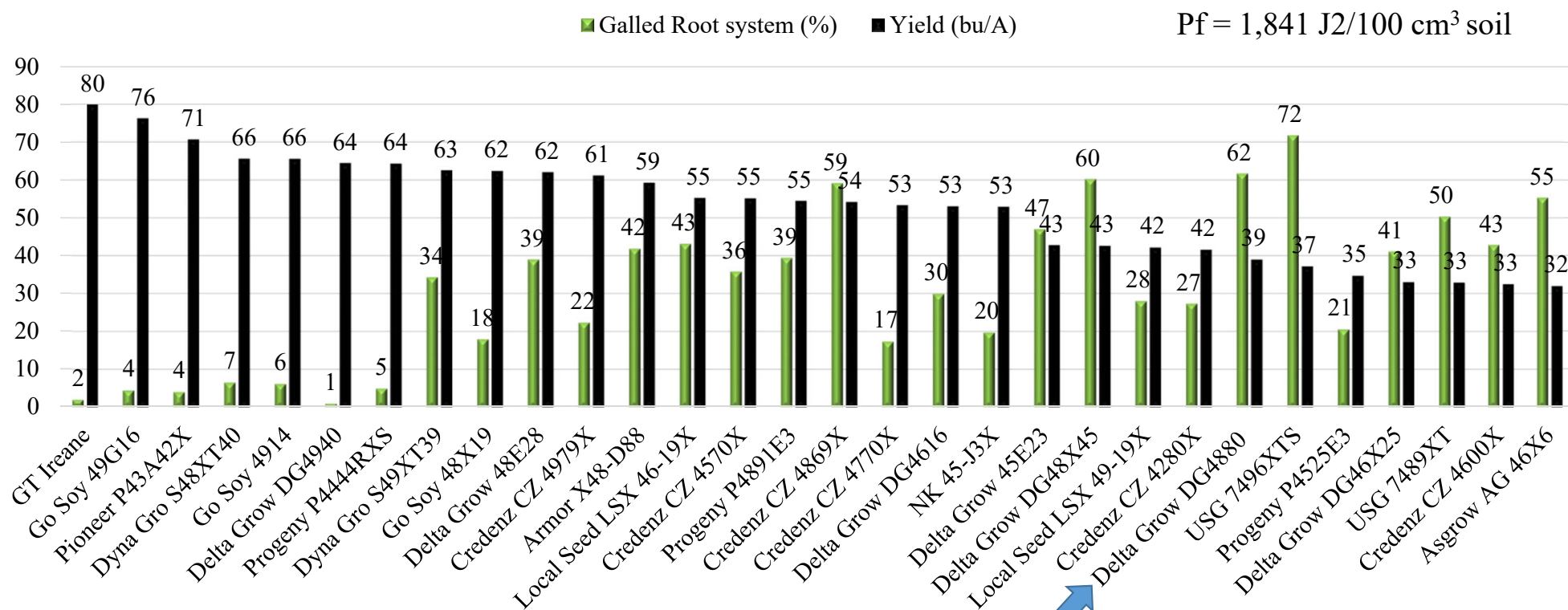


Susceptible Check

$P_i = 60$ and $P_f = 369 \text{ J2}/100 \text{ cm}^3$



2019 Field performance of RR and Xtend MG IV soybean cultivars in southern RKN field



Soybean cultivars with resistance to soybean root-knot nematode (2018 and 2019)

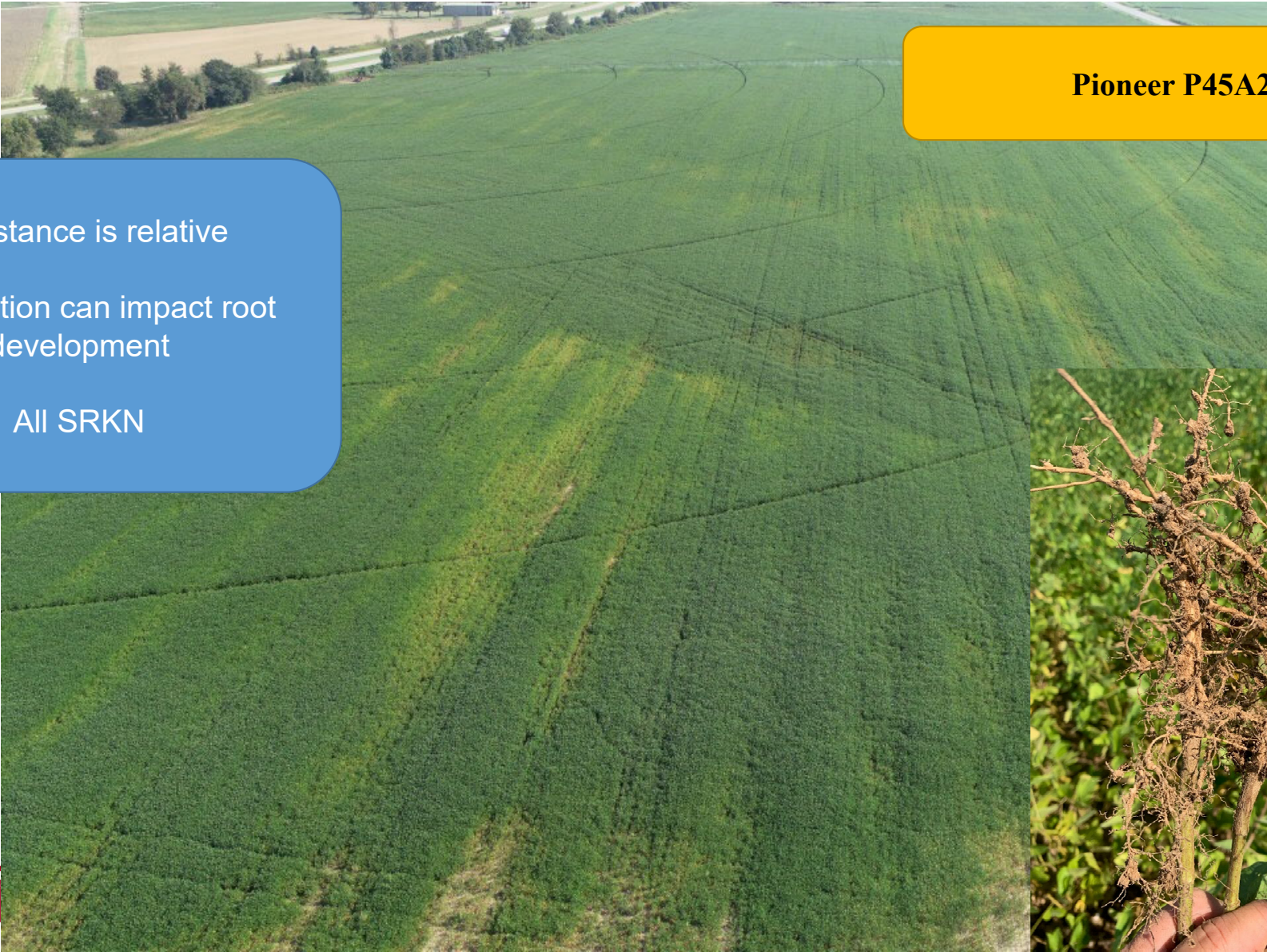
**2018: MG V
avg. +15 bu/A =
25% increase
over MG IV**

Suitability	MG IV	MG V
Resistant (1-4% galling)	GT Irene* Pioneer P46T59R Pioneer P43A42X* Terral REV 48A46	Terral REV 56... Terral REV52A... Pioneer P55A49X... Ag Venture 52M7RS1... Terral REV5659X* Local Seed LSX 55-19X* Go Soy 50G17* Progeny P5554RX* Delta Drow DG5585* Terral REV5299XS*
Moderately Resistant (4-9% galling)	Delta Grow 4940 GLY Go Soy 4914 GTS Go Soy 49G16	Go Soy 5214 Pioneer P55T81R Dyna Gro S52XT08

Soybean cultivars with resistance to southern root-knot nematode (2018 and 2019)

Suitability	MG IV	MG V
Moderately Resistant (4-9% galling)	Pioneer 45A29L Terral REV 46L99*	Pioneer P52A43L Terral REV 54L18
Moderately Susceptible (9.1-20% galling)	Delta Grow 4977LL/STS* Dyna Gro S49LS65*	

* Indicate one yr of data



Pioneer P45A29L

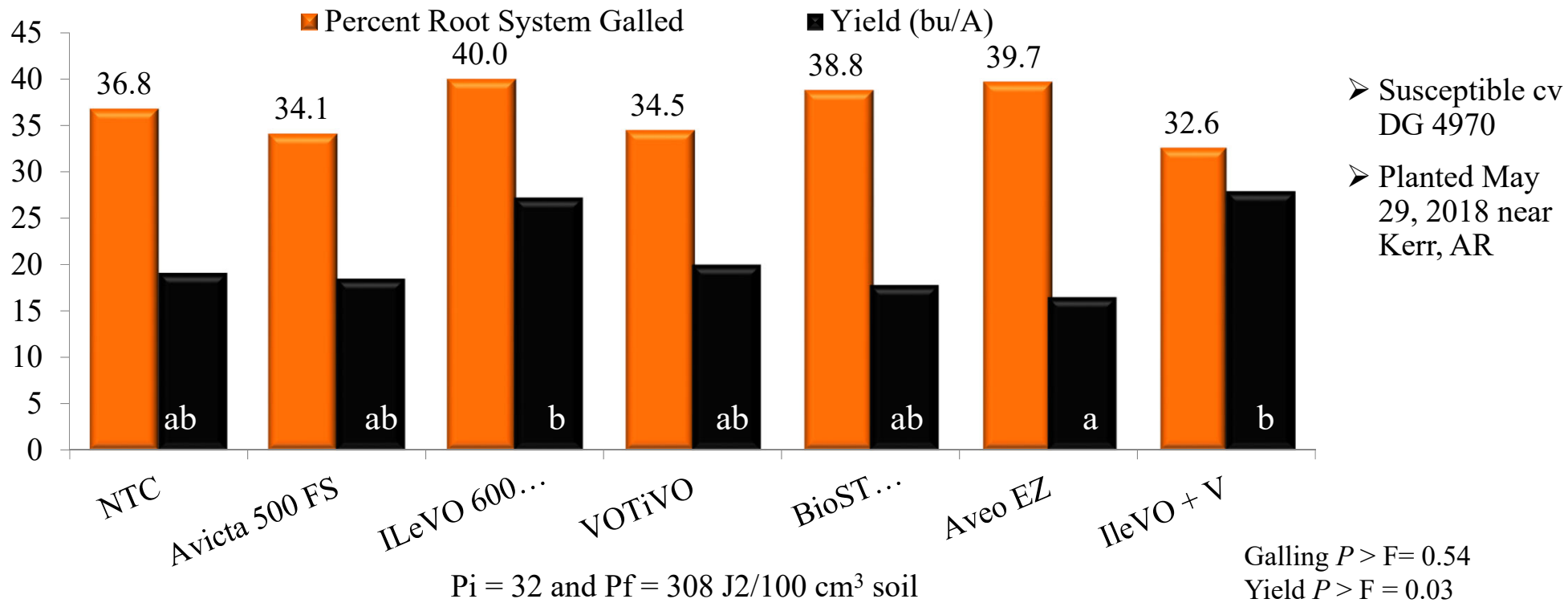
Resistance is relative
Compaction can impact root
development
All SRKN



Seed-applied nematicides registered for use in soybean

Trade Name	Active Ingredient	Company	Registration
Avicta	Abamectin	Syngenta Crop Protection	2011
ILeVO	Fluopyram	BASF	2014
NemaStrike ST	Tioxazafen	Bayer CropScience	2018
VOTiVO	<i>Bacillus firmus</i> I-1582	BASF	2011
BioST Nematicide	<i>Burkholderia spp.</i> A496	Albaugh	2017
AVEO EZ Nematicide	<i>B. amyloliquefaciens</i> PTA-4838	Valent	2018
Trunemco	<i>B. amyloliquefaciens</i> strain MBI 600 + cis-Jasmone	Nufarm	2019

2018 soybean seed-applied nematicide Trial



Expectations from a seed-applied nematicide

- Movement from seed
- Movement in soil
 - Water infiltration, soil type, and nematicide physical properties
- Best when nematode population density is low (60-100 J2/100cm³)
- Protection range from 4-6 wk, within range of nematicide distribution (zone of protection).
- Pair with MR for extended season protection



Questions



Travis Faske
501-266-3657
tfaske@uaex.edu
@travisfaske