Soybean Disease Management

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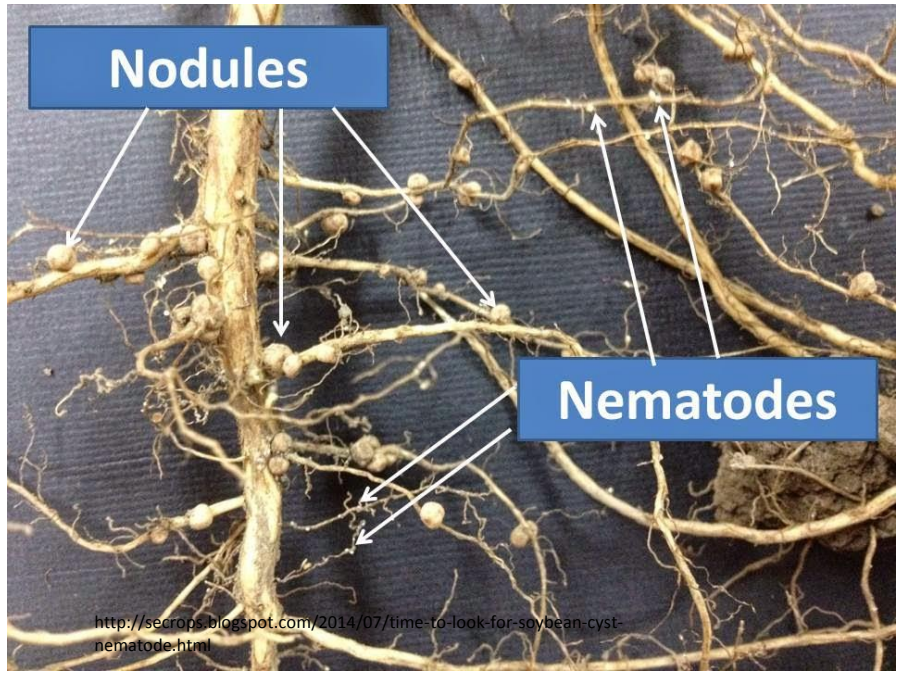
Nematodes of NC

- Most Prevalent Soybean Nematodes
  - Soybean Cyst (32%)
  - Root Knot (32%)
  - Stunt (83%)
  - Sting (88%)
  - Lesion (51%)



http://secrops.blogspot.com/2014/07/time-to-look-for-soybean-cyst-nematode.html

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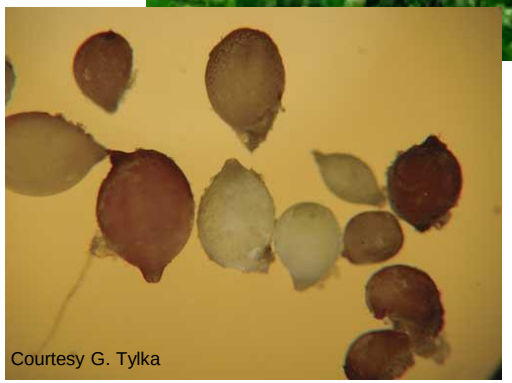
Soybean Cyst Nematode

- *Heterodera glycines*
- May cause irregular patches of stunted or yellow soybeans
  - Often mistaken for damage from nutrient deficiencies, herbicide injury, or other diseases
  - Yield losses of up to 30% are possible with no above-ground symptoms
- Infected roots are dwarfed or stunted, and may have adult female nematodes or cysts

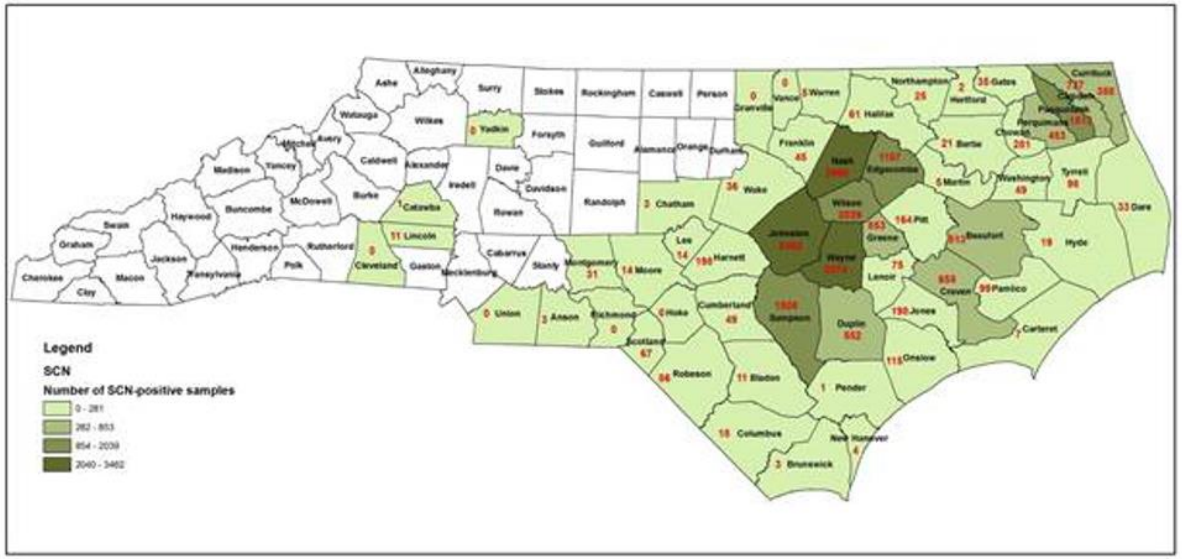


Courtesy G. Tylka

Courtesy R.D. Riggs

Soybean Cyst Distribution

Number of SCN Positive Samples



Average SCN Population Level

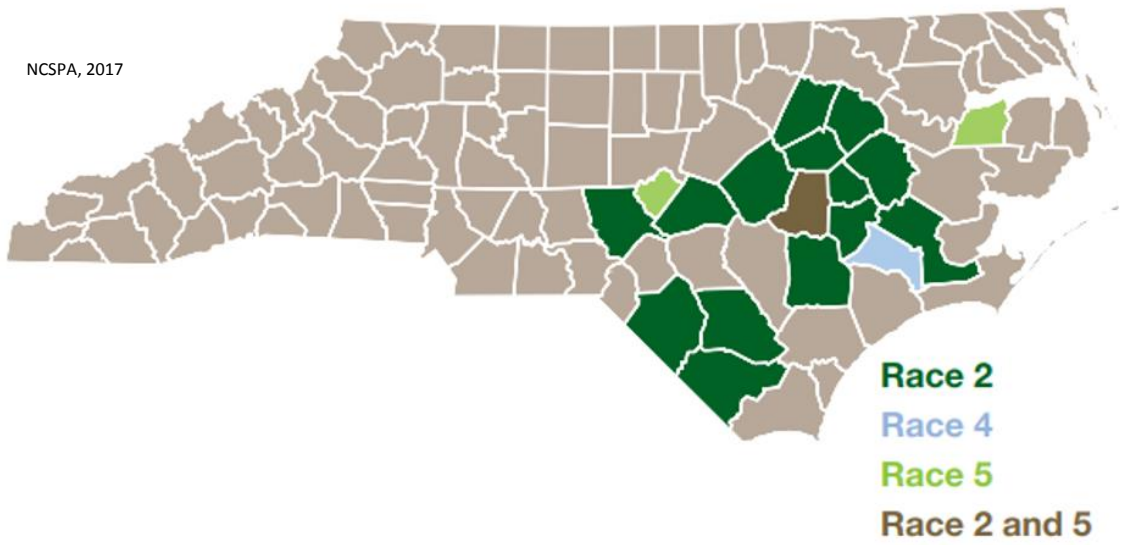
Weimin Ye, NCDA 2014-2017 Survey

Soybean Cyst Nematode

- Host Resistance
  - Sixteen different races of SCN/7 different HG Types
  - Races 2 (87%), 4 (10%), and 5 (3%) dominant in 18 counties

Variety	Growth Habit	Maturity Group	Maturity Date	Resistance Shatter	Resistance Lodge	Resistance Nematodes	Herbicide Ready	Height (in.)	Seed Size	Flower	Pub.	Co
HBK RY5421	Det	V	Oct 5-9	Exec	Fair		RR	39-43	Medium	Purple	Gray	
HBK RY5521	Det	V	Oct 6-10	Exec	Good		RR	32-36	Medium	Purple	Gray	
HBK RY7523	Det	VII	Oct 26-30	Good	Good	Ri	RR	36-40	Medium	Purple	Tawny	
Hutcheson	Det	V	Oct 6-10	Good	Good			31-35	Medium	White	Gray	
Jake	Det	V	Oct 5-9	Good	Good	C1,2,3,5,14R		32-36	Medium	Purple	Tawny	
JTN-5203	Det	V	Oct 4-8	Exec	Good	C2,3,5,14		30-34	Small	White	Gray	
JTN-5303	Det	V	Oct 5-9	Good	Exec	C2,3,5,14		27-31	Medium	White	Tawny	
JTN-5503	Det	V	Oct 5-9	Good	Good	C2,3,5,14		31-35	Medium	White	Tawny	
LC 4713S	InDet	IV	Sep 28-Oct 2	Good	Good	C3,14	STS,LL	31-35	Medium	Purple	Gray	
LL 396N	InDet	III	Sep 20-24	Good	Good		LL	33-37	Medium	White	Tawny	

NCSPA, 2017



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HG Types

Sixteen different races of SCN/7 different HG Types

Index number	HG type test indicator soybean line
#1	PI 548402 (Peking)
#2	PI 88788
#3	PI 90763
#4	PI 437654
#5	PI 209332
#6	PI 89772
#7	PI 548316 (Cloud)

For example: HG Type 1.2 = elevated development on Peking (line #1) and PI88788 (line #2)

Pro

- More accurate account of populations
- More resistance available than previously thought

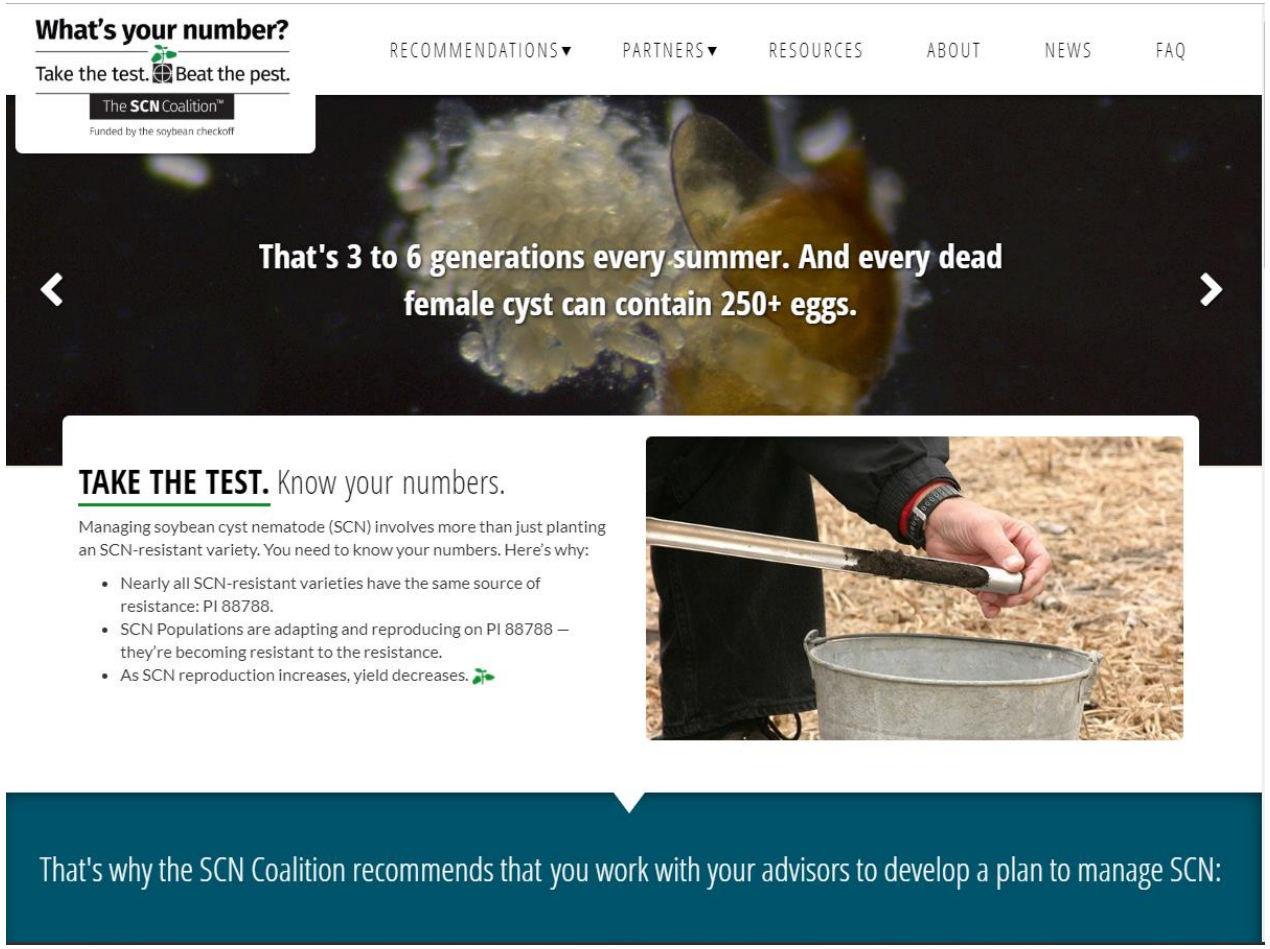
Con

- Seed companies still label with “nematode resistant” or races
- Producers unfamiliar with system

https://www.plantmanagementnetwork.org/pub/php/volume17/number2/PHP-PS-16-0615.pdf

Second Coming of SCN Coalition

https://www.thescncoalition.com/



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Root Knot Nematode

- *Meloidogyne* spp.
  - Five different species in NC
  - *M. enterolobii*
- Infections are characterized by reduced vigor, stunting, wilt, and chlorosis
- Roots appear deformed, have galls
  - Soybean nodules can be removed whereas galls are permanently in the tissues

2018 Trials

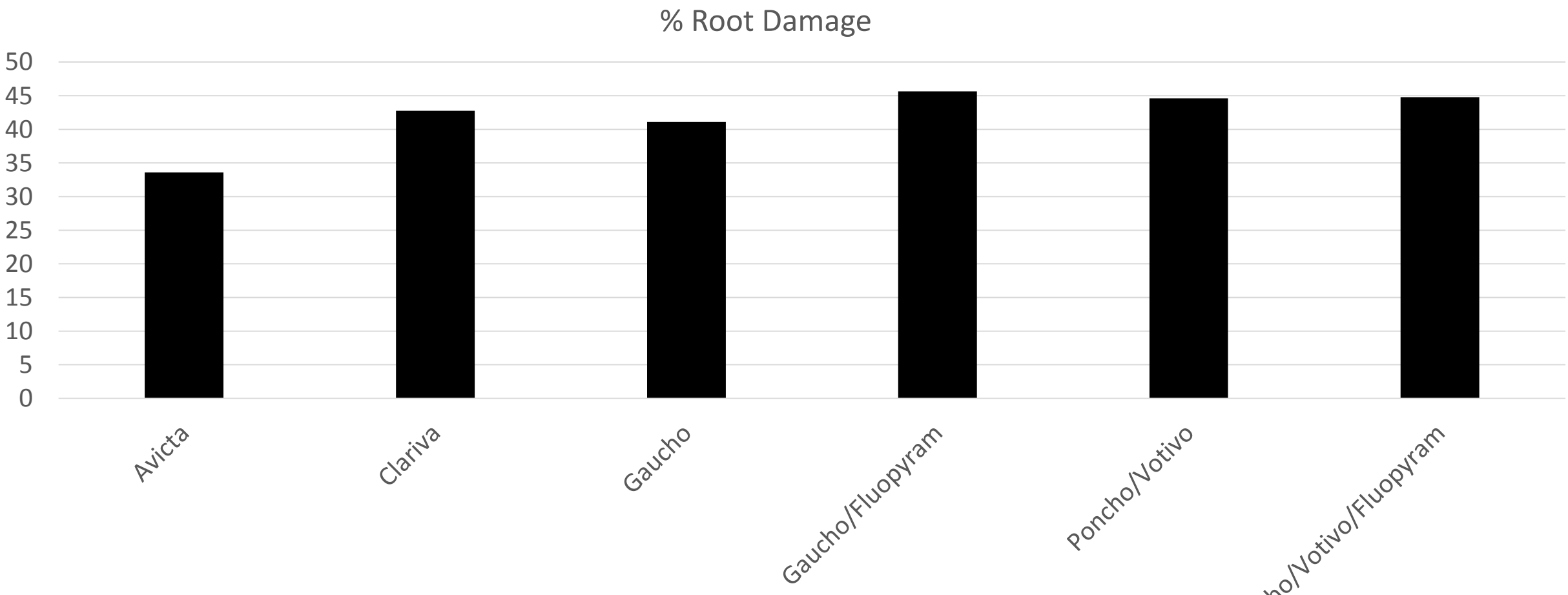
- Seed Treatments in Soybean
  - *M. incognita* (Hyde)
  - Mixed populations (Johnston)
  - SCN (Sandhills)

Soybean Nematode Trial

Seed Treatments

1. Gaucho (Imidacloprid, no-nematicide)
2. Avicta (Abamectin)
3. Clariva (*Pasteuria nishizawae*)
4. Gaucho/Fluopyram (Imidacloprid and Fluopyram)
5. Poncho/Votivo (Clothianidin and *Bacillus firmus*)
6. Poncho/Votivo/Fluopyram (Clothianidin, *Bacillus firmus,* Fluopyram)

Johnston County (RKN, Lesion)



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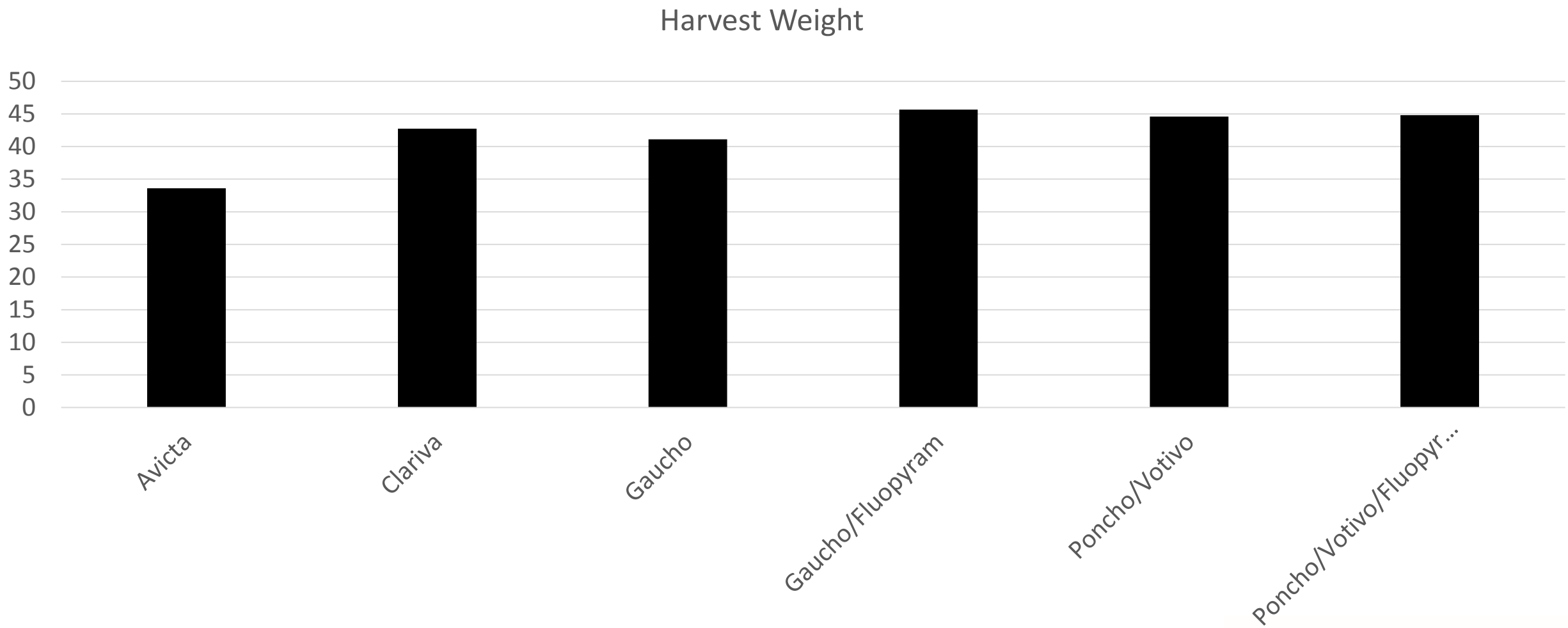
Johnston County (RKN, Lesion)



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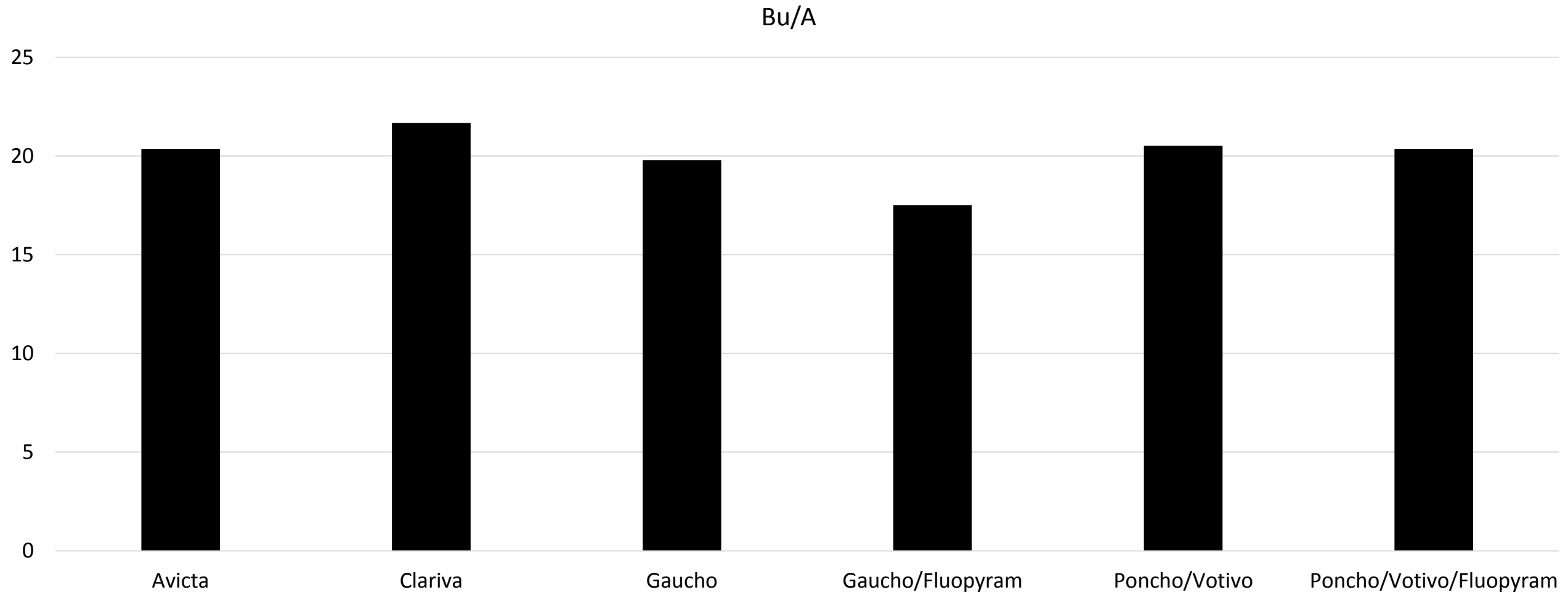
Sandhills Research Station

Sandhills (SCN)



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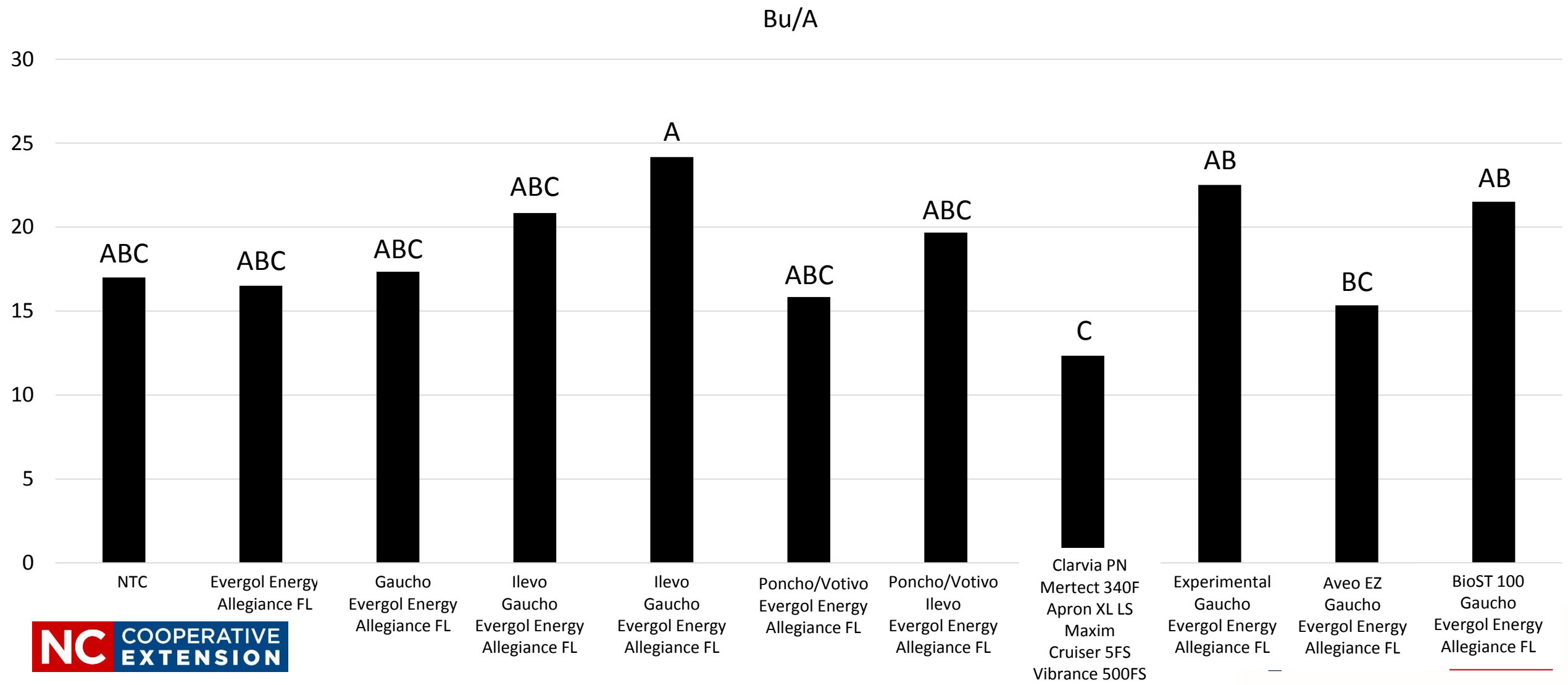
Sandhills (SCN Trial 2)



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Take Home Message

- Seed treatments are sometimes effective
  - Seem better placed with SCN management than RKN
  - Sometimes pay for themselves, sometimes not worth the investment
- Testing important to determine method of control!
  - Seed treatments better in low-moderate pressure environments
  - Targeted fumigation may be needed for high pressure RKN or *M. enterolobii*

Questions

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Soybean Portal: https://soybeans.ces.ncsu.edu/

Website: https://fieldcropspathology.wordpress.ncsu.edu/

NCSU Tobacco and Field Crops Pathology

@FieldCropsPath

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