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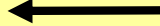
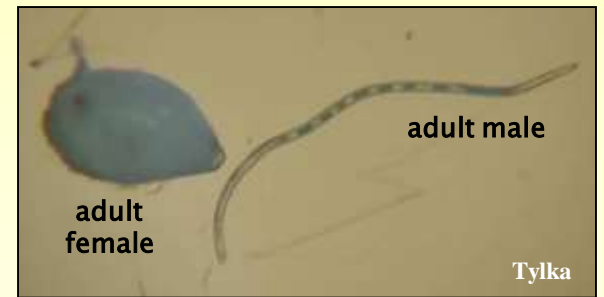
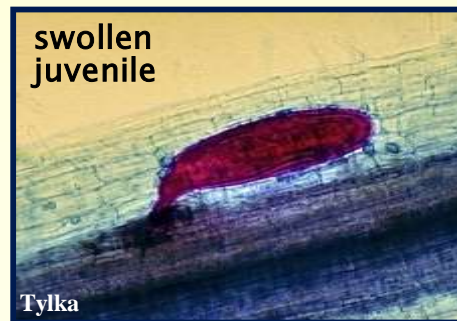
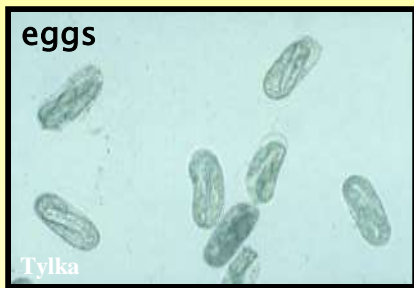
January 15-17, 2019

# Effects of Seed Treatments on the Biology of the Soybean Cyst Nematode

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# Laboratory Research with Seed Treatments

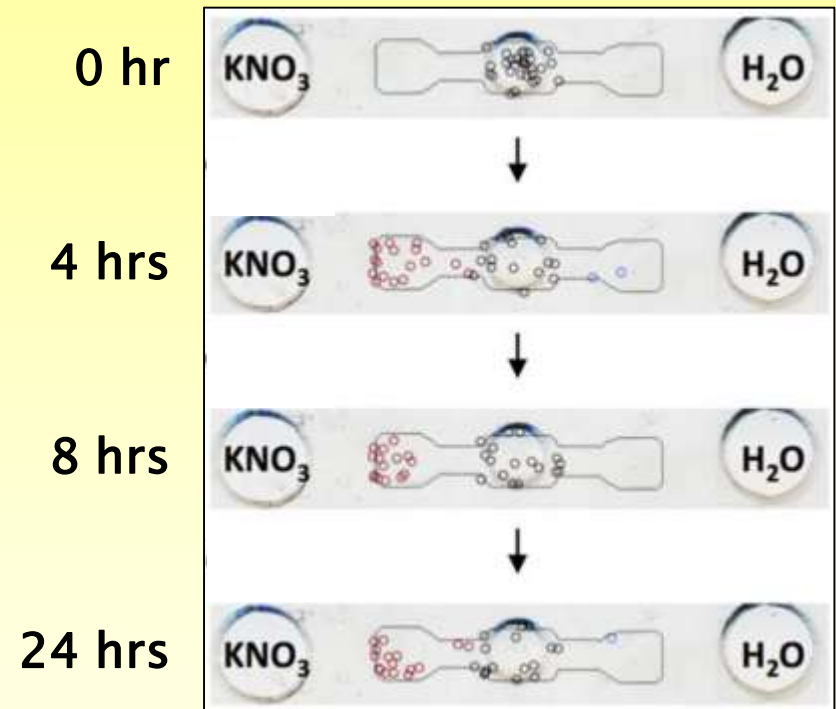
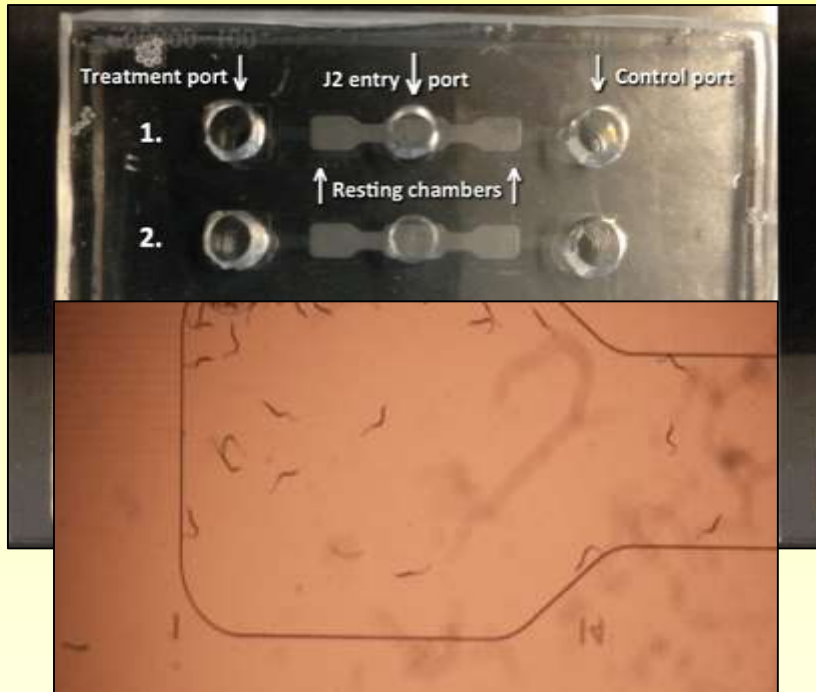
- Almost all nematode-protectant seed treatments are sold on a base seed treatment of fungicide(s) and insecticide(s).
- We want to study the effects of only the nematode-protectant seed treatments.
- Effects caused by the base seed treatment and by interactions of the nematode-protectant seed treatment with the base seed treatment may be missed.

# Laboratory Research with Seed Treatments

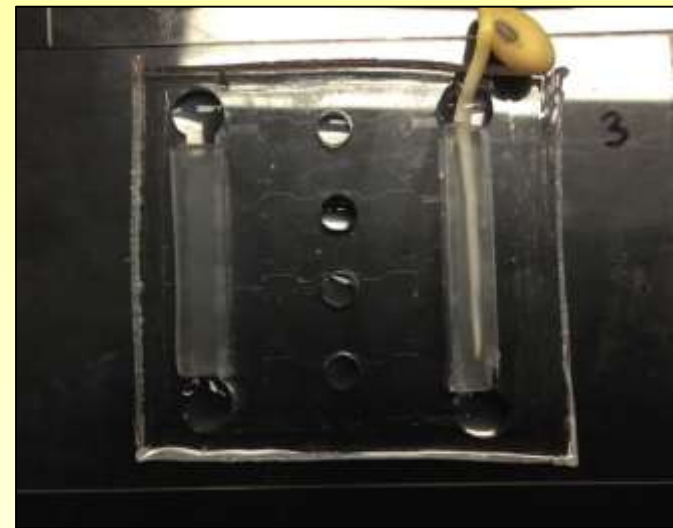
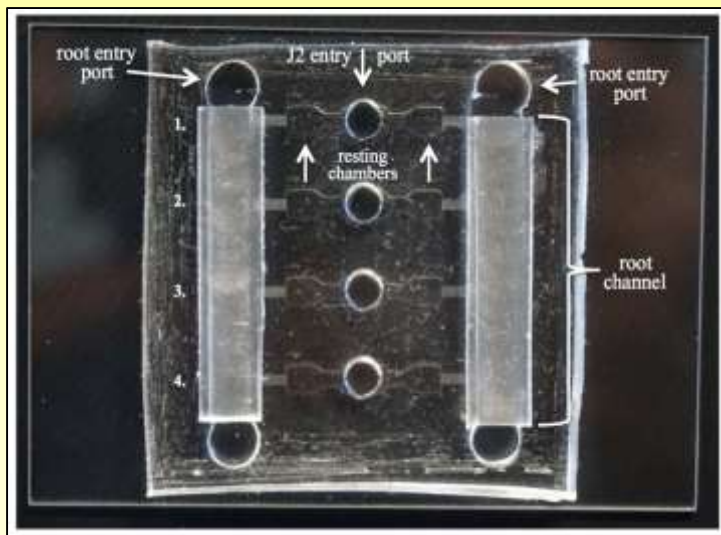
- Treatments we have used in our work:
  - ◆ pure active ingredients - ex. fluopyram
  - ◆ formulated product (nematode seed treatment only) - ex. Clariva
  - ◆ exudates from treated seeds
  - ◆ exudates from radicles growing from treated seeds
  - ◆ leachates from soil with treated seeds
  - ◆ experiments done with Avicta, Clariva, Ileva, Votivo so far



- individual juvenile movement towards or away from seed treatment active ingredients

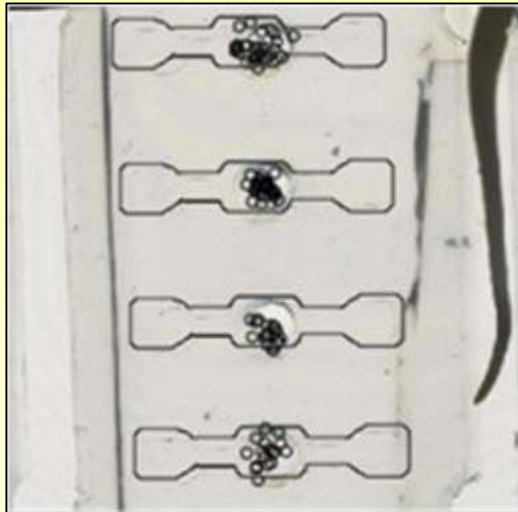


- individual juvenile movement towards or away from roots grown from treated seeds

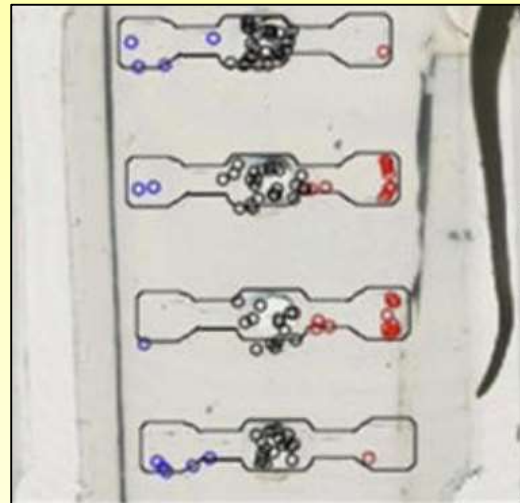


- individual juvenile movement towards or away from roots grown from treated seeds

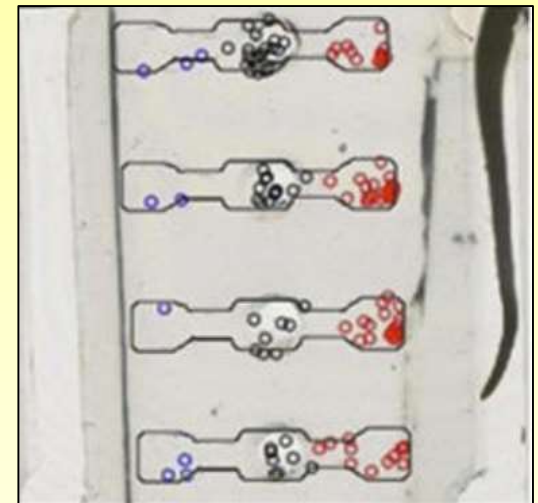
0 hr



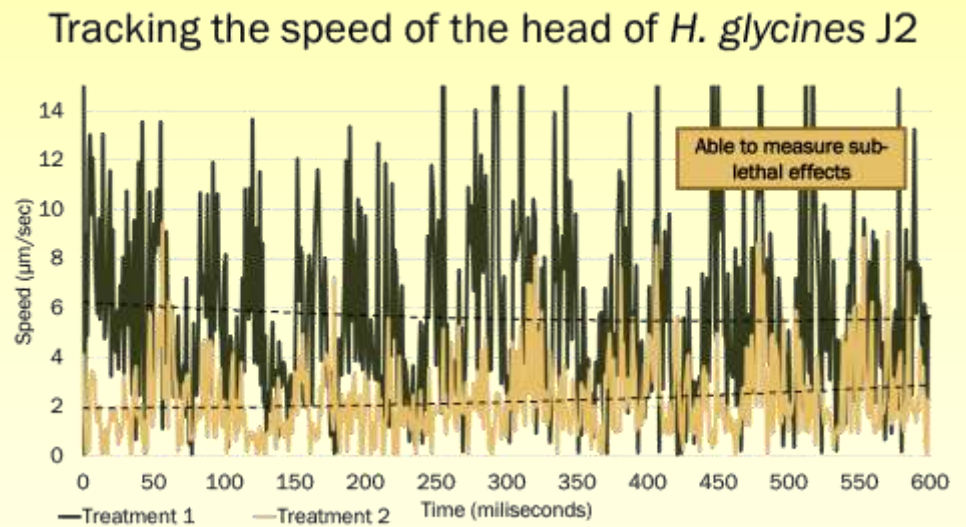
4 hrs



18 hrs

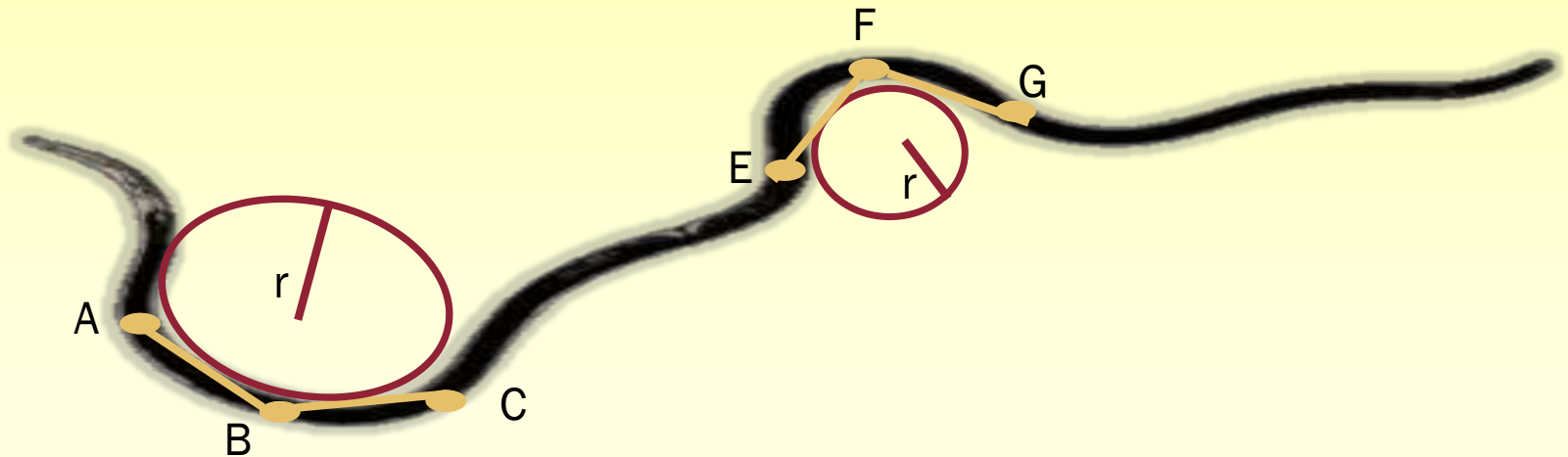


- velocity of movement of individual juvenile nematodes incubated in seed treatment active ingredients and formulated products





- curvature of movement of individual juvenile nematodes incubated in seed treatment active ingredients and formulated products

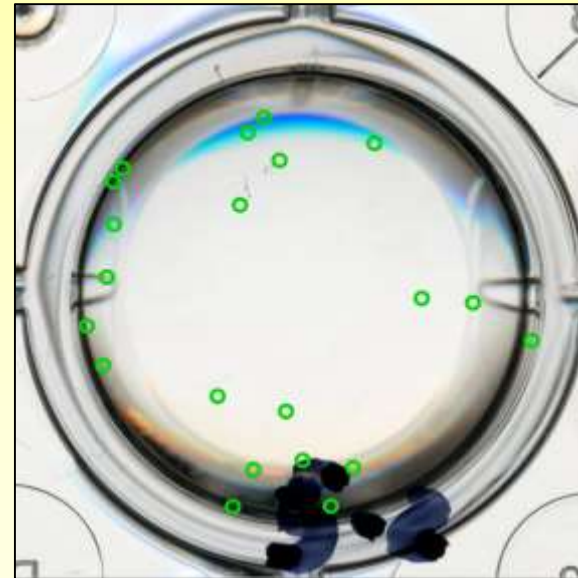


- velocity of movement of populations of juvenile nematodes incubated in seed treatment active ingredients and formulated products



EPSON Flatbed Scanner

Abamectin concentration 0.0 mg/L



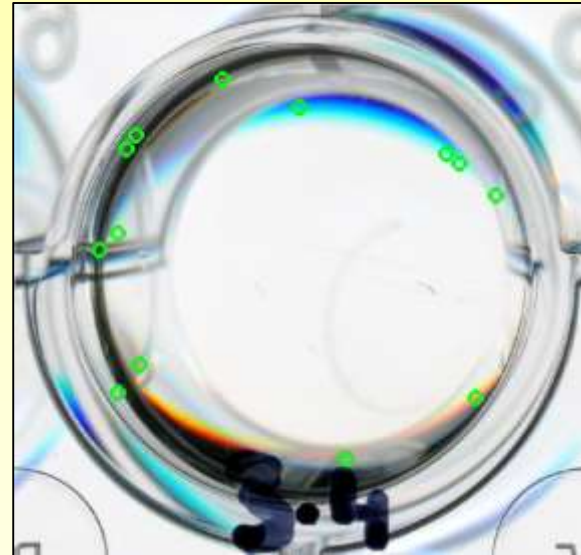
**BLUE** = moving more than 200  $\mu\text{m}$   
**RED** = moving less than 200  $\mu\text{m}$

- velocity of movement of populations of juvenile nematodes incubated in seed treatment active ingredients and formulated products



EPSON Flatbed Scanner

Abamectin concentration 1.0 mg/L



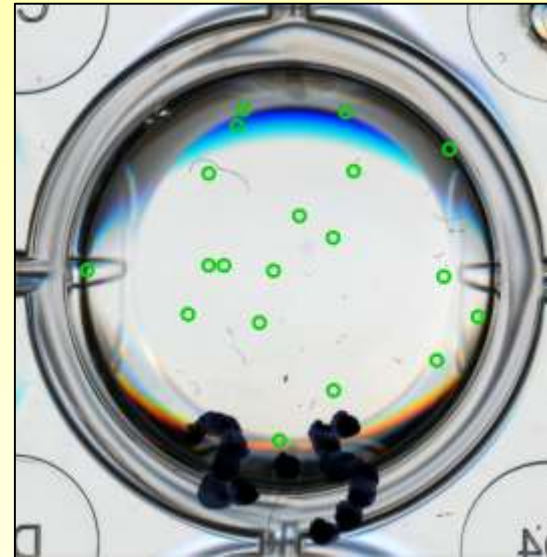
**BLUE** = moving more than 200  $\mu\text{m}$   
**RED** = moving less than 200  $\mu\text{m}$

- velocity of movement of populations of juvenile nematodes incubated in seed treatment active ingredients and formulated products



EPSON Flatbed Scanner

Abamectin concentration 10.0 mg/L



**BLUE** = moving more than 200  $\mu\text{m}$

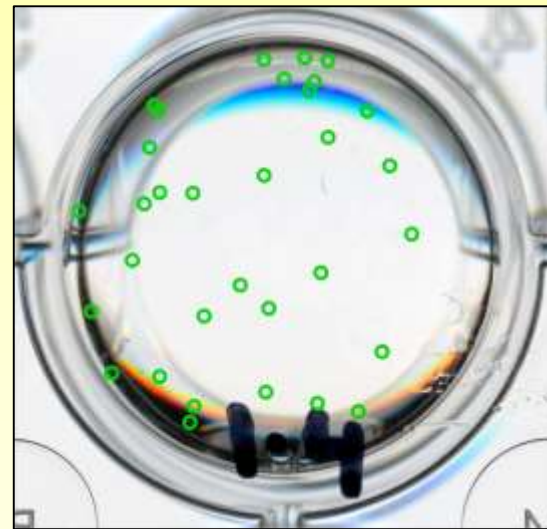
**RED** = moving less than 200  $\mu\text{m}$

- velocity of movement of populations of juvenile nematodes incubated in seed treatment active ingredients and formulated products



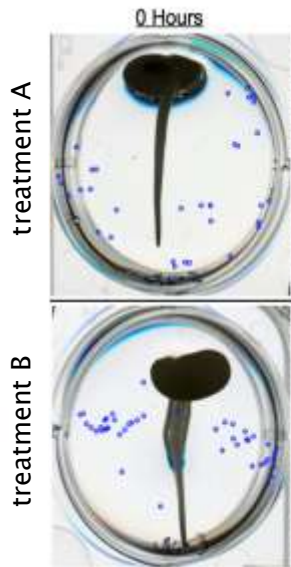
EPSON Flatbed Scanner

Abamectin concentration 100.0 mg/L



**BLUE** = moving more than 200  $\mu\text{m}$   
**RED** = moving less than 200  $\mu\text{m}$

- movement and infection of populations of juvenile nematodes into roots grown from seeds treated with formulated products



# Effects Detected So Far

- Avicta, Clariva, llevo and Votivo did not attract or repel SCN juveniles to treated roots
- leachates of soil with Avicta-treated seeds reduced speed, movement, and curvature of SCN juveniles
- SCN penetration of roots from Avicta-treated seeds was reduced
- movement of SCN juveniles in leachates of soil planted with Clariva-treated seeds was reduced
- SCN development was slowed in roots from Clariva-treated seeds
- leachates from llevo-treated seeds reduced hatching, speed and movement of SCN juveniles
- penetration of roots from llevo-treated seeds by SCN was reduced

# Credits

## Greg Tylka lab:

- Augustine Beeman, PhD 2017, Syngenta Seed Care Institute, Stanton, MN
- Jared Jensen, PhD 2017, AgBiome, Raleigh–Durham, NC
- EB Wlezien, PhD student, started 2017

## Santosh Pandey lab:

- Zach Njus, PhD 2016
- Taejoon Kong, PhD 2018
- Upender Kawal, PhD student, set to graduate 2019

## Support:



Bayer CropScience





# What's your number?

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