

# **Best Practices in Nematology, Finding Nemo!**

- sampling for success**
- establishing nematode gardens**

## Currently

- SYT BR&D Scientists have good capability to conduct internal Herbicide, Fungicide, and Insecticide trials.
- We do have some capability to conduct some Nematode trials internally, this capacity is increasing, but still remains limited.

## Future Plans- Why do we need more capacity?

- Continued screening of compounds for Nematicidal activity in Stein
- Early Stage compounds cannot go to COI's- IP/Secrecy
- Immediate need-
  - continued development of CLEO (100+ trials in BioPlan for CP/seedcare)
  - Submission still 3 years away
  - Support needed until/after registration (2024 and beyond)
- CLEO (peak sales) potential could be a \$200M business (US)

# Goal- To Expand Internal Capacity

- Guidance

- Transfer expertise to locations that may have capability (climate, soils, and crops), but lack the experience to conduct the trials
- By establishing new on-farm nematode sites for trials (RKN)
- Looking for grower fields with strong nematode history (SCN, RKN, Others)

- Internal Support

- Eliminate the perception that nematode trials are too difficult
- Provide inoculum and direction for Internal scientists to conduct trials in small field experiments and infesting fields

~~TIME~~

~~MONEY~~

PERSISTENCE ★

# Agronomic Crops

- Prospecting

- Look for Symptoms in Fields
- Ask Growers, Crop Advisers, University for leads....
- Sample
- Sample
- Sample (we need money and time to do this)
- GPS and Mapping of potential trial sites

- Timing

- Corn- Lesion numbers blow up at end of season (soil and roots)
- Soybean- Cyst counts highest around harvest, eggs most important
- Wheat- Lesion/Cyst counts highest in late spring when crop is present
- Cotton- for RKN, just pull up plants. For Reniform, mid-August
- Peanut- look at pods and pegs at harvest

## Do we need to Sample? Soybean Example.





## Do we need to Sample? Pepper Example.



## Do we need to Sample? Cauliflower Example.





## Horticultural Crops (RKN-using eggs)

- Production of Cysts, Eggs, and J2's to inoculate micro-plots and small field experiments. Production of nematodes at Vero Beach in greenhouse and ready to ship in the spring to Scientists.
  - Root Knot
    - *M. incognita*
    - *M. javanica*
    - *M. arenaria*
    - *M. hapla*
  - Soybean Cyst (microplot only)
  - Lesion Nematodes (microplot only)
  - ~~Other Ectoparasites (?)~~

**Requires Aphis Permits!**



## Horticultural Crops (using eggs)

- RKN and Cyst nematodes are different
  - A cyst is a survival mechanism, eggs retained in the cyst can require a hatching factor (host plant) to become active
  - For RKN, the survival stage is a J2. It must live off its fat reserves to survive. If no host is present, it moves downward to find cooler temperatures to slow metabolism
- For RKN, if the plant host is stressed, the nematode is stressed
  - Best to apply eggs when the soil temperature is cooler
  - Make sure the soil is moist
  - Placement of the eggs deeper in the soil instead of in the upper rhizosphere (#2 pencil)

## Horticultural Crops (using eggs)

- Inoculating a crop to increase the nematodes before conducting the trial
  - Eg. On plastic mulched beds, plant a crop of cucumber, inoculate with nematode eggs, grow crop for 42-60 days. At end of duration, cut off plants and remove, plant trial into same beds, adjacent plant holes.
  - Innovation- Inoculating eggs via the drip system.
- Cover cropping (Feeding your nematodes)
  - Always!
  - During fall and winter clover and vetch works well. During summer do not leave fallow, okra makes a good cover crop.

# Horticultural Crops (using roots)

- To start nematode fields consider gathering inoculum locally from “terminated fields”
- Scouting and maintaining touch with growers/ASR's/Sales/Channel
  - Dig roots once crop has been abandoned, but prior to tillage
  - Root-Knot easy to discern, collect root masses in back of pick-up truck or store in coolers/totes (short term)-quickly move them to desired field site
- Apply infected root systems to your own site
  - Use middle plow or shovels to open trench
  - Distribute infected root systems in trench
  - Cover with soil –(Can also bed bedded over and mulch laid on top)
  - Cover Crop! Multiple times if necessary
    - Summer- Okra
    - Fall- Clover and vetch

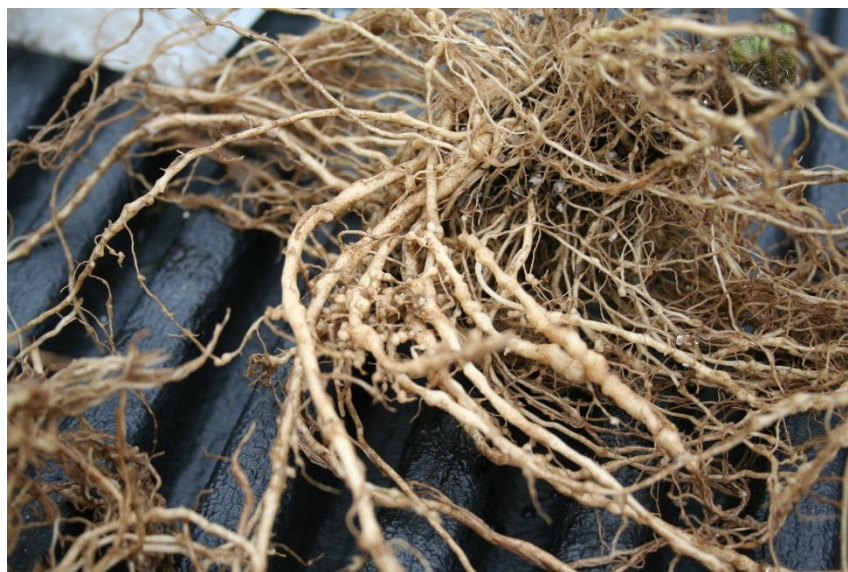


## Using a primary crop to increase nematode populations before planting a trial

Squash 6 Weeks after Planting



Tomato 6 Weeks after Planting



# Summary

- Row crops- Need to Prospect and Sample, nematodes are out there...somewhere....
- We can help you with inoculum, we just need advanced notice. 130 days is ideal (42 for transplant, 90 days of cook time)
- Nematode eggs are fragile, need to be babied.
- Cover Cropping- Feed your todes!

**Questions or Comments?**