



# Unraveling the Impact of Soybean Cyst Nematode (*Heterodera glycines*) on Dry Bean Production

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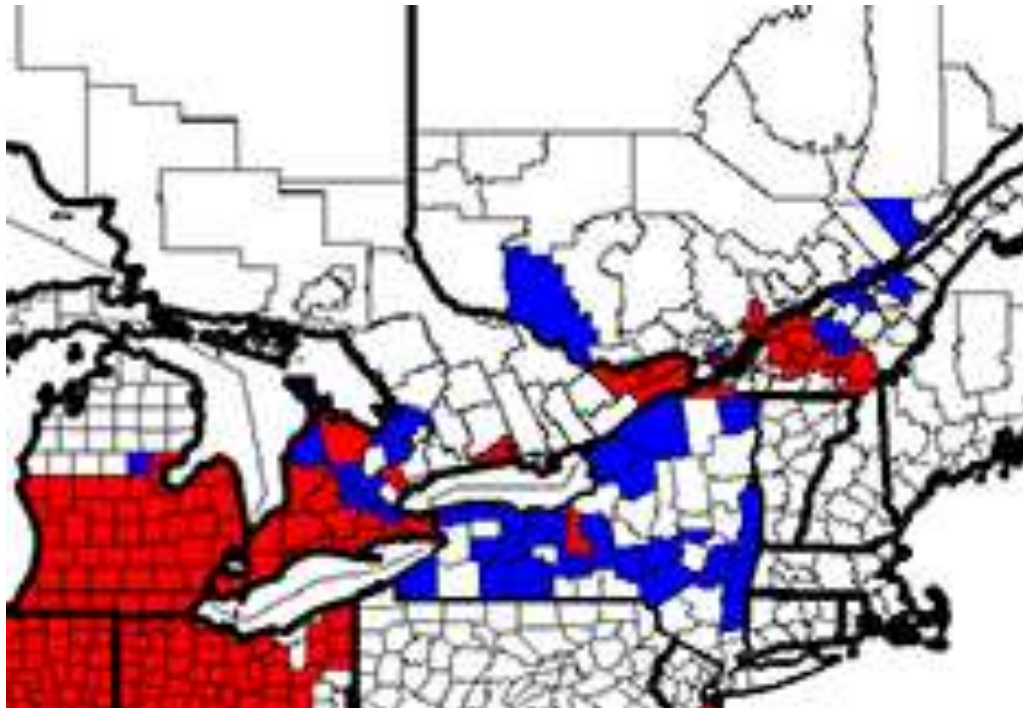
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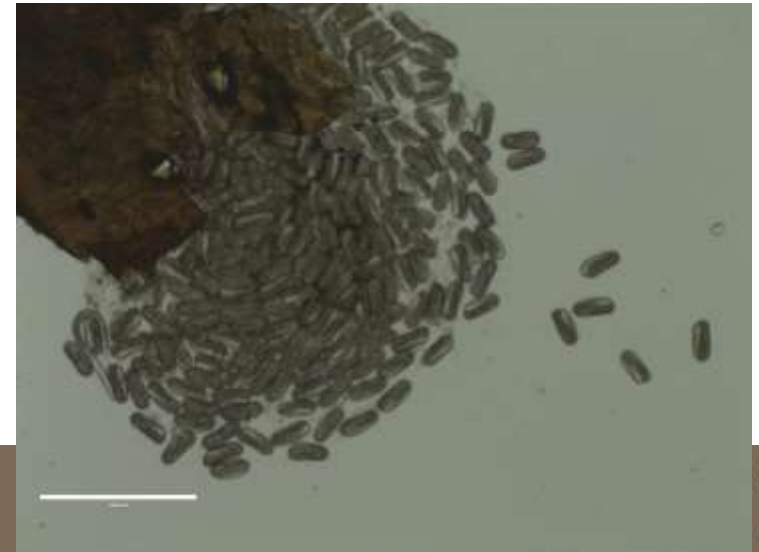
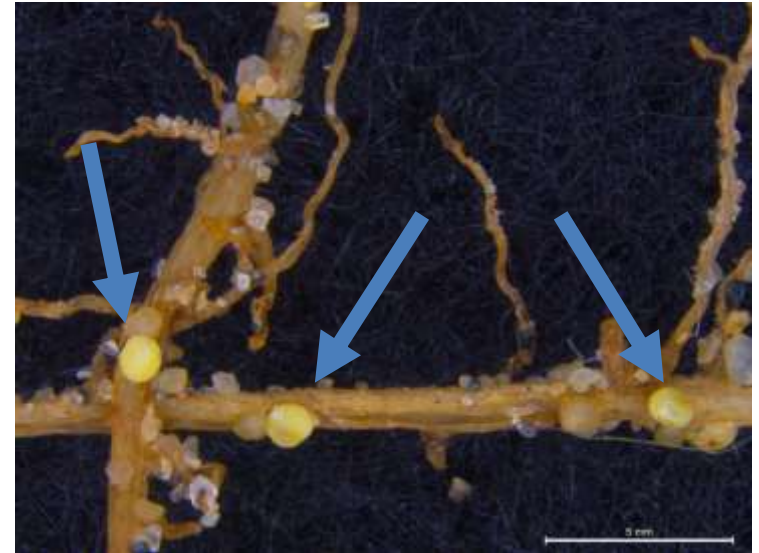
# Soybean cyst nematode

- Soil borne parasitic round worm
- By a large margin is the most yield reducing pathogen of soybean in Canada and USA (~120 M Bu/yr, #2 white mould ~30 M Bu/yr)
- Found in most soybean growing areas



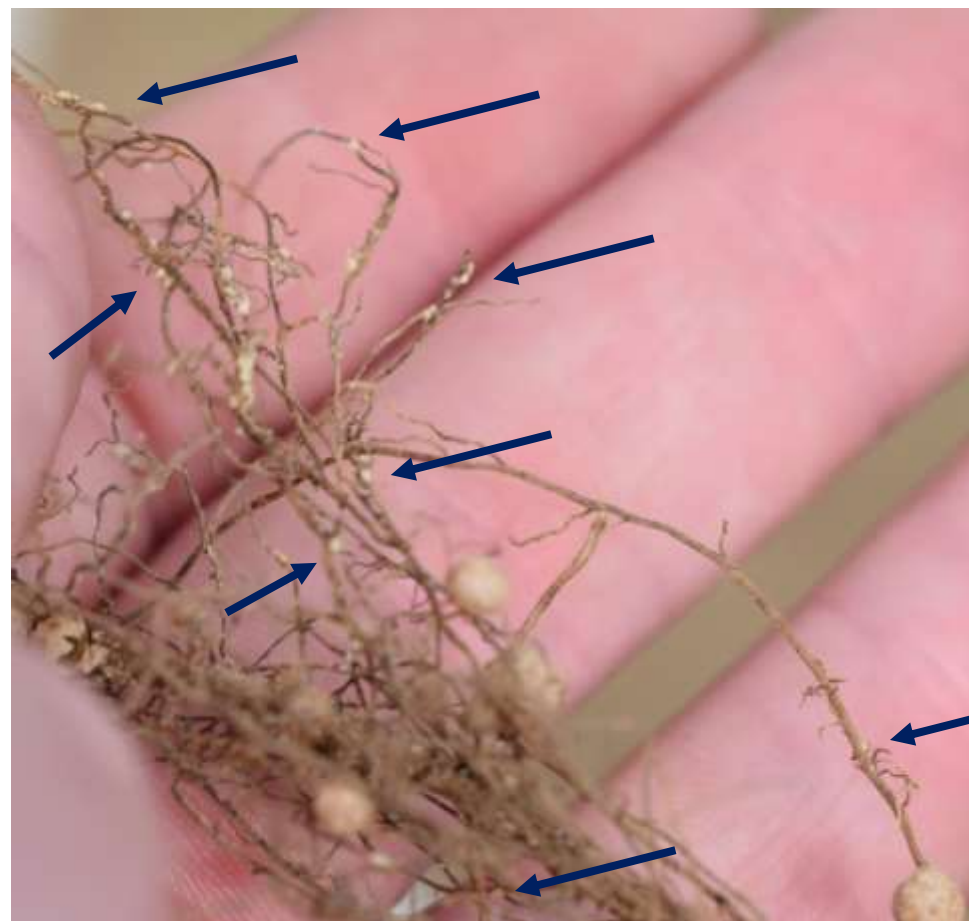
# Soybean cyst nematode

- SCN enters the cells
- Female SCN will begin to feed forming cell aggregates (Syncytium)
- Males fertilize the females, then leave the roots
- Females feed they swell with eggs within their body, forming a protective “cyst”
- Each female can contain up to 300 eggs



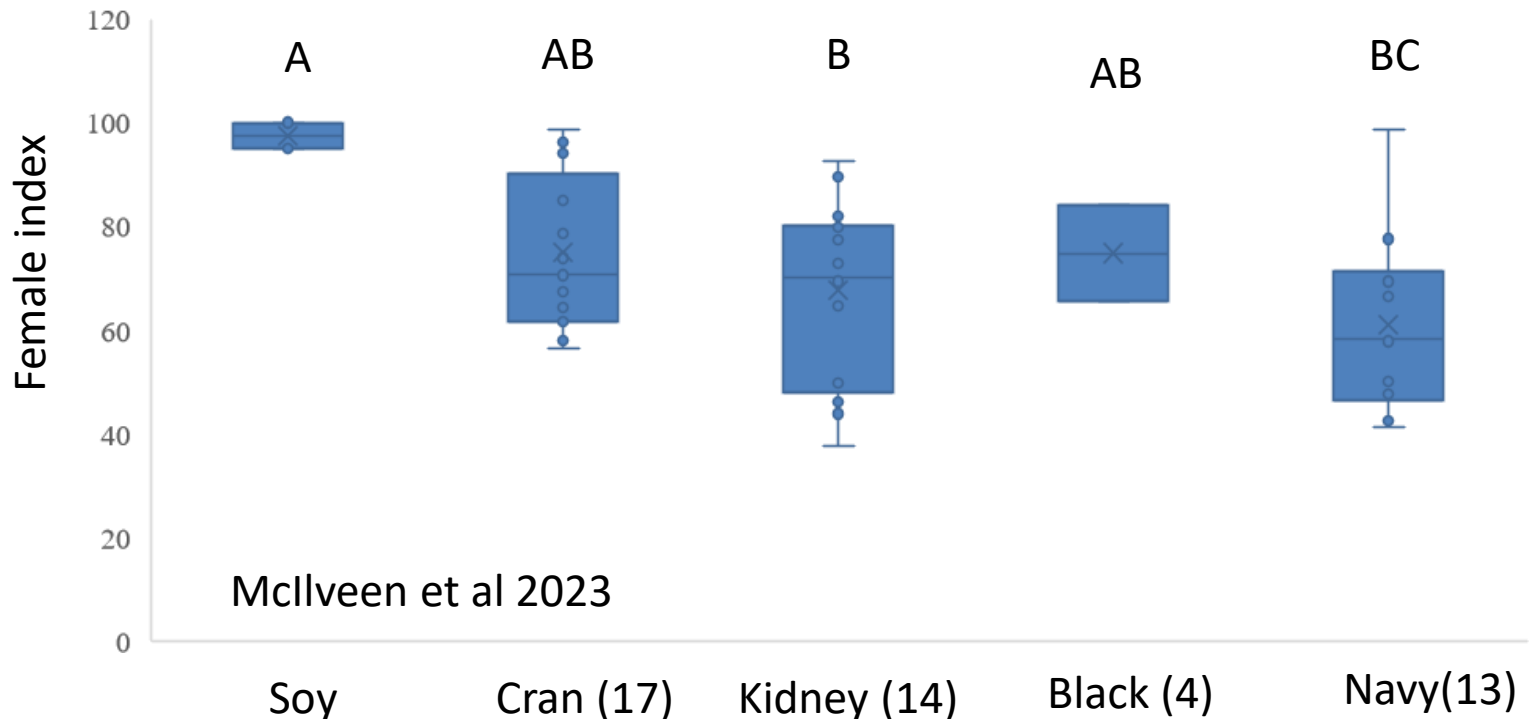
# Why is it such a problem?

- In most situations (~99%) there is zero visual above ground symptoms
- Rather they proceed to “steal” 5-10% of yield potential, which can be missed
- Very long lived in soil (10+ years)
- Can be seen with root digs, though can easily be missed
- Genetic resistance is good, however it is losing efficacy
- There are few effective chemical controls



# How does SCN impact Dry Bean production?

- SCN infects and reproduces on dry beans and other legumes (Adzuki, Mung, Lima beans )
- Many varieties have similar reproduction as to Soys against HG type 0 (race 3) SCN populations



# Impact on Growth?

- Extreme SCN levels (>30000 eggs/100g soil) have been correlated with reduced growth in Ontario (Trueman et al 2022)
- Moderate to very high (<10000) had no symptoms in the field
- Potted experiments indoors and outdoors showed reduction in height, number of pods and overall seed yield in some varieties (Poromarto et al 2010)



5000

0

10000

Growth of Pinto (GTS 900)  
With different levels of  
SCN (eggs/100 cc soil) in  
pots

Poromarto et al 2010

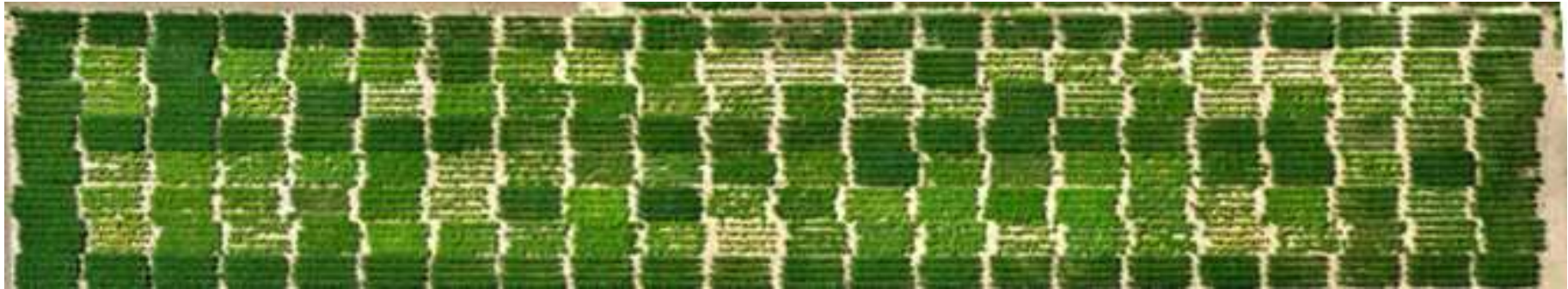
# Impact on yield in field

- Largely unknown
- Dry beans typically have heavy fertilization relative to soy, this likely covers up some of the damage (20-100 kg N/ha)
- Examine the impact of SCN on dry beans, along with the interaction to root rots and fertilization



# Variety trials

- Test the entries within the OPCC performance trials at 2 SCN infested sites, the relative yield will be compared using soybean checks (resistant and susceptible)
- Started in 2023



August 9. 2023 Field W, ~2000 eggs/100g soil



August 9. 2023 Field 51, 2000 to 15000 eggs/100g soil

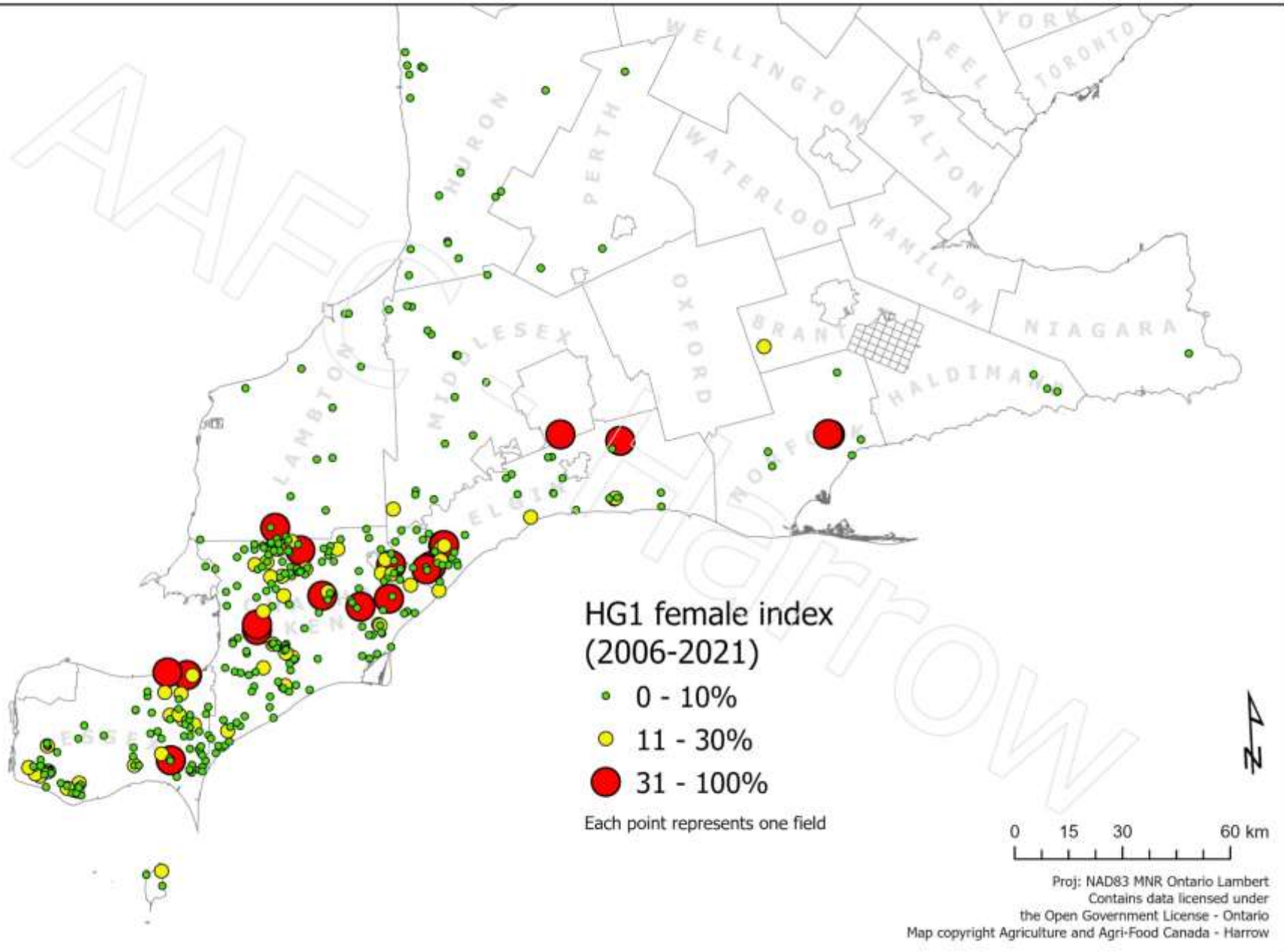


# Relation with N

- SCN infested fields, draw down residual N through planting sorghum and removing crop
- Repeat SCN tests under low, medium and high N rates



# HG1 female index in SCN populations sampled across SW Ontario, 2006-2021





# What we hope to accomplish

- Determine the overall impact of the pest on dry beans currently and under strict fertilization
- Work on developing mitigation strategies
  - Genetic resistance works for soybeans, work with breeders on finding resistance sources in common bean (medium long term)
  - Test existing and new seed treatments for short term bridges



# Acknowledgements



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