



LIVING LAB - ONTARIO

Biodiversity - Earthworms, Wireworms, Springtails, Mites

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Lead Researcher: Ian Scott (ian.scott2@agr.gc.ca)

Research Objectives:

Investigate the effect of cover crops and mixtures on:

- Insect crop pests (wireworm) and beneficial species (carabid beetle)
- Macro-invertebrate (earthworms) and micro-invertebrate (springtail, mite) diversity and abundance

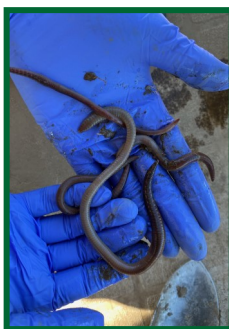


What Does This Mean for Agriculture in Ontario?

- Developing a baseline for above-ground beneficial insect diversity for ecosystem services assessments
- To measure the impact of long term cover crops on beneficial insect diversity and the relation to crop yields, soil nutrients, and soil structure compared to no cover crops
- The effectiveness of continuous cover and BMPs for the control of insect pests and support of beneficial insect biodiversity

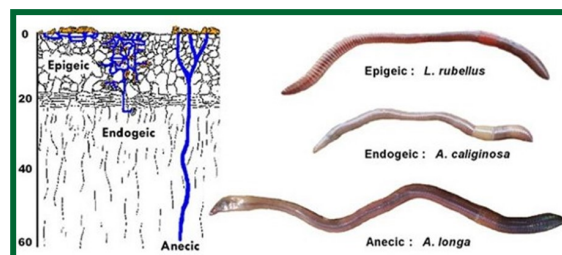
Parameters Measured

- Wireworm potato damage and Carabid beetle species identity
- Earthworm counts and macro-invertebrate species identity from soil monoliths (0.25 cm³)
- Micro-invertebrate identity from soil cores and feeding activity from bait lamina strips
- Soil % moisture, temperature, pH, particle size, and nutrients
- Weed species and abundance



Sampling soil monolith in crop plots at Ken Laing's (Left)

Anecic earthworms collected by mustard treatment (Right)



Types of earthworms: epigeics, endogeics, and anecics



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Sites Sampled

Henry Denotter



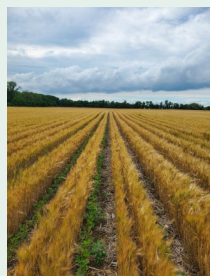
- Examine if buckwheat cover crops increase biodiversity and abundance of soil micro-invertebrates

Ken Laing



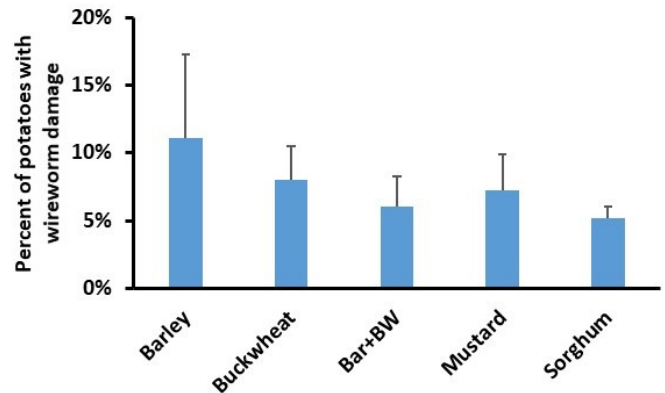
- Buckwheat, mustard, and sorghum to suppress wireworms and weeds and provide soil amendment
- Study how mulch created from grass and legume cover crops increases the abundance of epigeic and anecic earthworm species

Greg Vermeersch



- Examine whether no till soybean can increase biodiversity and abundance of micro-invertebrates

Early Results



- Combined results from farms for potato wireworm damage from potatoes after cover crops
- 50% less damage after sorghum compared to barley



Mowing a cover crop for potato trials



Wireworm (orange body) feeding in a potato

Key Terms

- Soil monolith:** intact block of soil which preserves its colours, structure and layers
- Crop residue:** plant material remaining after harvest
- Bait lamina test:** strips containing bait for soil organisms are placed into the soil and over a period of time the amount of bait left helps determine the feeding activity of soil organisms