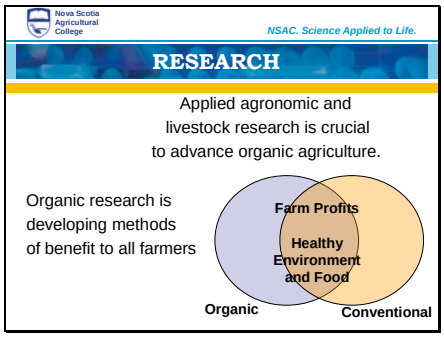
Slide 1

Slide 2



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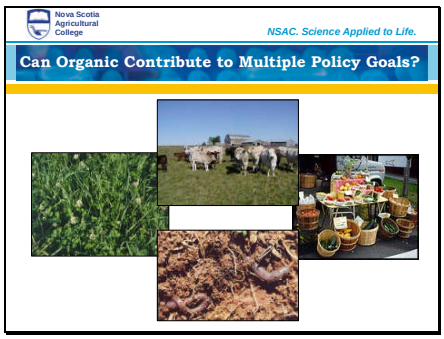

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Agricultural literacy

Branded production system… not product

Linking consumers with producers

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PRODUCTIVITY, SOIL FERTILITY AND SOIL HEALTH IN ORGANIC POTATO PRODUCTION

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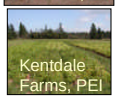
Locations: NSAC, Brookside, NS
Kentdale Farms, PEI



Varieties: Shepody, A90586-11

Amendments	N applied (kg/ha)
Control	0
Nutriwave manure	300; 600
Compost	300; 600

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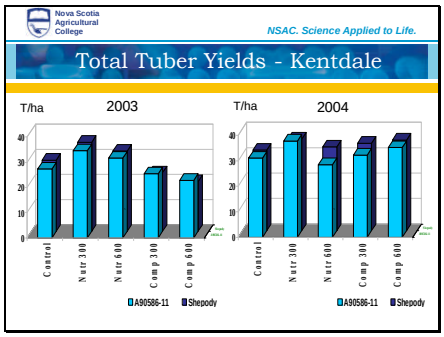

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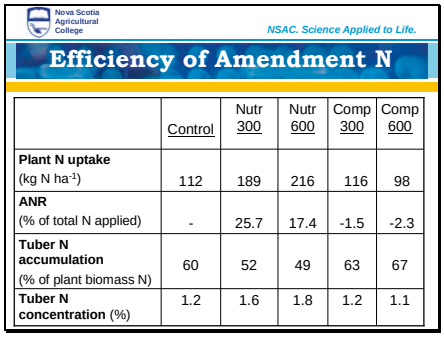

	Control	Nutr 300	Nutr 600	Comp 300	Comp 600
Plant N uptake (kg N ha^{-1})	112	189	216	116	98
ANR (% of total N applied)	-	25.7	17.4	-1.5	-2.3
Tuber N accumulation (% of plant biomass N)	60	52	49	63	67
Tuber N concentration (%)	1.2	1.6	1.8	1.2	1.1

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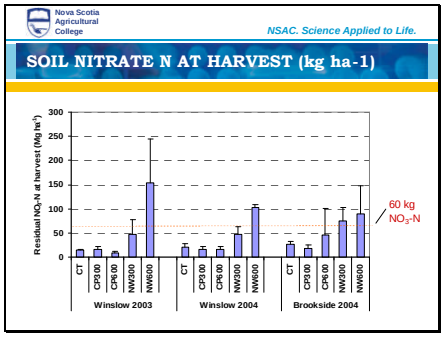
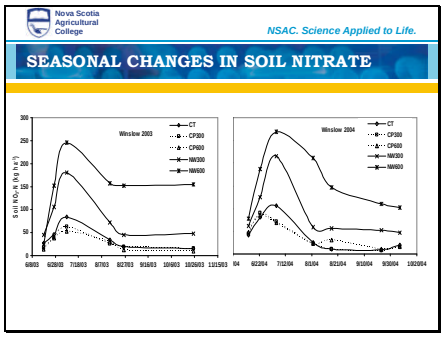


Slide 11



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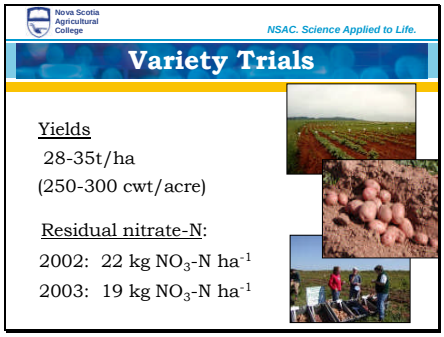

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Plant Health and Potato Beetle Dynamics

Colorado Potato Beetle dynamics (larvae development) are influenced by plant health/fertility

Boiteau et al., J. Applied Entomology, 2008

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Changes in Soil Health throughout an Organic Potato Rotation

Karen Nelson, MSc candidate
Nova Scotia Agricultural College

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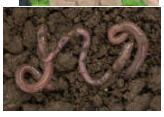
Soil Health

- Capacity of soil to function as a vital living system within ecosystem and land use boundaries (Doran et al. 1994)
- Central concept in sustainable agriculture
- Examines the soil holistically: interaction of physical, chemical and biological factors
- A diverse and abundant soil biota is considered integral to a healthy and productive soil
- Soils unable to recover from a disturbance (potato) will continue to degrade over time



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Objectives

1. To determine the yearly changes in the health of the soil throughout an extended 5 year organic potato rotation using biological, physical and chemical indicators

2. To measure the morphological growth and reproduction response of *Folsomia candida,* a potential bioindicator

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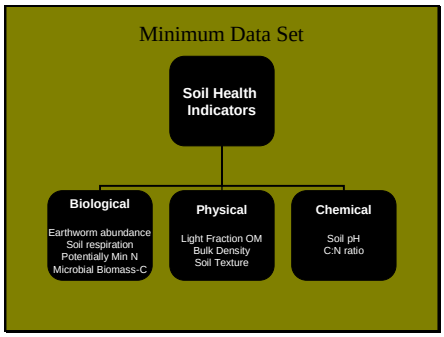

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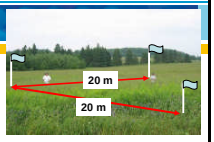
Methods

- RICB design
  - Four organic farms (PEI & NB)
  - 4 quadrants per field
  - Each phase of the 5yr rotation were composite sampled (n=24)
- Included adjacent reference fields at each farm
- Earthworms were collected in August by hand-sorting



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Collembola Analysis

- Growth and reproduction of *Folsomia candida* are being assessed in five substrates :
  - Long term pasture fields
  - Deciduous forest soil
  - Composted manure
  - Sand
  - Sand with yeast

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RESULTS

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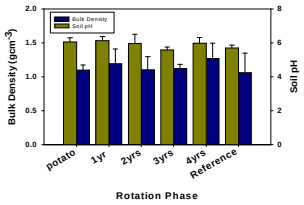
Results: Bulk Density & pH



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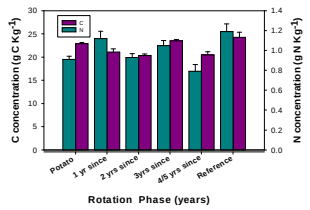
Results: Carbon and Nitrogen



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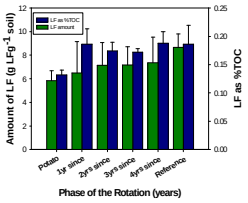
Results: Light Fraction OM



- Amount of LF indicates an increasing trend
- No significant difference when looking at it as a %TOC

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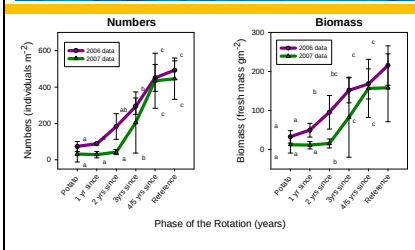
Earthworm: numbers & biomass



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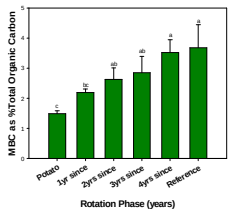
Microbial Biomass



- Microbial biomass-C as a % of TOC was lowest in the potato year
- MBC/TOC increased to levels found under pasture (3.7% TOC) after two or more years

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CONCLUSIONS

- Organic potato production systems are very conservative with respect to residual soil nitrates at harvest, and associated environmental risks
- Extended rotations characteristic of organic potato farms have measurable benefits to soil health
- Biological indicators most sensitive to changes in soil health - Earthworm abundance and soil microbial biomass increased as rotation period increased.

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NEW RESEARCH DIRECTIONS

- Soil Fertility and Soil Health
- Organic Systems and Air Quality (GHG)
- Organic Systems and Water Quality
- Improved Resource Utilization
- Blueberry Production
- Dairy Production
- Vegetable Production

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ACKNOWLEDGEMENTS

- Canada Research Chairs Program
- OMAF New Directions Program
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- Nova-Agri Associates (Centreville, NS)
- Western Ag. Innovations (Saskatoon, SK)
- Organic Meadow (Guelph, ON)
- Louisiana Pacific (Chester, NS)
- Many Farmers and Collaborators