Cover crops in vegetable production: A systems-based approach through collaboration

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Ontario Vegetable Production

Farm Value of Major Ontario Crops, 2005-2009

- Field tomatoes - all
- Proc tomatoes
- Potatoes
- Greenhouse tomato
- Mushrooms
- Apples
- Grain corn
- Soybeans
- Winter wheat

million dollars (CAD)
Ontario Vegetable Production

Challenges:

- Productivity - competitiveness
- Crop quality
- Limited land base – soil, climate, access to water
- Environmental impact

*A healthy, productive soil is crucial.*
I see you starting and setting the scene.
Dr. Laura VanEerd, 04/13/2011
Cover Crops & Vegetable Production

Current needs:
• scavenge nutrients
• provide nutrients

Many vegetable producers have traditionally used cover crops to maintain and protect high value, productive vegetable soils. Soil health improvements, reductions in the use of pesticides etc.
Systems-based Approach

- Part of the rotation
  - peas–cc, sweet corn–cc, wheat–cc, tomato–cc, corn–cc, squash–cc
- Many different disciples
This is where I can start or on the funding slide. Still have to tweak the next 10 slides

Dr. Laura VanEerd, 04/13/2011
Cover crops - Tomatoes

2 rotations: 2009-10 and 2010-11

OSR+Rye  No Cover  Rye  Oat

OSR  Oat  OSR+Rye  No Cover  Rye

L.L. Van Eerd. 2010. Ridgetown Campus  University of Guelph
No difference between cover crops

- **Foliar damage**
  - Colorado potato beetle (June 21, July 7)
  - Tobacco hornworm (July 26)
  - Bacterial speck/spot (June 21, Aug 8)
  - Bacterial canker (July 22, Aug 8)
  - Early blight (Aug 8)

- **Fruit damage**
  - Blossom end rot (July 22)
No difference between cover crops

- Fruit Quality
  - % Bacterial spot or speck
  - % Stink bug damage
  - % Anthracnose
### Tomato Fruit Quality

#### No difference between cover crops

<table>
<thead>
<tr>
<th>Parameter</th>
<th>TSH18</th>
<th>CC337</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agtron colour</td>
<td>18 (18)</td>
<td>19 (19)</td>
</tr>
<tr>
<td>Soluble solids</td>
<td>4.3 (4.3)</td>
<td>4.4 (4.4)</td>
</tr>
<tr>
<td>pH</td>
<td>4.2 (4.3)</td>
<td>4.3 (4.3)</td>
</tr>
</tbody>
</table>
Plant available nitrogen

- Oilseed radish
- Oilseed radish + fall rye
- No cover crop
- Fall rye
- Oats

A bar chart showing the plant available nitrogen (kg N/ha) for different treatments. The treatments are ordered as follows from left to right:

- Oilseed radish: a
- Oilseed radish + fall rye: ab
- No cover crop: ab
- Fall rye: b
- Oats: b
- Seeding cost of planting $20/ac
- Cost of cover crop seed($/lb, $/ac):
  - Oats - $0.3227, $26.14
  - Rye - $0.2727, $18.27
  - OSR - $2.10, $33.60
  - OSR + Rye - same as above, $28.18
- Cost of the burndown was $20.75/ac
Soil Quality

Difference between cover crops

Soil Quality Scoring (Ontario Soil Health Project - Cornell Test)

<table>
<thead>
<tr>
<th>Cover Crop</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>No CC</td>
<td>64</td>
</tr>
<tr>
<td>Oats</td>
<td>66</td>
</tr>
<tr>
<td>OSR</td>
<td>68</td>
</tr>
<tr>
<td>Peas</td>
<td>70</td>
</tr>
<tr>
<td>Rye</td>
<td>72</td>
</tr>
<tr>
<td>Vetch</td>
<td>74</td>
</tr>
<tr>
<td>No CC</td>
<td>76</td>
</tr>
<tr>
<td>Oats</td>
<td>78</td>
</tr>
<tr>
<td>OSR</td>
<td>76</td>
</tr>
<tr>
<td>Peas</td>
<td>74</td>
</tr>
<tr>
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<td>72</td>
</tr>
<tr>
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<td>70</td>
</tr>
</tbody>
</table>
Key Concepts about Cover Crops

- Risk management
- Return on investment
- Environmental benefits
Cover Crop KTT Activities

May 2010-April 2011

- Presentations
  - Prince Edward County Vineyard Growers Field Day (50+)
  - South Simcoe Soil & Crop Improvement Association (25)
  - Great Lakes Fruit Working Group (35)
  - Great Lakes Fruit and Vegetable Expo (150)
  - Potato Growers Conference (150)

- Demonstrations
  - Outdoor Farm Show – Brassica Cover Crop Demo

- Newsletter Articles/Radio Podcasts
- Purdue Cover Crop Guide
Cover Crop KTT Activities

May 2010-April 2011

- Grower Meetings
  - Processing Vegetable Industry Convention (125)
  - Southwest Agricultural Conference (120)
  - Pioneer Seed Corn Growers Meeting (150-200)
  - Conservation Tillage & Technology Conference (350)
  - Grain Farmers of Ontario (40)

- Meetings for industry or extension personnel
  - Seed Corn (6)
  - Great Lakes Vegetable Working Group (35)
  - Midwest Cover Crop Council (30)
1. Ontario Cover Crop Decision Tool
   - Based on Midwest Cover Crop Council (MCCC)

Objectives:
LV6

This could go at the first part too. Do you like how I use ‘custom animations’ to layer into 1 slide?

Dr. Laura VanEerd, 04/13/2011
Objectives:

3. Increase knowledge and experience
   - Innovator profiles
   - Posters
   - Workshop

Help us get the cover crop information you want!

GROWERS: Number of acres farmed (owned + rent)?
- 1-500
- 501-1000
- 1001-1500
- 1501-2000
- > 2000

AGRONOMIC CONSULTANT: Number of acres consulted?
- 1-5,000
- 5,001-10,000
- 10,001-20,000
- 20,001-50,000
- > 50,000

How old are you? Check one.
- < 24
- 24-34
- 35-49
- 50-64
- > 65

What do you grow? Check all that apply.
- Field crops
- Vegetables
- Fruit

Have you used a cover crop (including red clover) in the past year?
- Yes
- 3 years
- 6 years
- 12 years
- 13 or more years
- Never

Rank the importance of possible benefits of cover crop use.

- Reduce soil erosion
- Improve soil quality or organic matter
- Nitrogen holding/soil leaching
- Nitrogen credit for next crop
- Conserve water in the next crop
- Weed control
- Other reasons (____________________)

Rank the importance of possible concerns of cover crop use.

- Too costly
- Too much time involved
- Cover crops difficult to control
- Cover crops attract unwanted pests or weeds
- Cover crops take nutrients (N) from the next crop
- Cover crops reduce crop yield
- I don't have a runoff or soil erosion problem
- I don't have a highly leachable soils
- Don't need them
- Other reasons (____________________)

In terms of general crop production, how do you prefer to get information?

- NOT important
- VERY important
- Email
- Internet/Web
- Print - newspaper, trade magazines
- Your crop input dealer or crop scout
- Personal one-on-one communication
- Field days
- Grower meetings
- Radio stations
- Other reasons (______________________________)

Thank You!
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KTT

Objectives:

Rate how you prefer to get information on general crop production practices.

Help us get the cover crop information you want!

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Cover Crop Funding Partners

- Grower organizations
  - Ontario Tomato Research Institute
  - Fresh Vegetable Growers of Ontario
  - Seed Corn Growers of Ontario
  - Ontario Processing Vegetable Growers
- AAFC – Agricultural Adaptation Council CORD IV program
- OMAFRA – New Directions, Resources Management & Environment, COA-Ontario Great Lakes Program
  - OSCIA – Nutrient Management BMP Demonstration Grant
LV3  maybe put at end?
Dr. Laura VanEerd, 04/13/2011