Wireworm Research Activities in PEI in 2015 and Advances in Click Beetle Trapping

Christine Noronha
Charlottetown Research and Development Centre
Charlottetown
OUTLINE OF THIS PRESENTATION

1. Insecticide Trials
2. Mustard Trials
3. Variety Trials
4. Click Beetle Trapping
INSECTICIDE TRIALS
INSECTICIDE TRIALS

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Mean number of holes per tuber</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check</td>
<td>8.3 a</td>
</tr>
<tr>
<td>Thimet 32 g AI/100 m</td>
<td>4.4 b</td>
</tr>
<tr>
<td>Capture 240 EC 264 g AI/ha</td>
<td>5.1 b</td>
</tr>
<tr>
<td>Capture 240 EC 311 g AI/ha</td>
<td>5.5 b</td>
</tr>
</tbody>
</table>
INSECTICIDE TRIALS

Thimet 32 g/100mrow
Capture 311gai/ha
Titan 6.2 gai/100kg
Titan 6.2 gai/100kg + Capture 311gai/ha
Titan 12.5gai/100kg
Titan 12.5gai/100kg + Capture 311gai/ha

Mean number of holes per tuber

Check 4.7a
Thimet 1.4 c
Capture 2.1 bc
Titan low 5 a
Titan low + Capture 1.7 bc
Titan 3.3 b
Titan high + Capture 1.6 bc
INSECTICIDE TRIALS

Check

Titan

Thimet

Sample 1
Check

Sample 1
Pencho low

Sample 1
Thimet
INSECTICIDE TRIALS

Capture

Thimet

Check
MUSTARD TRIALS
Using brown mustard as a nurse crop

Brown Mustard was planted in the potato rows at 5 different seeding dates throughout over the Summer.
Growth observed of Brown mustard planted in the potato row on September 16

Seeding date July 14

Seeding date July 30

Seeding date Aug 13

Seeding date Aug 20

Seeding date Aug 28
Mustard roots within potato zone
Roots of Brown mustard planted within potato row

Seeding date July 14

Seeding date July 30

Seeding date Aug 13

Seeding date Aug 20

Seeding date Aug 28
Figure 1. Number of blemishes caused by wireworm feeding in plots planted with brown mustard as a nurse crop on 5 different dates during the growing season 2015. **No insecticide was used**
Twenty varieties and six replicates per variety
Figure 2. Mean number of blemishes (holes+scars) in different potato varieties grown without an insecticide application to protect against wireworm damage.
Where do they prefer to lay their eggs

Undisturbed fields with green plant material are preferred

Sod fields

Crop Fields

Pasture fields

Adults will also lay eggs in bare soil
Proportion of male and female click beetle (*A. sputator*) population in fields

- **Males:** 60%
- **Females:** 40%
Proportion of male and female click beetle (*A. sputator*) population in fields

- 40% Females
- 15% Males
- Remove 45% of the males using pheromone traps
Objective

• To find a way to attract and trap females in the field and subsequently reduce egg laying.

• To develop trap that could be placed in any field.

• Easy to install and use.
LIGHT TRAPS
Study was conducted in 2 field

- 10 Light traps, 10 No-light traps field one (8 acres)
- 5 light traps, 5 no-light traps in field 2 (7 acres)
### Species found in Traps

<table>
<thead>
<tr>
<th>Species</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriotes Sputator</td>
<td>![Image of Agriotes Sputator]</td>
</tr>
<tr>
<td>Hypnoidus abbreviatus</td>
<td>![Image of Hypnoidus abbreviatus]</td>
</tr>
<tr>
<td>Ctenicera cylindriformis</td>
<td>![Image of Ctenicera cylindriformis]</td>
</tr>
<tr>
<td>Sylvanelater cylindriformis</td>
<td>![Image of Sylvanelater cylindriformis]</td>
</tr>
</tbody>
</table>
Figure 1. Comparison of the mean number of click beetles captured in ten the light and no-light traps over their activity period (May 19-Aug. 25) (Field 1, 8 acres)

- **Total:** Light = 9362, No light = 3613
- **Males:** Light = 4570, No light = 1867
- **Females:** Light = 3206, No light = 1314
- **Not sexed:** Light = 1584, No light = 432

98% *A. sputator*
Figure 2. Comparison of the number of *Agriotes sputator* male and female adults captured per trap in the light and no-light traps (Field 1, 8 acres)
Figure 7. Comparison of the number of *Agriotes sputator* adults captured per traps when the light was turned on or off. (Field 2, 7 acres)
Figure 6. Comparison of the number of click beetles captured in traps when the light was turned on or off (Field 2)

97% A. sputator

Light-on
Light-off

Click beetles

Number of beetles captured

Total  Males  Females  Not Sexed

*
Figure. Total number of beetles found per sample days in light and no-light traps in Field 1. 2015
Cost of one trap $12

Number of **females** caught in each trap  = 320

One female lays 100-200

320 females would lay 32,000 - 62,000 eggs

If half of the eggs survive you will have 16,000 – 32,000 larvae

One trap can prevent a considerable number of eggs from being laid
How to position the light and pitfall trap
How to position the light and pitfall trap
How to position the light and pitfall trap
Research to continue in 2017

- **Insecticide Trials** – Continue to test different insecticides and insecticide combinations
- **Rotation Crops** - Continue to refine the use of brown mustard and buckwheat
- **Click beetle trapping** - Ascertained the trapping distance of the light trap to determine how many traps are required per acre
- **Click beetle biology** – Conduct studies on the biology of *Agriotes sputator* to determine egg laying preference, egg laying duration, hatch time, female life span etc.
ACKNOWLEDGEMENTS

Technical Assistance
The Entomology Team
Natasha Boyle, Suqi Liu, Dave Carragher, Samantha Gauthier, Alister Ozon, Olivia Doran, Megan Jetson, Dan Ulrick, Ron White, Dave Sherren and several other students and technicians

Local Support
The PEI Department of Agriculture
PEI Potato Board
PEI Horticultural Association

Funding Support
Canadian Horticultural Council
Agriculture and Agri-Food Canada
Industry Members

All the growers I have the pleasure to work with in PEI