Western Bean Cutworm History

- *Striacosta albicosta* (Smith)
- Specimen collected in Arizona in 1887
- Damage documented in dry beans in Colorado and Idaho in 1940s
- Significant damage in corn in Nebraska by 1970s
- Sporadic damage on occasion in Iowa but no noticeable expansion until 1999
<table>
<thead>
<tr>
<th>State/Province</th>
<th>Date</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minnesota</td>
<td>1999</td>
<td>(O’Rourke &amp; Hutchison 2000)</td>
</tr>
<tr>
<td>Illinois</td>
<td>2004</td>
<td>(Dorhout &amp; Rice 2004)</td>
</tr>
<tr>
<td>Missouri</td>
<td>2004</td>
<td>(Dorhout &amp; Rice 2004)</td>
</tr>
<tr>
<td>Wisconsin</td>
<td>2004</td>
<td>(Cullen 2007)</td>
</tr>
<tr>
<td>Indiana</td>
<td>2006</td>
<td>(Dorhout &amp; Rice 2008)</td>
</tr>
<tr>
<td>Michigan</td>
<td>2006</td>
<td>(DiFonzo &amp; Hammond 2008)</td>
</tr>
<tr>
<td>Ohio</td>
<td>2006</td>
<td>(DiFonzo &amp; Hammond 2008)</td>
</tr>
<tr>
<td>Ontario</td>
<td>2008</td>
<td>(Baute et al. 2009)</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>2009</td>
<td>(Baute et al. 2009)</td>
</tr>
<tr>
<td>New York</td>
<td>2009</td>
<td>(Baute et al. 2009)</td>
</tr>
<tr>
<td>Québec</td>
<td>2009</td>
<td>(Baute et al. 2009)</td>
</tr>
</tbody>
</table>

Rapid spread across Mid-West US and Eastern Canada
Western Bean Cutworm Seasonal Cycle

- Over winter in soil chambers
- Pupae
- Adults
- Egg laying
- Larvae
- Damage

Larval dispersal
Western bean cutworm larva

5th and 6th instars

T. Baute, OMAFRA
Larvae chew into pods
Damage to commercial beans
(from Greg Varner – MI Bean Commission)

2-5% culls
Research Collaborators

- Dr. Art Schaafsma, UGRC (PI)
- Chris Gillard, UGRC
- Jocelyn Smith, UGRC, PhD candidate
- Lindsey Goudis, MSc candidate
- Dr. Rebecca Hallett, University of Guelph
- Cheryl Trueman, UGRC
- Elaine Roddy, OMAFRA
- Dr. Jeremy McNeil, Western University
Research Objectives 2010 - 2013

1. Determine the distribution and overwintering success of WBC.

2. Determine the phenology of WBC in the Great Lakes Region.

3. Determine the host range of WBC.

4. Evaluate the efficacy of foliar insecticides in corn, dry beans, vegetable crops and transgenic corn for WBC control.

5. Establish economic thresholds for WBC in dry beans and corn.

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WBC Pheromone Trapping
WBC Trap Network

An extensive network of Western Bean Cutworm (WBC) traps across Ontario will be used to detect the peak adult moth flights of this corn and dry bean pest. Trap catches will guide field scouting activities and the timing of management of WBC and will also be used to determine the extent of the expanding distribution of WBC.

Watch for weekly maps showing updates on trap catches province-wide [here].

WBC Scouting and Training Material - Presentations

Click on the title above for more resources and presentations related to Western Bean Cutworm (WBC), including VERY useful tools for identifying WBC.

Trapping WBC - Instructions

Click on the title above to access trapping instructions and training materials.

Weekly Maps of Average Corn Growth Stages and WBC Trap Catches

Click on the title above to access Weekly Maps of WBC Trap Catches, Corn Growth Stages and links to Michigan and Ohio data.

Archives located under the above title - ** In the Archives section are all previous year's WBCTN Participant's Reports. **
### WBC Trap Network Success

<table>
<thead>
<tr>
<th>Year</th>
<th># Traps</th>
<th>Moths Captured</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010*</td>
<td>471</td>
<td>59582</td>
</tr>
<tr>
<td>2011</td>
<td>621</td>
<td>159076</td>
</tr>
<tr>
<td>2012</td>
<td>395</td>
<td>126962</td>
</tr>
<tr>
<td>Totals</td>
<td>1487</td>
<td>345620</td>
</tr>
</tbody>
</table>

*2010 captured most northern moth on record (Timiskaming)*
Western Bean Cutworm Trap Network 2012
Trap Catches for Week 9 (July 15-21)

Legend
- ★ = Sweet Corn
- □ = Snap Beans
- ○ = Corn Site
- △ = Dry/Edible Bean Site

- Trap not yet reporting
- Trap reporting—no moths caught
  - 1 - 50
  - 51 - 100
  - 101 - 500
  - 501 - 750
  - 751 - 1000
  - Over 1001

Eastern, Central and Northern Ontario

Agricultural Adaptation Council
Ontario Grain Farmers of Ontario
Coloured Bean Growers
Ontario White Bean Producers
Laresco
Average Number of WBC Moths Caught Per Week in Ontario 2009-2012

Week 1 = Week of June 5
Week 2 = Week of June 13
Week 3 = Week of June 20
Week 4 = Week of June 27
Week 5 = Week of July 4
Week 6 = Week of July 11
Week 7 = Week of July 18
Week 8 = Week of July 25
Week 9 = Week of August 1
Week 10 = Week of August 8
Week 11 = Week of August 15
Week 12 = Week of August 22
Week 13 = Week of August 29
Week 14 = Week of September 5

(+ /− 1 or 2 days depending on calendar year)
Pre-pupa within a soil chamber
Jocelyn Smith, UGRC
• Average ~ 2 moths/m² emerged
• Emergence from 5 July to 2 August
• Peak emergence during the week of 18-25 July
Research Objectives

3. Determine the host range of WBC.
   • 3.1. Evaluate field and vegetable crop and weed species for successful WBC development and potential as hosts of WBC.
WBC Host Range Study

- UGRC and MSU
- Lab no-choice assay
  - Newly hatched larvae fed leaf tissue from 26 different host plants
  - % survival measured at 31 days

- Field no-choice assay
  - Newly hatched larvae caged on host plants
  - Larvae recovered, measured and weighed at 28-32 days
WBC Survival

- **High**
  - Dry beans
  - Peas
  - Lamb’s quarters
  - Eastern black nightshade
  - Red root pigweed
  - Cucumber
  - Squash

- **Medium**
  - Soybean
  - Green beans
  - Hot pepper

- **Low**
  - Tomato
  - Potatoes
  - Bell pepper
  - Hairy Crabgrass
  - Green Foxtail
  - Velvetleaf
Table 1. Parameters of field trials to evaluate management strategies for Western bean cutworm in field corn in Ontario in 2011.

<table>
<thead>
<tr>
<th></th>
<th>Bothwell</th>
<th>Clachan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planting date</td>
<td>7 May 2011</td>
<td>4 June 2011</td>
</tr>
<tr>
<td>Cultivar (CHU)</td>
<td>N53W (3150 CHU)</td>
<td>DKC 43-61 (2800 CHU)</td>
</tr>
<tr>
<td>Bt event</td>
<td>Cry 1Ab</td>
<td>Cry 1Ab</td>
</tr>
<tr>
<td>Application date</td>
<td>27 July 2011</td>
<td>26 July 2011</td>
</tr>
<tr>
<td>Wind speed, air temp, RH</td>
<td>2.9 km/h W, 21.9°C, 65.3%</td>
<td>2.4 km/h N, 28.8°C, 71.2%</td>
</tr>
<tr>
<td>Machine harvested area per plot (m)</td>
<td>2.28 x 16.8 (0.004 ha)</td>
<td>1.9 x 16.8 (0.008 ha)</td>
</tr>
<tr>
<td>% Plants with egg masses 0 DAA</td>
<td>84.0</td>
<td>78.0</td>
</tr>
</tbody>
</table>
Grain quality concerns including DON (deoxynivalenol)
Which Bt events work best?

- **Non-Bt**
  - Yes
  - 70-90%
- **SmartStax**
  - Yes
  - 70-90%
- Control

Cry1A.105  Cry2Ab2  **Cry1F**  Cry3Bb1  Cry34Ab1/ Cry35Ab1
Which Bt events work best?

Yes
100%
Control

Viptera

Vip3A  Cry1Ab  mCry3A

Non-Bt
EXTENSION OUTCOMES
Scout Corn Ears for Western Bean Cutworm

September 1, 2011 • Written by Tracey Baute

Some corn fields may be at risk of extended WBC feeding this fall, particularly those that were late planted or are situated where egg laying occurred over a wider window. This year in particular, we are seeing a wide range of larval sizes because of the extended egg laying period that took place across much of the province. Fields that are maturing quickly may be less at risk, as the larvae will be dropping down to the ground to overwinter as the ears dry down in these fields.

Though we know there were hot spots this year, including Bothwell to Strathroy and south of Tillsonburg, we encourage all corn producers to be scouting for ear damage over the next month. Scouting will identify additional areas that had decent WBC pressure and are at risk of higher overwintering populations and therefore infections again next year.
Next Steps

- Analysis of 2012 field season
- Greenhouse and lab bioassay work continues this winter
- Develop BMP for corn and dry beans
- Investigate IRM strategy for transgenic corn
We’d like to thank the following people for their efforts in this project:

Jennifer Bruggeman, Todd Phibbs, Steve Willis, the numerous summer students and WBC trap participants across Ontario.
Questions?

Tracey Baute

tracey.baute@ontario.ca

519-674-1696

BauteBugBlog

@TraceyBaute