Managing Caterpillars in Sweet Corn Ears

Rick Foster
Department of Entomology
Purdue University
Three Main Caterpillar Pests and One New Guy

• European corn borer
• Fall armyworm
• Corn earworm
• Western bean cutworm
Important Points to Remember

- Sweet corn is a small island in a sea of field corn
- What is happening in field corn determines what happens in sweet corn
European Corn Borer

- Two generations per year
- Declining in importance due to Bt corn
- Still need to keep track of populations
Monitoring European Corn Borers

- Blacklight traps -
  [http://www.entm.purdue.edu/entomology/ext/ext_newsletters.html](http://www.entm.purdue.edu/entomology/ext/ext_newsletters.html)
Monitoring European Corn Borers

- Blacklight traps – 10 moths per night
- Walk grassy areas around fields – kick up 20 moths in 20 feet
- Look for whorl feeding – 20% of plants with feeding
European Corn Borer Management

• Treatment at pre-row tassel is the key
• Pyrethroid insecticides work best – especially Capture, Mustang Max and Warrior
Fall Armyworm

- Overwinters in the South
- Usually a late arriver – July-August
- Relatively minor in importance here
Fall Armyworm Monitoring

• Look for whorl feeding – much more dramatic than corn borers
• Damage is often localized in field
Fall Armyworm Management

• Treat at pre-row tassel if whorl damage is present
• Capture, Mustang Max, Warrior
Corn Earworm

- Pest of sweet corn, seed corn and tomato
- Two generations per year – 2nd is most important
- Does not overwinter in large numbers in northern 2/3 of state
Corn Earworm Biology

• Females prefer to lay eggs on green silks
Corn Earworm Biology

- Females prefer to lay eggs on green silks
- When larvae hatch, they move directly into the ear tip
- Once inside the ear, the larvae are protected from insecticides
Corn Earworm Control

• Must have insecticide present on silk when larvae hatches from egg
• Pyrethroids are primary control options, especially Capture, Mustang Max and Warrior
• Some concerns about resistance
Corn Earworm Management

- Treat when fresh, green silks are present (start at 70%)
- Treat if catching more than 10 moths per night
Corn Earworm Management

- Make treatments every 2-5 days from 70% silks until silks are brown; generally 3-4 treatments
- Shorten interval if temperatures are high
- Shorten interval if moth catches are high
- Include Penncap-M for adult control when moth catches exceed 100/night
2008 Meigs Farm CEW Pheromone Trap Catches

Week Ending

Moths per Week

Corn Earworm Management

- First generation populations may or may not reach economic levels
- During much of the season, few earworms present
- Once the second generation hits, populations will likely be high for the rest of the season
- Date of arrival of second generation is variable
- A pheromone trap is a critical management tool
Quiz Question

Which of the following factors is most important in determining the level of corn earworm control you will receive?

A. Choice of pyrethroid insecticide
B. Nozzle tip type
C. Gallonage
D. Timing
E. Pressure
Quiz Question

Which of the following factors is most important in determining the level of corn earworm control you will receive?

A. Choice of pyrethroid insecticide
B. Nozzle tip type
C. Gallonage
D. Timing
E. Pressure
CEW Management Tips

• The first application (70% silks) is the most critical, with each succeeding spray being less important

• Getting good coverage of the silks is imperative – consider drop nozzles. Test with water sensitive paper.

• High gallonage is preferred – 20 gallons per acre
Managing Corn Earworm in Bt Sweet Corn

- Bt toxin will kill or stunt the growth of earworms
- In late planted sweet corn, may have lots of very small larvae in ear tip
- May also need to treat to control rootworm beetles
Normal Sweet Corn
Bt Sweet Corn
## 2007 Sweet Corn Trial

<table>
<thead>
<tr>
<th>Chemical</th>
<th>Small CEW/ear</th>
<th>Large CEW/ear</th>
<th>% Clean Ears</th>
<th>Damaged Kernels/Ear</th>
</tr>
</thead>
<tbody>
<tr>
<td>Untreated</td>
<td>0.51 c</td>
<td>0.98 a</td>
<td>3.0 h</td>
<td>25.3 a</td>
</tr>
<tr>
<td>BC0805</td>
<td>0.79 ab</td>
<td>0.06 e</td>
<td>50.0 a</td>
<td>2.6 g</td>
</tr>
<tr>
<td>Warrior</td>
<td>0.06 e</td>
<td>0.19 b-e</td>
<td>24.6 def</td>
<td>12.2 c-f</td>
</tr>
<tr>
<td>Mustang Max</td>
<td>0.10 e</td>
<td>0.21 b-e</td>
<td>26.8 def</td>
<td>10.7 c-f</td>
</tr>
<tr>
<td>Capture</td>
<td>0.14 de</td>
<td>0.22 b-e</td>
<td>36.0 a-e</td>
<td>11.4 c-f</td>
</tr>
</tbody>
</table>
# 2008 Sweet Corn Trial

<table>
<thead>
<tr>
<th>Chemical</th>
<th>Small CEW/ear</th>
<th>Large CEW/ear</th>
<th>% Clean Ears</th>
<th>Damaged Kernels/ear</th>
</tr>
</thead>
<tbody>
<tr>
<td>Untreated</td>
<td>0.18 b</td>
<td>0.45 a</td>
<td>25.0 g</td>
<td>14.4 a</td>
</tr>
<tr>
<td>BC0805</td>
<td>0.38 a</td>
<td>0.01 de</td>
<td>64.5 f</td>
<td>2.3 b-e</td>
</tr>
<tr>
<td>BC0805 + Warrior</td>
<td>0.07 c</td>
<td>0.01 de</td>
<td>92.0 a</td>
<td>0.3 e</td>
</tr>
<tr>
<td>Warrior</td>
<td>0.02 c</td>
<td>0.04 cde</td>
<td>85.8 abc</td>
<td>1.3 de</td>
</tr>
<tr>
<td>Capture</td>
<td>0.04 c</td>
<td>0.03 cde</td>
<td>85.0 a-d</td>
<td>1.6 cde</td>
</tr>
</tbody>
</table>
Western Bean Cutworm

- Native to North America, first described in Arizona in 1887
- Long time pest of dry land beans and corn
- Gradual migration to the east, CO, NE, IA
- 2005, significant moth captures in Illinois
- 2006, first moths captured in Indiana
- 2007, first damage documented in NW Indiana
Western Bean Cutworm
Western Bean Cutworm Trapping, 2006
Western Bean Cutworm
2008 Documented Damage
2006 WBCW Trap Catches
2007 WBCW Trap Catches
2008 WBCW Trap Catches
Western bean cutworm

Multiple worms often found on an ear

Smooth textured skin lacking obvious stripes

Two distinct black rectangles behind orange head
Corn earworm

Skin is rough, “5 o’clock shadow”

Alternating light and dark stripes running lengthwise on the body

Usually a double middorsal dark line the length of the body

Cannibalistic, usually only one worm in ear
Don’t use coloration or size alone for ID. Can you tell which is fall armyworm, corn earworm, or western bean cutworm in this picture?
Don’t use coloration or size alone for ID. Can you tell which is fall armyworm, corn earworm, or western bean cutworm in this picture?
Corn earworm and western bean cutworm will both feed anywhere on the ear and create an exit hole in the husks (inset).
Comparison of 2007 Pheromone Trap Catches, Indiana

WBC = 42 Counties, 83 Traps (1,544)
CEW = 1 County, 1 Trap (7,096)
Bottom Line on WBC

- It’s a new pest that for some reason is expanding its host range
- Right now it is far less important than CEW
- Continues to be more common in NW Indiana
- We will keep monitoring it
Conclusions

• All 4 caterpillar pests are potential problems
• Corn earworm is the most important, most consistent pest problem of sweet corn
• Pheromone traps are an essential management tool