

5th National Integrated Pest Management Symposium
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Mini-Symposium:
Technology Enables IPM and Delivers on the Promise

The Benefits and Limitations of Technology for Insect Management in Corn and Soybeans

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“The symposium will begin with a review of change from the early use of highly toxic pest control methods to the modern emphasis on focused pest removal without disruption of non-targets in the environment.”

***The Benefits and Limitations of Technology
for Insect Management in Corn and Soybeans***

Caveats

- I do not speak for the use of insect control technologies in all cropping systems, only in the corn/soybean cropping system.
- I do not speak for all states regarding the corn/soybean cropping system, only for Illinois (based upon my knowledge of history, my perspective and experiences).

Who Needs IPM in the 21st Century?

A Critical Point/Counterpoint for Agriculture

- *“Killing Pests or Managing Risks? IPM As a Strategy for Sustaining Pesticide Technology As a Viable Tool”*

Allan S. Felsot, Washington State University

- *“The Devil and Leon Higley: An IPM Story”*

Leon G. Higley, University of Nebraska

2006 Illinois Crop Protection Technology Conference

<http://www.ipm.uiuc.edu/conferences/cptc/proceedings.pdf>

<http://www.ipm.uiuc.edu/conferences/cptc/videos.html>

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Technologies for Control of Insects in Corn and Soybean

Changes During Five Decades

- Corn (mostly soil insects, especially corn rootworms)
 - ❑ Organochlorines, especially cyclodienes
 - ❑ Organophosphates, carbamates
 - ❑ Pyrethroids
 - ❑ Transgenic Bt corn hybrids
 - ❑ Nicotinoids
- Soybean (almost exclusively above-ground pests)
 - ❑ Organophosphates, carbamates
 - ❑ Pyrethroids
 - ❑ Nicotinoids

Control of corn insect pests in Illinois

- Mostly broadcast applications of chlordane, heptachlor, aldrin, dieldrin
 - Ultimate demise? Environmental issues
 - Effective demise? Insect resistance
- Organophosphates or carbamates applied in bands over the planted row or in the seed furrow

Control of corn insect pests in Illinois

Organophosphates or carbamates

- ❑ Furadan granules (a carbamate)
 - Ultimate demise? Avian toxicity
 - Effective demise? Enhanced microbial degradation
- ❑ Counter (an organophosphate)
 - Ultimate demise? User safety, other issues
 - Effective demise? Interaction with sulfonylurea herbicides
- ❑ Others
 - Ultimate demise? User safety, environmental concerns
 - Effective demise? Reduced efficacy

Causes: early planting, environmental and soil conditions between planting and needed efficacy

Control of corn insect pests in Illinois

- Pyrethroids (primarily applied to foliage, but one soil insecticide)
- Transgenic Bt corn for control of borers, corn rootworms
- Nicotinoid seed treatments
 - Clothianidin
 - Thiamethoxam

Managing insects in soybeans in the Midwest has changed from the 20th to the 21st centuries.

■ 20th Century

- Bean leaf beetle was the primary insect pest of concern.
- Others (GCW, woollybears, TSSM)



Photo: Marlin Rice
Iowa State University

■ 21st Century

- 2000
 - Discovery of soybean aphid
 - Bean leaf beetle, bean pod mottle virus
- 2001—Soybean aphid outbreak
- 2003—Soybean aphid outbreak
- 2005—Soybean aphid outbreak



Photo: Gary Bretthauer
University of Illinois

Soybean aphids have changed the way we perceive and practice soybean insect management.

We have responded in some of the same ways as we responded to corn rootworms in corn.

- ❑ Annual insect control costs mostly insignificant in the 20th Century; now many growers expect to spend money annually.
- ❑ Some percentage of producers are seeking prophylactic solutions.
- ❑ Knee-jerk reactions have been common.

Recent changes in soybean pest control products and strategies

- Roundup Ready soybean
- Relatively cheap and effective pyrethroid insecticides
- Seed treatments
 - Fungicides
 - Insecticides (nicotinoids)
 - thiamethoxam, a.i. of Cruiser
 - imidacloprid, a.i. of Gaucho
- Foliar fungicides?

Control of corn and soybean insect pests in Illinois

- The benefits of pyrethroids, Bt corn, nicotinoid seed treatments
 - Considerably lower use rates
 - More selective
 - More toxicologically benign
 - Considerably fewer environmental hazards
 - Relatively low costs

- The war is won, right?

Control of corn and soybean insect pests in Illinois

- Limitations of pyrethroids, Bt corn, nicotinoid seed treatments (speculations about the causes of their eventual demise)
 - All based on overuse, resulting in . . .
 - Resistance
 - Replacement
 - Resurgence
- The pesticide and seed industry has done a great job of addressing environmental and human health concerns, but . . .

Control of corn and soybean insect pests in Illinois

Evidence of encouragement to overuse

- Every acre of corn not treated with Poncho 1250 should be treated with Poncho 250.
- Double Down to control variant western corn rootworms
 - Aztec 2.1G + Poncho 1250
- YieldGard Rootworm corn + soil insecticide (and all YGRW corn is treated with a nicotinoid)
- Quadris + Warrior provides a yield benefit, even in the absence of pests.

Control of corn and soybean insect pests in Illinois

■ Insect Resistance Management

- As a term, this was a relatively new concept to corn growers
 - Has been embraced by corn growers.
 - Questions about why there are no requirements for resistance management strategies for other products, e.g., nicotinoids

- One of the best insect resistance management strategies is to use an insecticide only when necessary.

The Benefits and Limitations of Technology for Insect Management in Corn and Soybeans

■ Benefits

- ❑ Improved production of corn and soybean
- ❑ Over time, less impact on the environment
- ❑ Over time, less hazard to humans (users, food safety)
- ❑ More selective, less impact on natural enemies?

■ Limitation

- ❑ Use when not needed
- ❑ Economic and ecological costs