Western Bean Cutworm in Corn – One to Watch in 2007

Eileen Cullen
UW Madison, UW-Extension

Wisconsin Fertilizer Aglime & Pest Management Conference

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WBC Expanding its Range

- Mid-season corn pest that can cause extensive damage to the corn ear
- Native to North America. Corn and dry bean hosts. Soybeans not a suitable host.
- Emerging as a new pest by ***expanding its range***
- Previously confined to the western Corn Belt (before 2000)
- Migrating eastward: IA, IL, WI, IN

Presentation Outline

- Field identification, corn ear damage
- Review of regional expansion
- WBC Pheromone Trap Results 2006
- Look alike moths
- Scouting, economic thresholds, control
- Regional research update
- Outlook 2007

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Eggs and Larvae (WBC)

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- One generation/year.
- Eggs laid on upper surface of corn leaves near developing ears.
- Cornfields in late-whorl stage.
- Eggs,white when first laid, turn dark purple ~ 1 day before hatch.

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Feeding Behavior

- 6-7 larval instars
- Broad, dark brown stripes immediately behind head.
- **Pretassel corn**: larvae move into whorl.
- **Tasseling:** larvae move to green silks.
- **Posttassel corn:** move directly to fresh silks.

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Photo: University of Nebraska

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Ear Damage

Photo:
Univ. of Nebraska

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- **Reduced yield** (kernel damage) & **quality** (entry for fungal and mold infections).
- Ear tip feeding.
- **If ear tip crowded,** will move to outside of ear, and enter through husks.

Photo: University of Nebraska

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Photo: University of Nebraska

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- Larvae overwinter in soil, pupate in spring.
- Sandy soils typically larger populations.
- Soil moisture required to emerge.
- Most eggs laid during **peak moth flight … mid- to late July**
- Female moths emit a pheromone scent. Attracts males.

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2006 WBC Monitoring Network

www.ent.iastate.edu/trap/westernbeancutworm/

- Moth flight monitored by pheromone traps.
- Traps up by July 1 across eight NC states
- **Wisconsin –**
  40 Counties; 142 Sites
- Daily trap catches used to determine peak flight in an area

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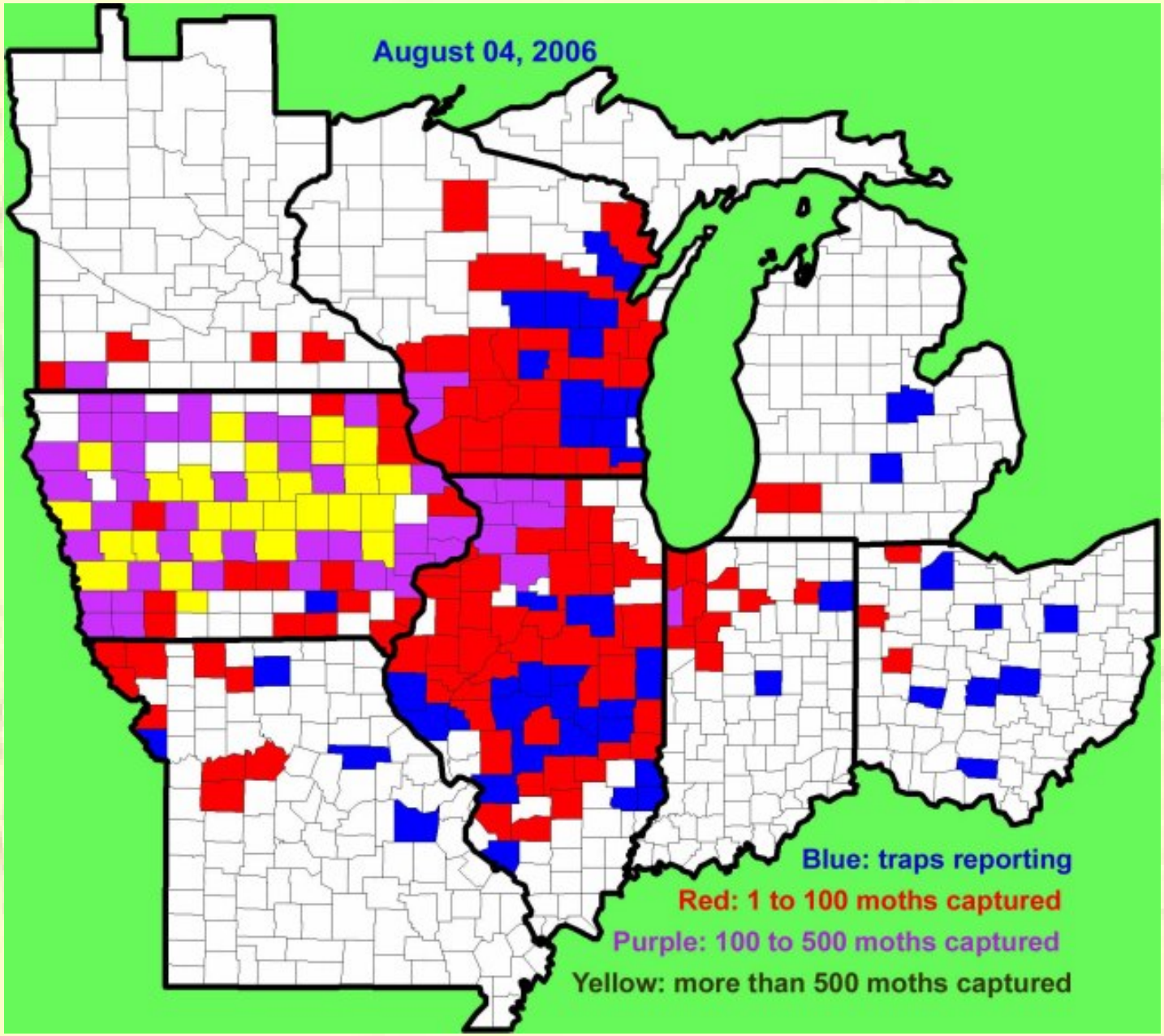

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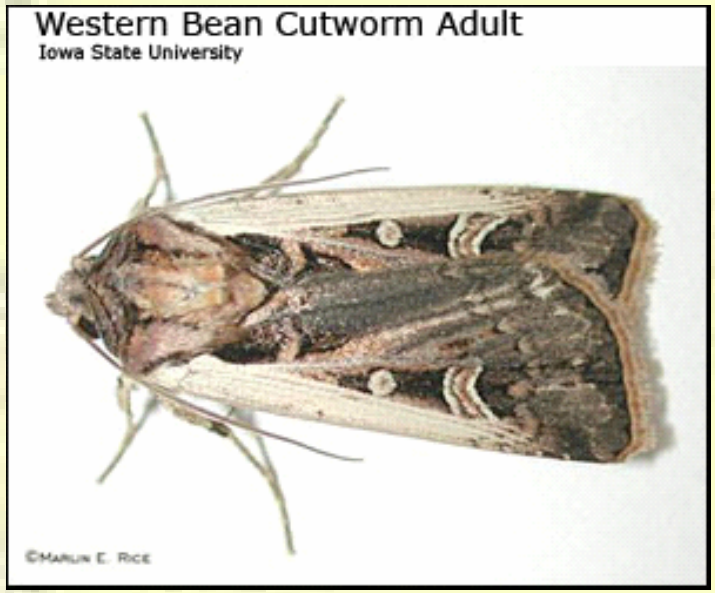
WBC Moth look-alikes

entomology.unl.edu/scal/Lighttrap/Insect_Images.html

Western Bean Cutworm



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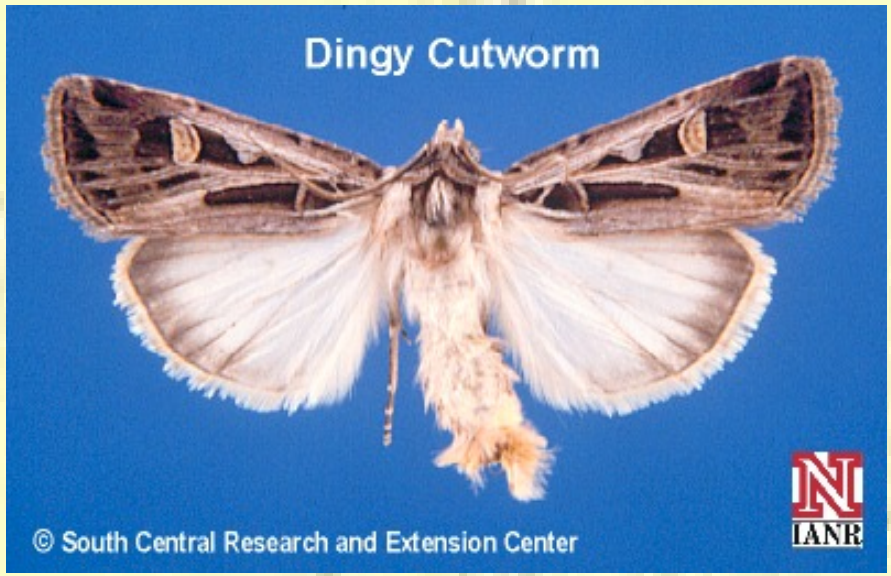
Dingy Cutworm



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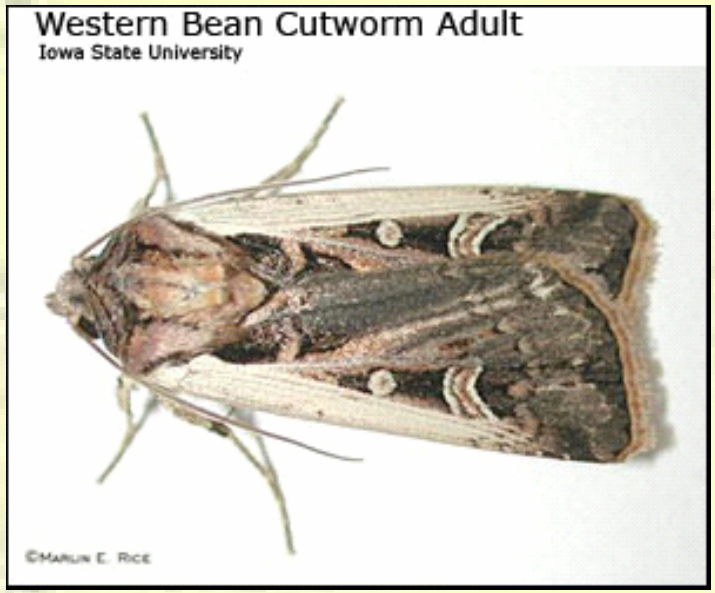
Western Bean Cutworm



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Yellowstriped Armyworm

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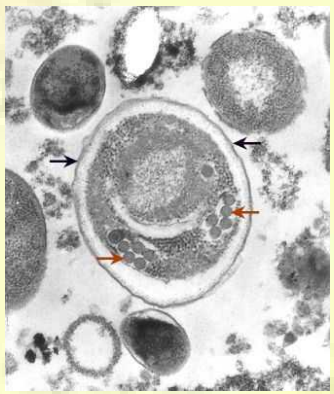
Photo: University of Nebraska



- Plowing, disking may reduce winter survival (more research required)
- Predators: ladybird beetle adults feed on WBC eggs and larvae up to 3rd instar. Blackbirds.
- WBC susceptible to naturally occurring insect parasitic disease (*Nosema* sp.)

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Mid-season WBC Scouting

- Begin scouting **when moths are first noticed in pheromone traps**.
- May also start scouting based on 50% predicted adult emergence.
- Degree Days (base 50°F) for 25%, 50% and 75% adult emergence are 1,319 DD; 1,422 DD; and 1,536 DD, respectively.
- Check **20 consecutive plants at five locations** in the field. Inspect the upper 3 or 4 leaves for egg masses and larvae. Check whorl, developing tassel for larvae.

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Threshold & Treatment Timing

- If 8% of field corn plants sampled have an egg mass and/or small larvae on leaves or in tassel, consider treatment.
- Univ. of Nebraska threshold. WBC infestations occur every year in western NE.
- If threshold reached, insecticide should be applied at 90 to 95% tassel emergence.
- If tasseled, apply at 70 to 90% egg hatch.
- Once larvae reach ear tip, control is nearly impossible.

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Insecticides labeled for WBC, Field Corn

Product	Rate/Acre
Ambush	6.4 - 12.8 oz
Asana XL	2.9 - 5.8 oz
Baythroid XL	1.6 – 2.8 oz
Capture 2EC	2.1 – 6.4 oz
Lorsban 4E	1 – 2 pt
Mustang Max	1.76 – 4.0 oz
Penncap M	2 – 4 pt
Pounce 3.2EC	2 – 4 oz
Sevin XLR Plus	2 qt
Warrior	1.92 – 3.2 oz

Bt corn insect control spectrum for selected Wisconsin Lepidoptera

Product	Protein	Western bean cutworm	European Corn Borer	Corn Earworm	True Armyworm
Herculex I	Cry1F	Yes	Yes	Suppression	Not labeled
Herculex XTRA	Cry1F & Cry34/35Ab1	Yes	Yes	Suppression	Not labeled
YieldGard Corn Borer	Cry1Ab	No	Yes	Suppression	Not labeled
YieldGard Plus	Cry1Ab & Cry3Bb1	No	Yes	Suppression	Not labeled

**As stated by seed industry literature*

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ECB and WBC larval competition Hypothesis …

- Study conducted in SD, where WBC not a pest prior to 2000.
- SD Ranks first in U.S. for proportion of corn acres planted to Bt corn (52%) (NASS 2005).
- Is emergence of WBC as potential corn pest related to widespread planting of Cry1Ab Bt corn hybrids ?

Catangui and Berg, 2006.
Journal of Economic Entomology **35(5):1439-1452.**

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Proportion (%) of ears in SD study infested with WBC or ECB

YEAR	Bt Cry1Ab Corn Hybrids		Conventional Corn Hybrids	
	WCB	ECB	WBC alone	ECB alone
2000	18 – 20%	nearly 0	28%	33%
2003	38 – 70%	nearly 0	8 – 28%	58 – 80%
2004	0 – 34%	nearly 0	13 – 19%	8 – 25%

Conventional Hybrids infested by both WBC & ECB much lower than single infestations: 8% (2000), 0-18% (2003), 0-1% (2004).

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Catangui and Berg, 2006.
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Observations from SD study

- In general, WBC peak moth flight occurred between 1st and 2nd generation ECB flights.
- WBC destroyed ~66% (Avg.) more kernel area than ECB per infested ear.
- WBC leave larger frass pellets near injured kernels than ECB.
- ECB usually left silken webs on infested ears, but WBC did not.

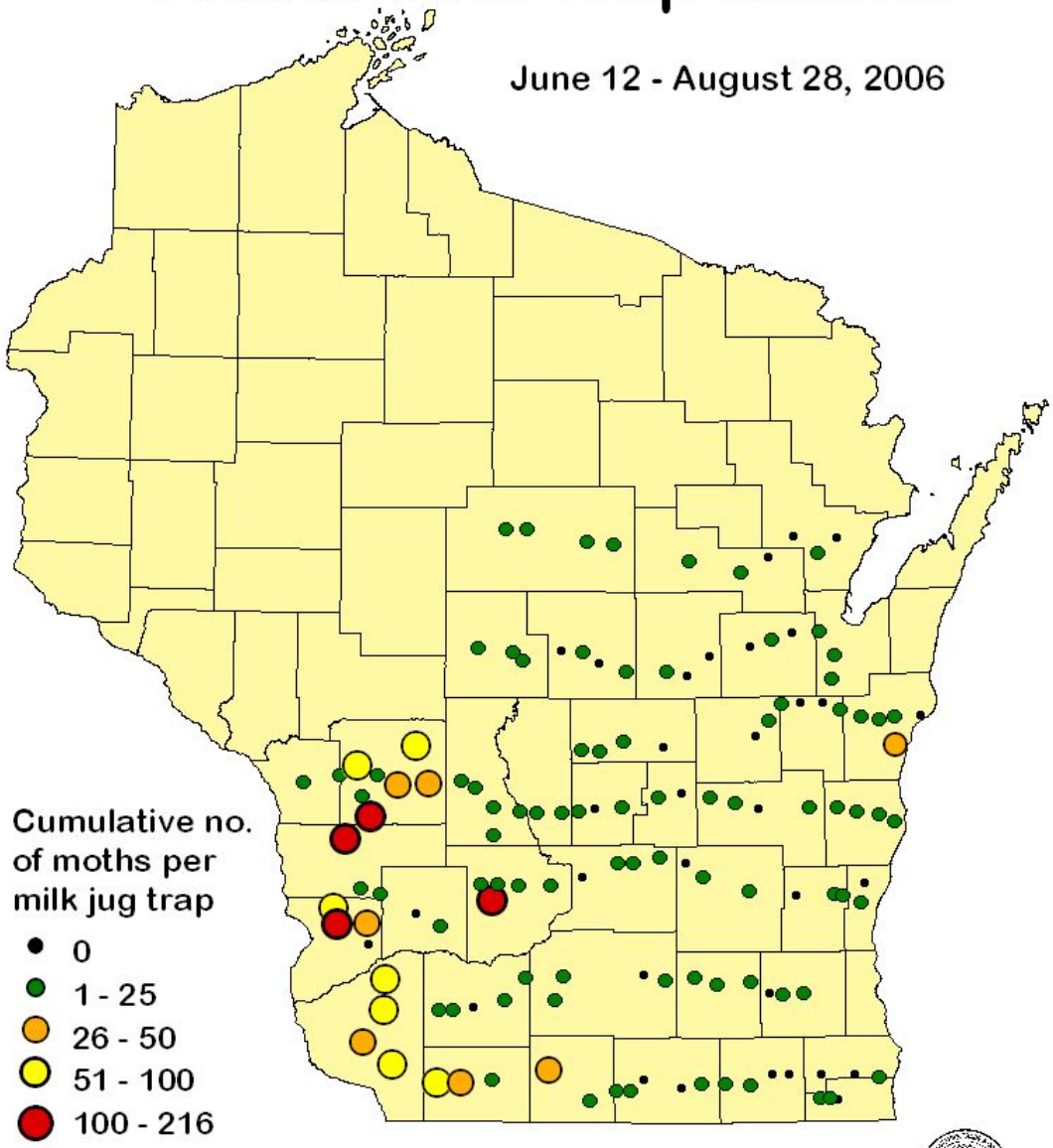
Catangui and Berg, 2006.
Journal of Economic Entomology **35(5):1439-1452.**

Summary

- Results indicate niche overlap and competition between WBC & ECB on corn
- No studies have been done on emerging or potential insect pests of transgenic crops.
- Changes in IPM and transgenic technologies may lead to rearrangement of niches occupied by corn-associated insects.

Catangui and Berg, 2006.
Journal of Economic Entomology **35(5):1439-1452.**

Western Bean Cutworm Pheromone Trap Counts



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2007 Outlook for WBC

- Most infestations detected in 2006 were spotty and not severe.
- Moths captured in WI milk jug pheromone traps low compared to Illinois and Iowa.
- Potential for WBC to become a major WI pest exists, not yet severe. Follow WBC trap catches and check corn fields in 2007.

Western Bean Cutworm Short Course

February 28, 2007
8:30 am to 12:30 pm CST

WI, IL, IA (MN):
Local Sites, check with
County Extension Office

CCA CEUs applied for

Photo:
Univ. of Nebraska

Entomologists from WI, IL, IA and NE

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