**Bt Corn Rootworm Corn Hybrid Damage in Illinois, 2004**

**Eileen Cullen**[1]

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**Eileen Cullen**

**UW Madison Entomology Dept.**

### Bt CRW Performance Article Highlights:

*Transgenic Corn Rootworm Hybrid Stumbles in Urbana Experiment; Some Producers Also Report Severe Lodging with YieldGard Rootworm Hybrids in Commercial Fields*

*University of Illinois, Urbana-Champaign*
*Pest Management & Crop Development Bulletin*
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*http://www.ipm.uiuc.edu/bulletin/pastissues.php*

[1] *Assistant Professor and Extension Entomologist*, University of Wisconsin, Madison, Entomology Department, 1630 Linden Drive, Madison, WI 53706.

## Transgenic Corn Rootworm Hybrids "Bt CRW Corn"

YieldGard Rootworm (YGRW) Corn [MON 863] received EPA registration February 2003.

YGRW is not a high-dose transgenic event as are Bt Corn Borer hybrids.

YGRW is a non-high dose event, thus expect corn rootworm survivorship (adult emergence) in YGRW fields.

## Transgenic Corn Rootworm Hybrids "Bt CRW Corn"

Although a non-high dose event, root protection in University trials overall has been excellent.

Adult corn rootworm beetles in YGRW fields are present due to:

1. Immigrants from other corn fields
2. Survivors from YieldGard Rootworm corn

## 2001 Adult Emergence Numbers from YGRW corn (Univ. of Illinois study)

**(comparable reports from other universities)**

**Emergence cages were placed over transgenic Bt rootworm corn and non-transgenic isoline.**
(n=96 cages total in replicated, split plot design).

**Adult emergence projection from MON 863-corn:**
2,450 male western CRW adults per acre
25,320 female western CRW adults per acre
**Overall projection: 27,770** adult western CRW emergence from 1 Acre of transgenic corn
(MON 863, Cry3Bb1).

## I. 2004 CRW product efficacy trials (Univ. Illinois)

Three sites (DeKalb, Monmouth, Urbana)

Planted: (4/28, 4/27, 4/19)
Roots Rated: (7/21, 7/15, 7/10)

Heavy CRW pressure, trap-cropped fields.

**Golden Harvest (H-8588 RW) YieldGard Rootworm**
**Golden Harvest (H-8799) Non-transgenic Isoline**

**Untreated Check Damage Severe:**
**2.0 to 3.0 nodes destroyed.**

**YGRW Damage: pruning observed, considerably less than 1 node destroyed.**

## II. Calls from Illinois Producers Lodging observed at U of Illinois, Urbana site

Following a mid-July storm with high winds, U of I Extension received calls on severely lodged corn. Including fields with YieldGard Rootworm hybrids.

Severe lodging of the YieldGard Rootworm hybrid (Golden Harvest H-8588RW) observed at U of I, Urbana trial site.

Monsanto personnel had checked plants from U of Ill. DeKalb, Monmouth, and Urbana trial sites for expression of Cry3Bb1 protein, **Results Positive.**

## III. 2004 CRW product efficacy trials (Univ. Illinois) – Revisited in August

During 1st Week of August: 40 roots (10/replicate) were taken from YieldGard Rootworm plots in the Urbana experiment.

Root ratings on Golden Harvest H-8588RW in August, 3+ weeks after original (7/10) rating average of considerably less than 1 node destroyed:

Rep A 1.43 (nearly 1-1/2 nodes destroyed)
Rep B 1.08 (1 node destroyed)
Rep C 1.64 (slightly more than 1-1/2 nodes destroyed)
Rep D 1.24 (slightly more than 1 node destroyed)

Damage significantly greater in August than in July at the U of Illinois Urbana site.

## Possible Explanations

Resistance unlikely, YGRW hybrids released commercially for the first time in 2003.

1. Early planting of Urbana Experiment (4/19)
2. Development and emergence of surviving CRW from YGRW corn is known to be delayed as compared to non-transgenic corn hybrids.
3. Intense larval pressure in Urbana trial 2004

Perhaps combined factors above compromised YGRW efficacy in the Illinois example.

## Further Questions

Does expression of the Cry3Bb1 protein diminish as the season progresses?

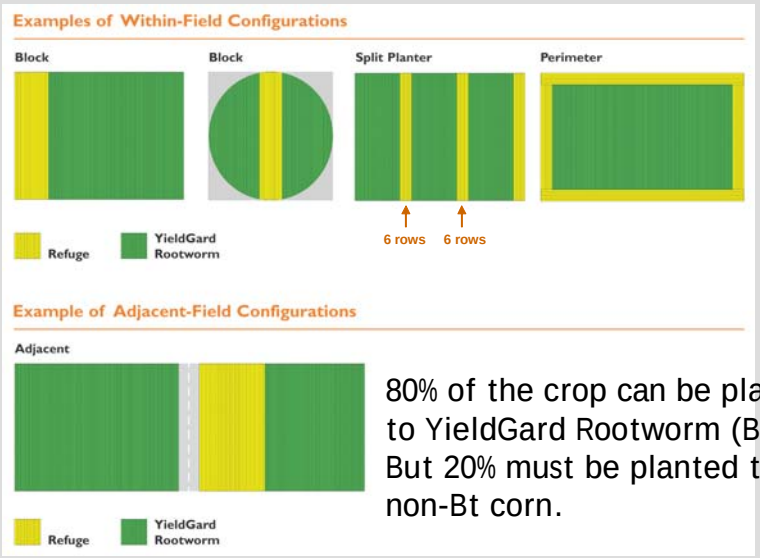
Are there differences in expression across hybrids?

Do hybrid root characteristics influence YGRW technology performance?

## Steps to take if unexpected YGRW damage or suspected resistance should occur:

1. Check planting records
2. Rule out damage from nontarget insects, weather, or other environmental factors.
3. Conduct tests to verify MON 863 was planted and that the correct % of plants are expressing. (e.g. Monsanto personnel verification)
4. If expression is +, and root damage is near 0.5 (node-injury scale) on any expressing plant, Evaluate roots from **the corresponding refuge**.

## YieldGard® Rootworm Refuge Configurations




80% of the crop can be planted to YieldGard Rootworm (Bt-corn) But 20% must be planted to non-Bt corn.

For complete IRM information please refer to the IRM Grower Guide for YieldGard Rootworm or you may also call 1-800-951-9511.