Monitoring the Variant Western Corn Rootworm in Wisconsin

Southeast Wisconsin Variant Western Corn Rootworm (V_{wcrw}) Trapping Network

UW Center for Integrated Agricultural Systems

The Morgridge Center for Public Service

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VARIANT

Western Corn Rootworm

www.ipmworld.umn.edu/chapters/maize/SoCRWA

Need for information on the growing range of Variant WCR and uncertainty of crop rotation efficacy to manage rootworms in Southern Wisconsin.

Southeast Wisconsin Variant Western Corn Rootworm Trapping Network

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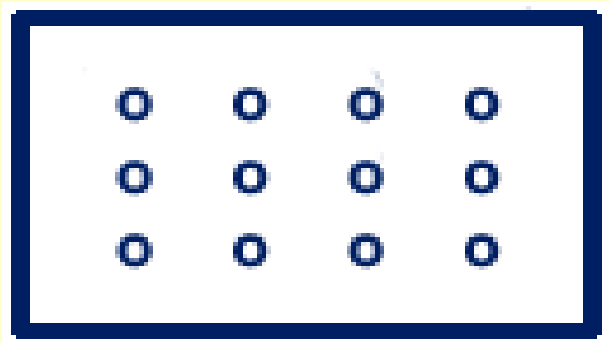
Approach to monitoring VWCR

1. Conduct beetle counts in randomly selected soybean fields in So. Wisconsin
   - Fields that will be planted to corn next year
   - In suspect counties – SE Wisconsin
   - Surrounding counties to establish safety zone
2. Rate corn roots for damage the following year
   - Confirms beetles are the variant
   - Compare to Il-derived IPM threshold



Distribution of Pherocon® AM Traps in a soybean field

Trap grid graphic courtesy of UIUC

Beetle counts in soybean
to determine need for
root protection in next year's corn

University of Illinois – Urbana Champaign

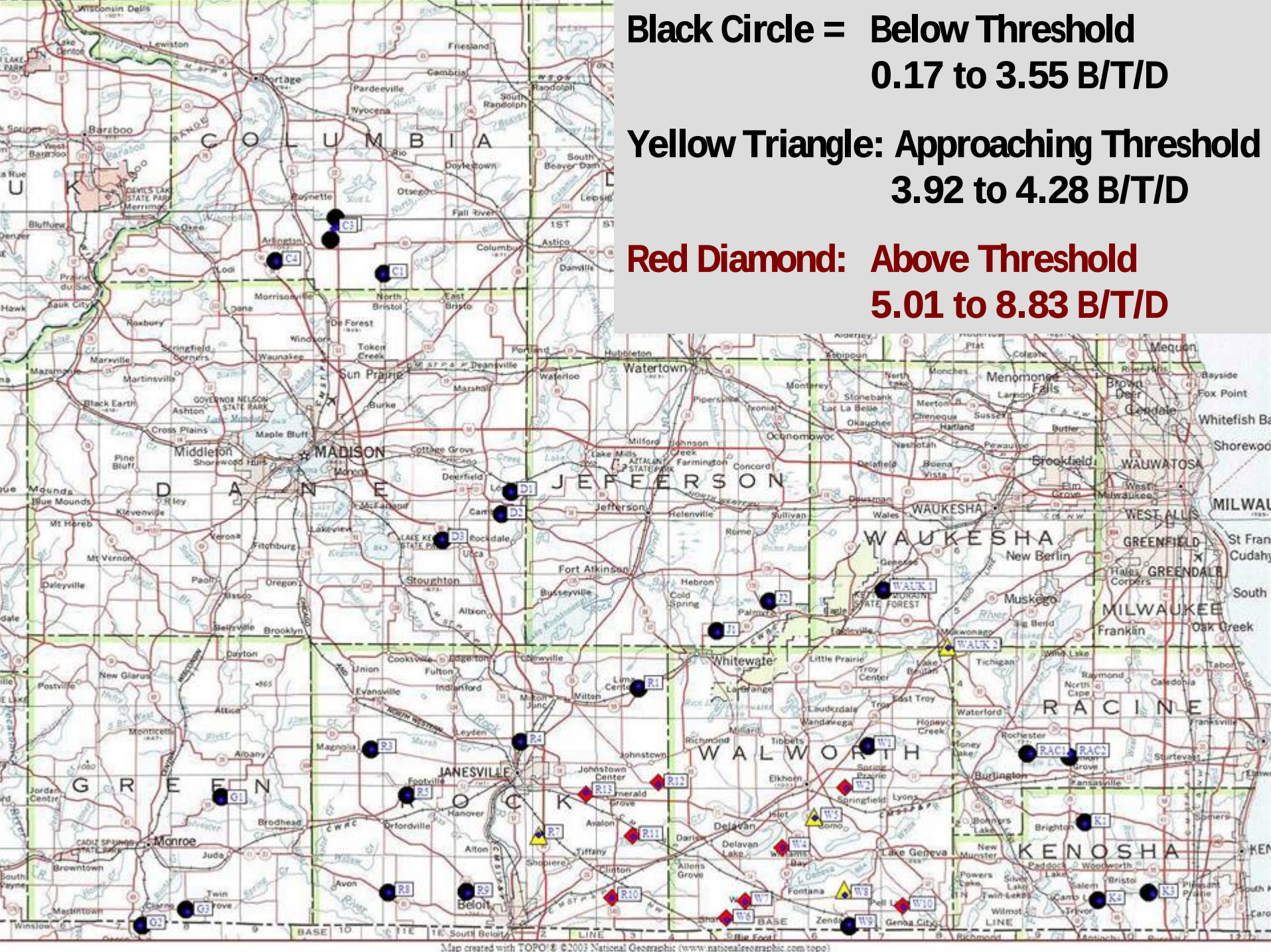
Trap during adult WCR beetle emergence and egg-laying period (late July through late August, 4 weeks.)

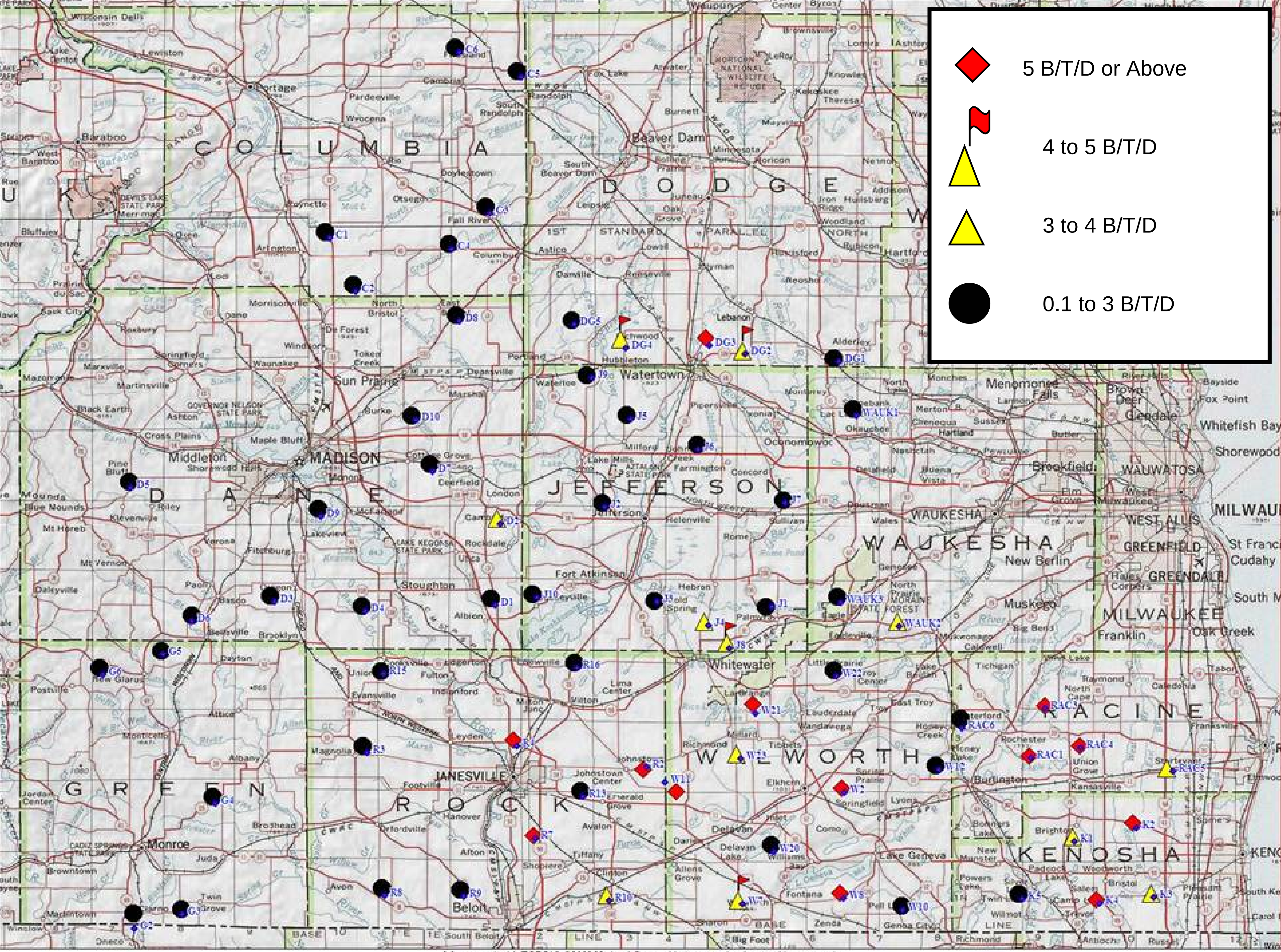
12 trap grid per soybean field
Pherocon® AM yellow sticky trap

Each week count total WCR beetle adults. Replace traps every 7-10 days.

An Average of **5 beetles/trap/day (B/T/D) over 4 week sampling period**, documented to result in first-year corn damage the next season.

Network monitored 71 soybean fields in 2005 to help producers determine distribution of Variant WCR risk in SE/So. Wisconsin.


Black Circle = Below Threshold
0.17 to 3.55 B/T/D
Yellow Triangle: Approaching Threshold
3.92 to 4.28 B/T/D
Red Diamond: Above Threshold
5.01 to 8.83 B/T/D
COLUMBIA
DANE
JEFFERSON
WAUKESHA
WALWORTH
RACINE
KENOSHA
ROCK
GREEN
MADISON
JANESVILLE
Map created with TOPO!® ©2003 National Geographic (www.nationalgeographic.com/topo)



Map created with TOPO!® ©2003 National Geographic (www.nationalgeographic.com/topo)

Detection Survey Summary …

- Variant wcr has expanded its range from point of origin in IL to southeast and southern Wisconsin

- 2005 map indicates relative risk areas; 13 of 71 soybean fields exceeded 5 B/T/D threshold:

  2/5 **Kenosha**; 3/5 **Racine**; 3/10 **Rock**;

  4/10 **Walworth**; and for first time 1/5 **So. Dodge** Co., indicating northward expansion.

- 4 of the 71 soybean fields* between 4 and 5 B/T/D, approaching threshold.

- 1 SW Walworth; 1/10 SE Jefferson; and 2 fields in southern Dodge County.

** 2 soybean fields trapped in Grant Co. not displayed on map.*
Variant WCR not detected in the 2 Grant Co. fields.
Well below 5 B/T/D threshold (0.24 and 0.56 B/T/D)

First year corn roots evaluated in 2005 for the same fields trapped as soybeans (B/T/D) in 2004!

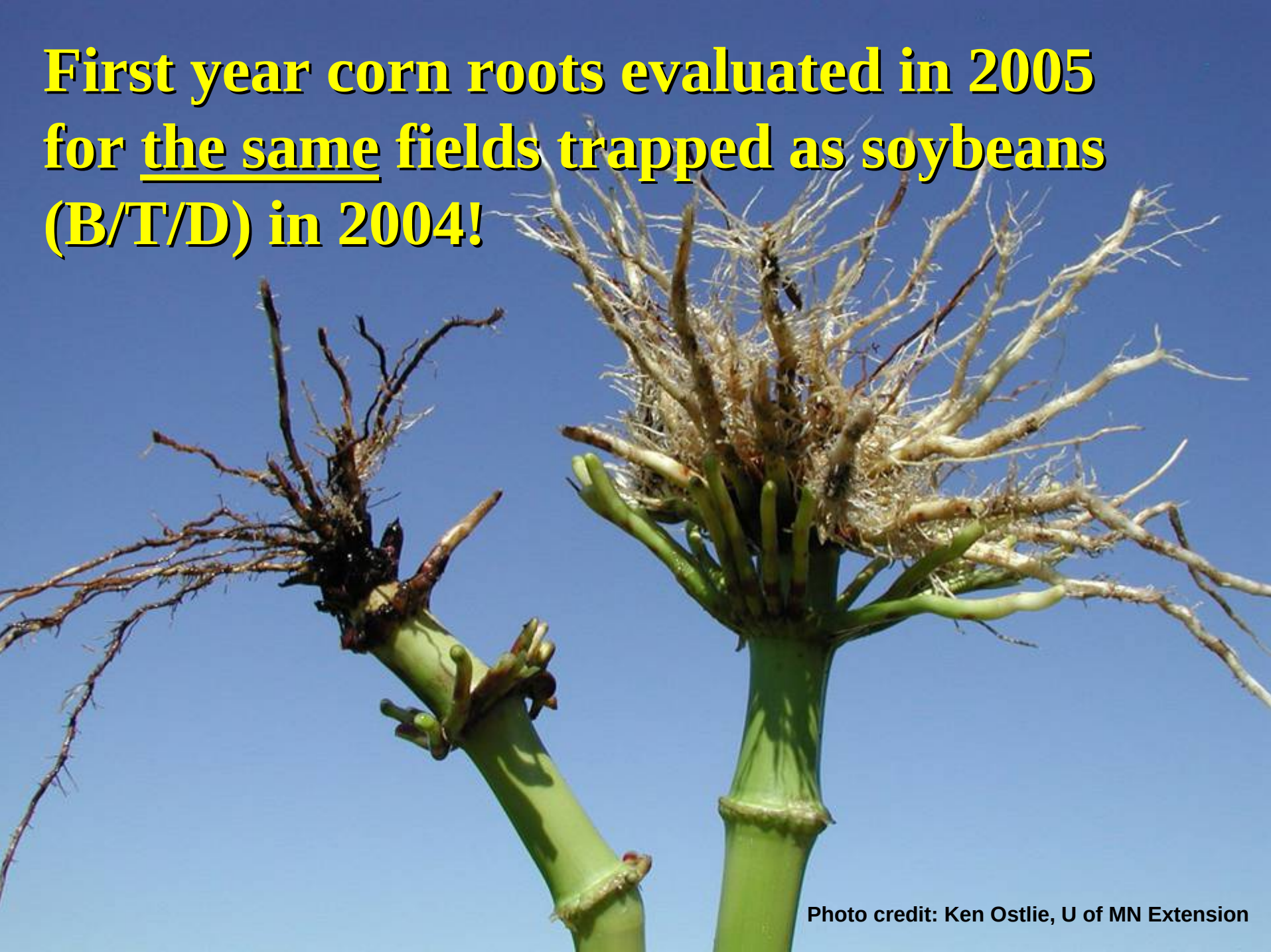


Photo credit: Ken Ostlie, U of MN Extension

0 to 3 Node-Injury Scale

Root Ratings **below 0.50** considered adequate root protection/product performance

X . YY

Wisconsin Crop Manager
Explains the ISU Node-Injury Scale
Vol. 12, No. 18, pp. 139-141.
http://ipcm.wisc.edu/wcm/

Percentage of a node eaten

Number of full nodes eaten

Rock County

Correct Choice?	'04 – '05 Field ID	2004 B/T/D soybeans	2005 Corn root injury
Yes	R1	2.22	0.1
Yes	R3	1.34	0.3
No	R4	1.57	0.6
No	R5	0.97	0.7
Yes	R8	1.17	0.2
No	R9	1.52	0.6
Yes	R10	7.33	0.7
Yes	R12	8.30	0.7
Yes	R13	5.10	0.4

Walworth/Kenosha/Racine

Correct Choice?	'04 – '05 Field ID	2004 B/T/D soybeans	2005 Corn root injury
Yes	W7	8.83	0.5
No	W6	5.36	0.1
Yes	W4	5.59	1.9
Yes	W8	4.16	0.3
No	K4	2.39	0.8
No	W10	5.66	0.2
Yes	Rac1	1.96	0.2
Yes	K1	2.34	0.2
Yes	K3	2.68	0.2

Columbia/Dane Counties

Correct Choice?	'04 – '05 Field ID	2004 B/T/D soybeans	2005 Corn root injury
Yes	C1	0.21	0.0
Yes	C2	0.78	0.0
Yes	C3	0.23	0.0
Yes	C4	0.71	0.0
Yes	D1	0.67	0.3
Yes	D3	0.42	0.0

Summary: 2004 soybean field B/T/D 2005 corn root injury prediction

...

If farmers had based CRW treatment decision upon threshold of 5 B/T/D, 75% (18/24 fields) would have made the correct decision.

25% (6/24) failed to predict

- Corn root damage higher than predicted (0.6-0.8) in 4 fields (17%; 4/24).
- Damage less than predicted (0.1-0.2) in 2 fields (8%; 2/24).

Findings/recommendations into 2006

Grower Decision Making for 1st year corn

- WI results thus far, similar to published threshold work from Univ. of Illinois: 5 B/T/D threshold in soybeans tied to economic root feeding in following year's corn.

- *IPM protocol (yellow sticky traps in soybeans)* offers farmers *a predictive tool* to estimate potential severity of CRW larval injury based on density of adults in soybeans the previous season.

- IPM trapping encouraged in the affected counties of Kenosha, Racine, Walworth, Rock, Jefferson and Dodge. Trapping is also encouraged in areas on the leading edge of Variant range: Waukesha, Washington, Columbia, Dane, Green

Findings/recommendations into 2006 – cont.

- Prophylactic treatment of corn following soybeans with an insecticide or CRW BT corn are options in the affected counties;
- However, due to the field to field variability shown, use of CRW control products for 2006 corn following soybeans will be speculative without trapping data.
- Add rootworm control to annual production costs of first year corn **<or>** Determine from one year to the next whether expense of control is necessary.

Continued work on Variant WCR Risk Management …

- **UW Entomology/UW Agricultural Economics have proposed a project to:**

1. Evaluate costs & returns to each approach (combine economic analysis with IPM data).
2. Monitor adult WCR activity in other crop rotations (corn following wheat, alfalfa).
3. Re-evaluate lower intensity trapping methods (fewer traps?, fewer weeks?).

Thank you!

Southeast Wisconsin

Variant Western Corn Rootworm

Trapping Network

2005-06