Soybean Aphid IPM – An Overview for 2007

Eileen Cullen
UW Madison, UW-Extension

Wisconsin Fertilizer Aglime & Pest Management Conference

January 18, 2007

Presentation Outline

- USDA IPM PIPE web site – Pest Information Platform for Extension and Education
- Suction Trap Summary 2006
- On-farm and UW-Extension field trials – foliar insecticides (white aphid morphs), seed treatments.
- Biological control (predators, parasitoids)
- Soybean aphid Host Plant Resistance

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USDA Legume IPM PIPE

- USDA partnering with land-grant universities and soybean check-off –
- Best Management Practices SBR & SBA
- Site debuted in 2005 with SBR. 2006 marked first year of SBA in the PIPE.
- **www.sbrusa.net**
- SBA density maps by week, with national commentary.

USDA United States Department of Agriculture

Pest Information Platform for Extension and Education

Getting Started

Prev Next

July - 2006

						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

August - 2006

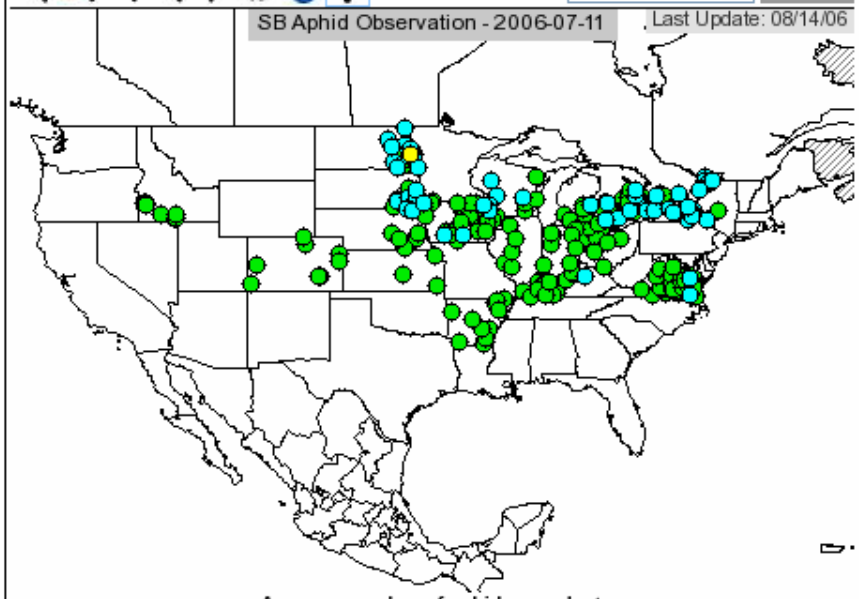
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

September - 2006

					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

- Overlay - Load

SB Aphid Observation - 2006-07-11 Last Update: 08/14/06



Average number of aphids per plant

0 | 1 - 39 | 40 - 149 | 150 - 249 | 250 - 499 | > 500

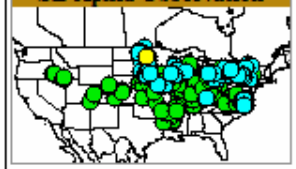
Printable Map Threshold

Jul 11, 2006

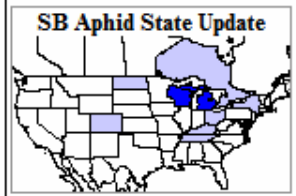
Legumes/Kudzu

Soybean Aphid

SB Aphid Observation



SB Aphid State Update



- National Commentary

- University SBA Sites
- USDA SBA Sites
- Private/Industry SBA Sites
- International SBA Sites
- Observation Animations
- Not Sure if it is Soybean Aphid

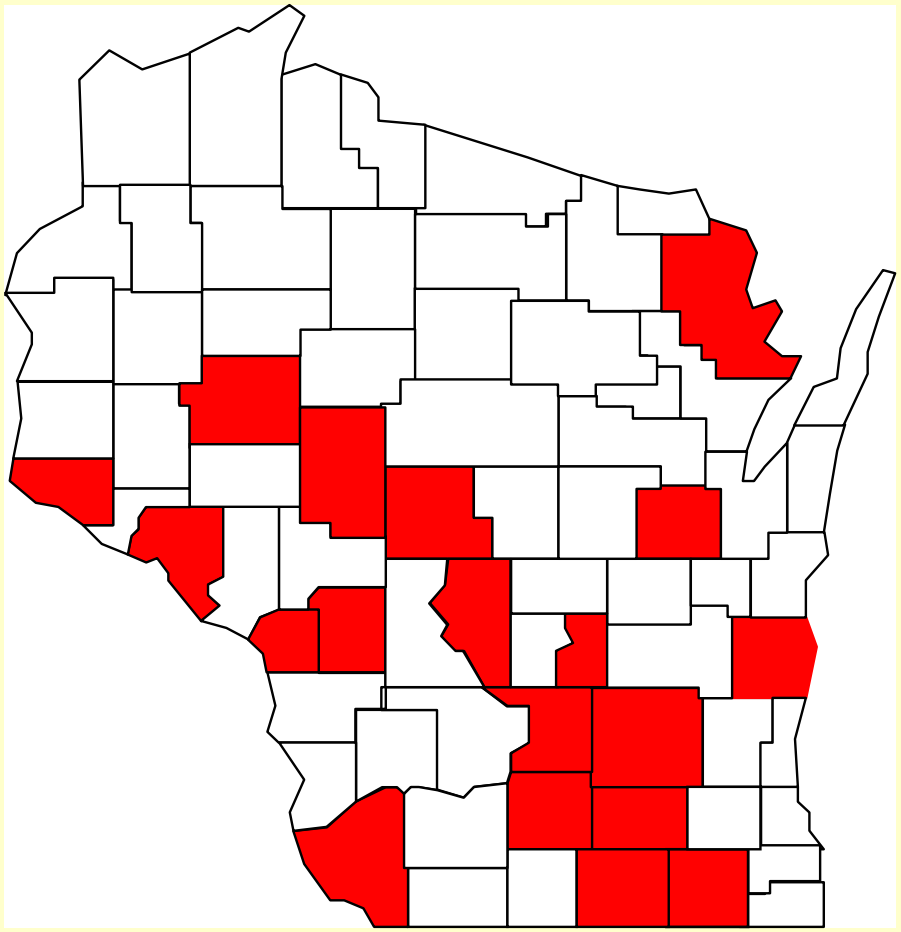
National Soybean Aphid Commentary (updated:)

National Map Commentary Not Available

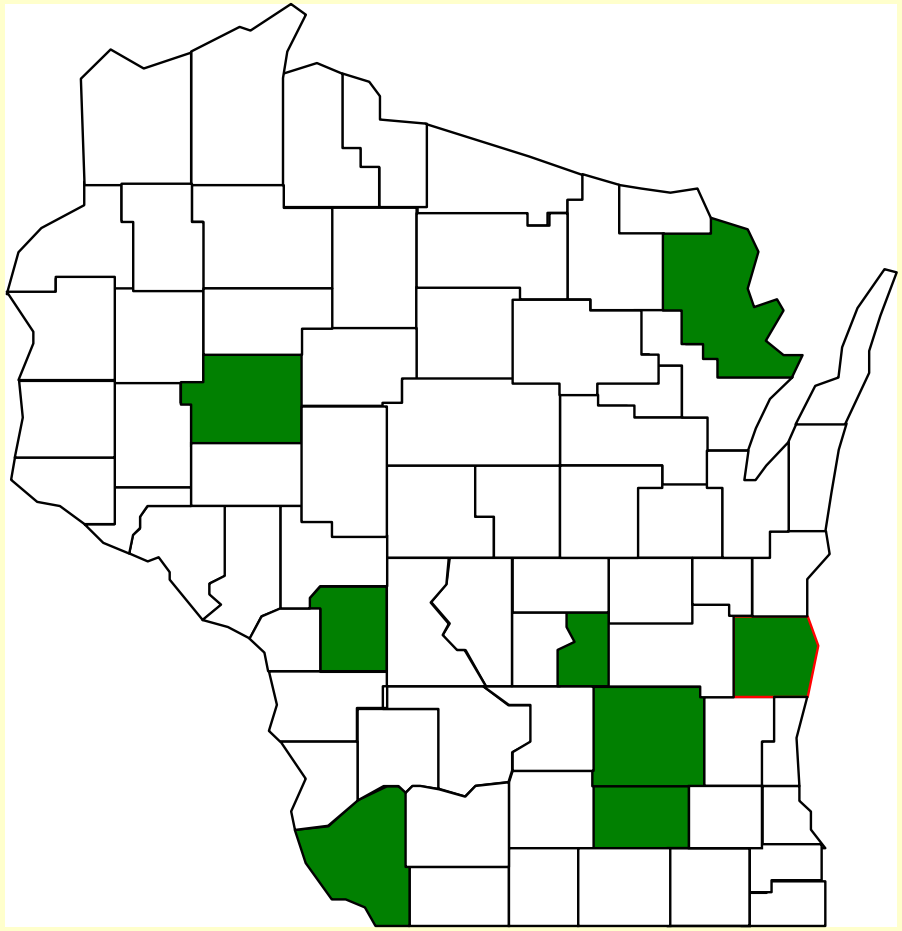
Management Toolbox

- Guidelines - USA
- GFP Tool
- Insurance Docs
- Commentary Chron

2006 WI Soybean Rust Sentinel Plots Reporting



2006 WI Soybean Aphid Plots Reporting



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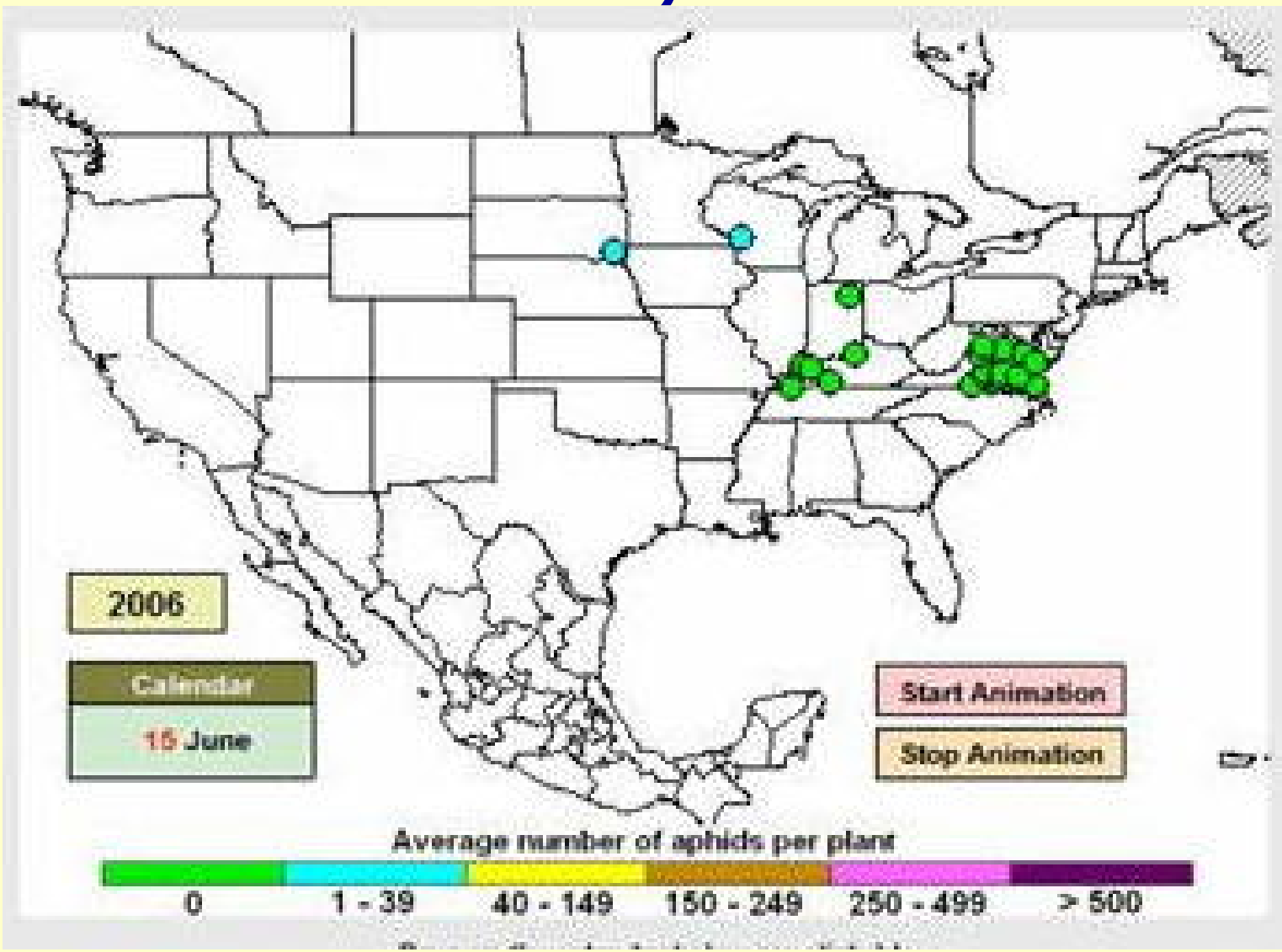
June 15, 2006



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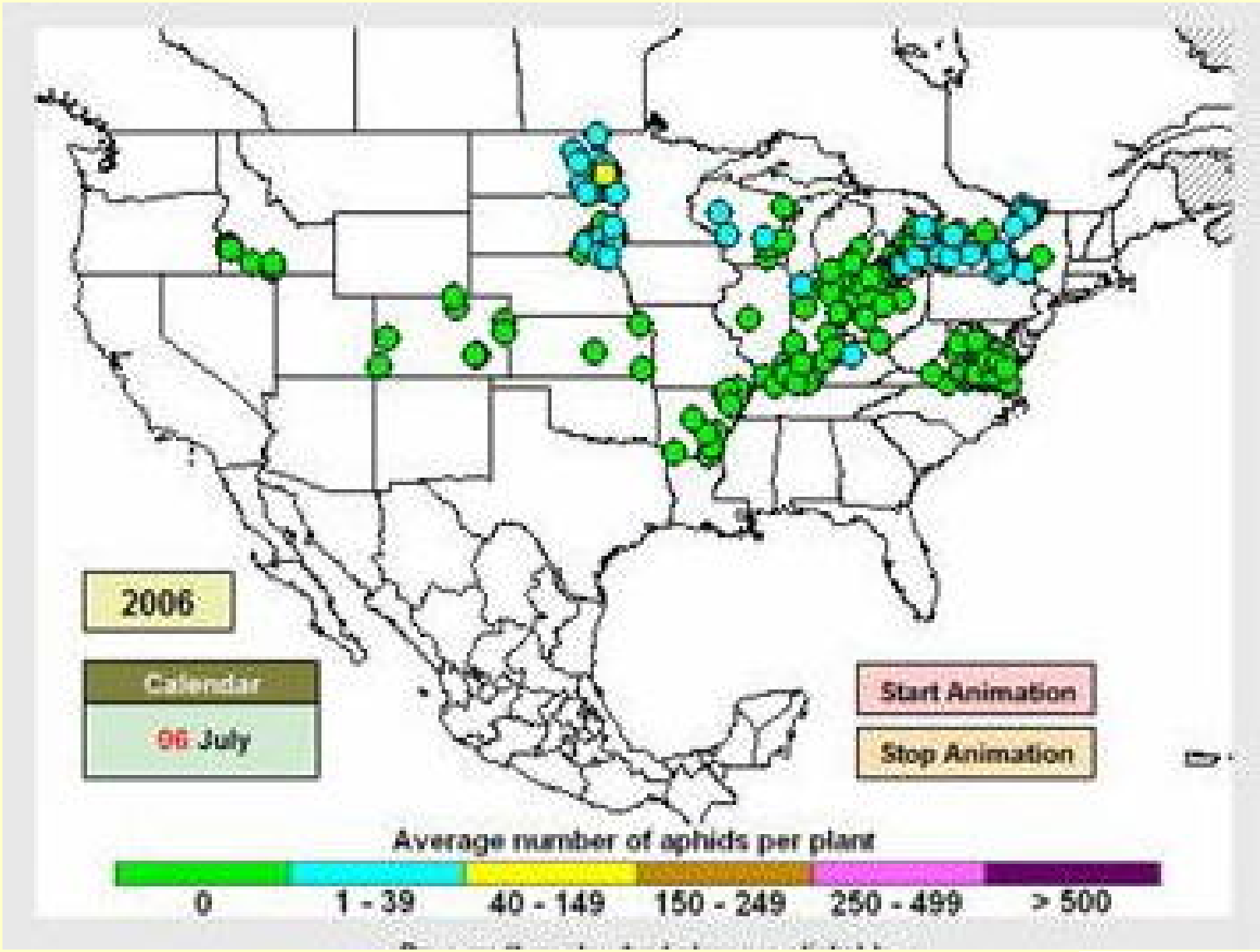
July 6, 2006



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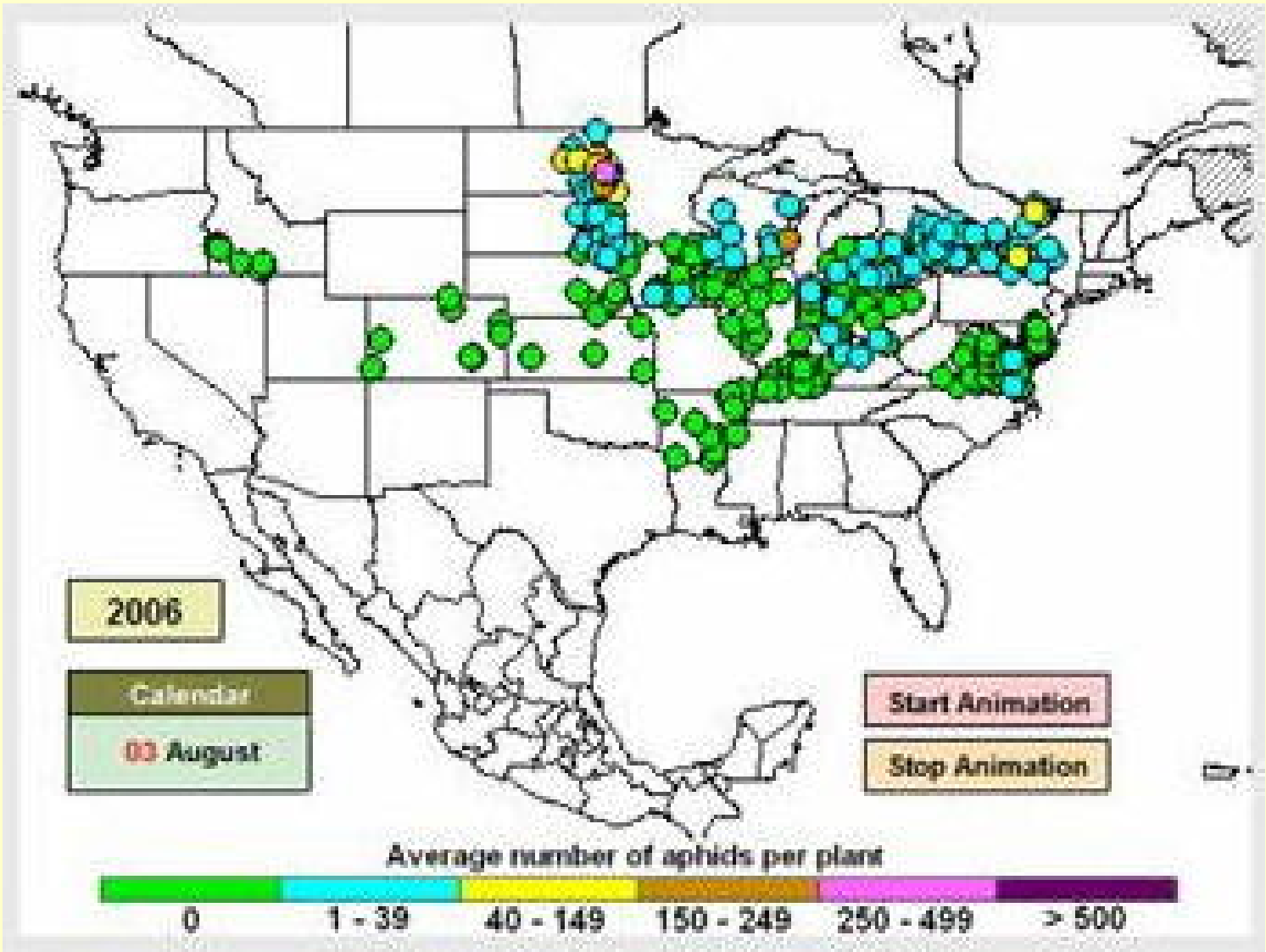
August 3, 2006



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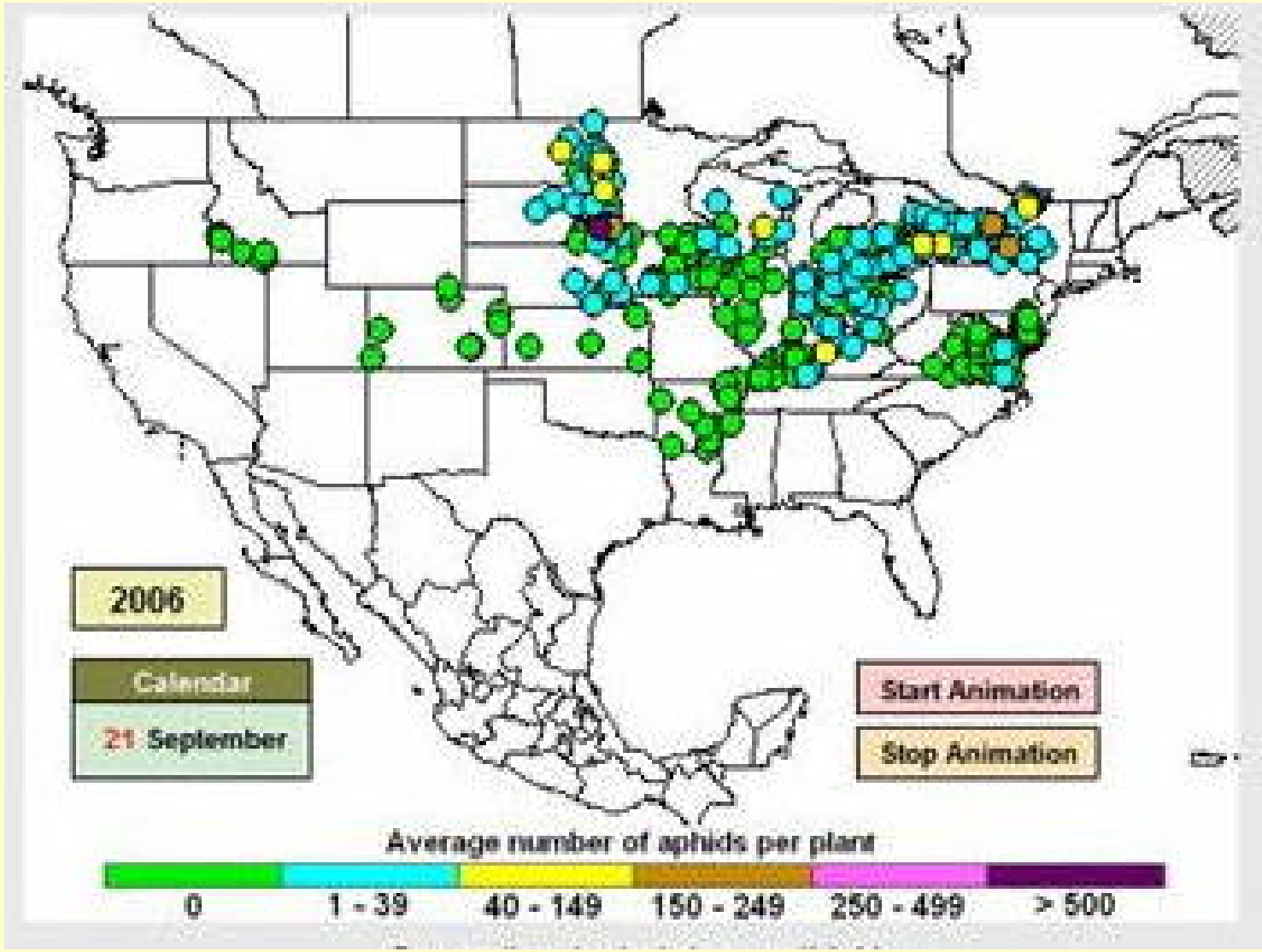
September 21, 2006



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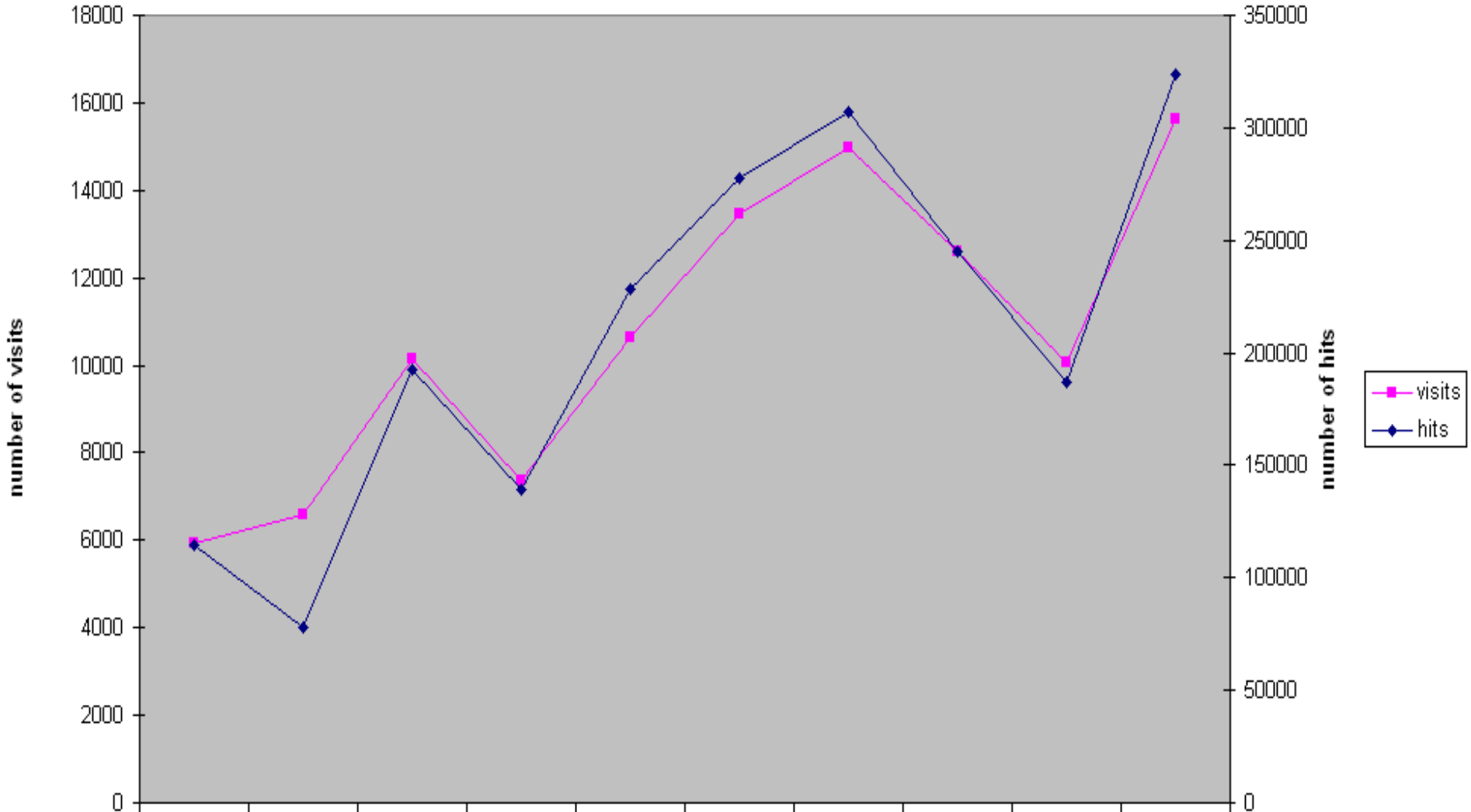
USDA Public PIPE Website Usage Statistics for 2006



	January	February	March	April	May	June	July	August	September	October
visits	5945	6574	10145	7357	10630	13469	14966	12594	10063	15632
hits	114541	78017	192285	139487	227929	277706	306738	244673	186800	323492

Midwest Soybean Aphid Suction Trap Network

- 7 WI Locations
- Catch and count aphid flights
- Weekly samples, spring-fall
- Track potential overwintering.

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Fall 2006 Trap Captures Posted at: www.ncipm.org/traps/

- WI trap capture low.
- 7 WI location ranged between 5 and 68 winged soybean aphids.
- Some surrounding states higher, particularly IL and IN, with thousands.

Buckthorn. The Soybean Aphid's Overwintering Host Plant.

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Table 1. 2006 soybean aphid suction trap captures by state and month. Sept.-Oct. column represents the overwintering flight to buckthorn.[1]

State (no. sites)	June	July	August	Sept. - Oct.
WI (7)	1	221	843	213
MN (5)	4	409	497	376
IL (9)	0	10	142	1762
IA (4)	0	21	358	532
IN (6)	0	3	28	8322
MI (5)	0	1	7	209

[1]Values in table display total soybean aphids captured each month from all sites per state. Data summarized in table form from project website: http://www.ncipm.org/traps/

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Scouting and Treatment Threshold Best Management Practices

- Reproductive (e.g., flowering) R1 to R5 treatment may be necessary at 250 aphids/plant; ~ 80% of field infested; and populations actively increasing.
- Regular scouting to determine rate of population increase, density.
- Emergence to vegetative; R7 and R8 – current research does not yield economic return.

Little White Aphids

Usually appear mid to late season. Calls come in mid to late August.

They ARE soybean aphid
They ARE NOT all “baby” aphids
They ARE NOT diseased aphids.
In literature; referred to as “white dwarfs”.

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Aphids of many species do this in response to change. May be … hot temperatures, Higher humidity, shorter day-length, change in plant nutritional quality.

We do know they are living, feeding, and reproducing aphids.

Easy to miss in scouting, should still be Included in the total plant population count when assessing threshold.

On-farm field trials August 7-10, 2006 white aphid morphs

- 3 fields (Rock, Jefferson, Walworth) sampled August 5th, white aphid morph infestation.
- Planting dates mid-May (Field 1), and late-May (Field 2), June 8 (Field 3).
- Fields: 80-170 Acres. Each field with 3 treated strips, 3 untreated checks.

Tom Novak
Total Crop Management LLC, 2006

On-farm field trials August 7-10, 2006 white aphid morphs

- Strips randomly located in each field. Each strip averaged 0.60 Acre.
- Fields treated August 7-10, 2006
- Treated with lambda-cyhalothrin (Warrior) at 3.0 oz/acre
- 15 GPA; 40-60 psi (depending on sprayer)

Tom Novak
Total Crop Management LLC, 2006

1

Plot #	Treatment	SBA/Plant	Yield @ 13% Bu/A
1	Untreated Check	1,000+/plant (white aphids)	44.5
2	Treated	1,000+/plant (white aphids)	51.0
3	Untreated Check		42.7
4	Treated		50.9
5	Untreated Check	200-300/plant (white aphids)	41.2
6	Treated	200-300/plant (white aphids)	42.0
3 Replicate Averages	TREATED	*+5.2 bu/A Yield Return*	48.0
	CHECK		42.8

Tom Novak
Total Crop Management LLC, 2006

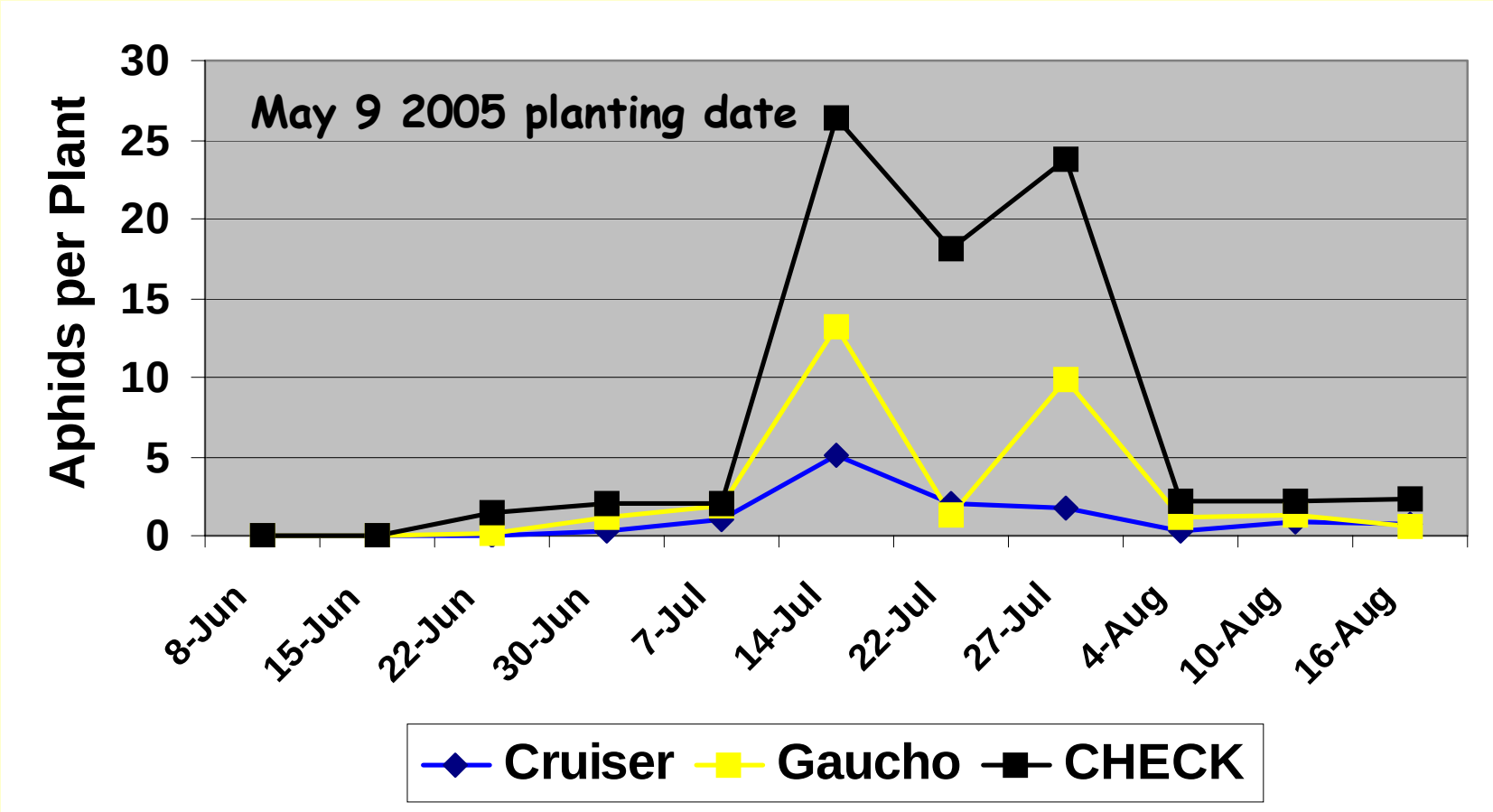
Plot #	Treatment	SBA/Plant	Yield @ 13% Bu/A
1	Untreated Check	400-600/plant (white aphids)	37.4
2	Treated	400-600/plant (white aphids)	46.0
3	Untreated Check	400-600/plant (white aphids)	42.4
4	Treated	400-600/plant (white aphids)	43.7
5	Untreated Check	400-600/plant (white aphids)	36.0
6	Treated	400-600/plant (white aphids)	43.4
3 Replicate Averages	TREATED	*+5.8 bu/A Yield Return*	44.4
	CHECK		38.6

Tom Novak
Total Crop Management LLC, 2006

Plot #	Treatment	SBA/Plant	Yield @ 13% Bu/A
1	Untreated Check	1000-1500/plant (white aphids)	47.0
2	Treated	1000-1500/plant (white aphids)	54.5
3	Untreated Check	1000-1500/plant (white aphids)	50.5
4	Treated	1000-1500/plant (white aphids)	51.7
5	Untreated Check	1000-1500/plant (white aphids)	50.0
6	Treated	1000-1500/plant (white aphids)	55.0
3 Replicate Averages	TREATED	*+ 4.5 bu/A Yield Return*	53.7
	CHECK		49.2

Tom Novak
Total Crop Management LLC, 2006

2005 Soybean Seed Treatment Trials
Soybean Aphid
UW Madison Entomology - Arlington, WI



Scott Chapman, Bryan Jensen, Eileen Cullen
UW-Madison Entomology Department

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2005 Soybean Seed Treatment Trials
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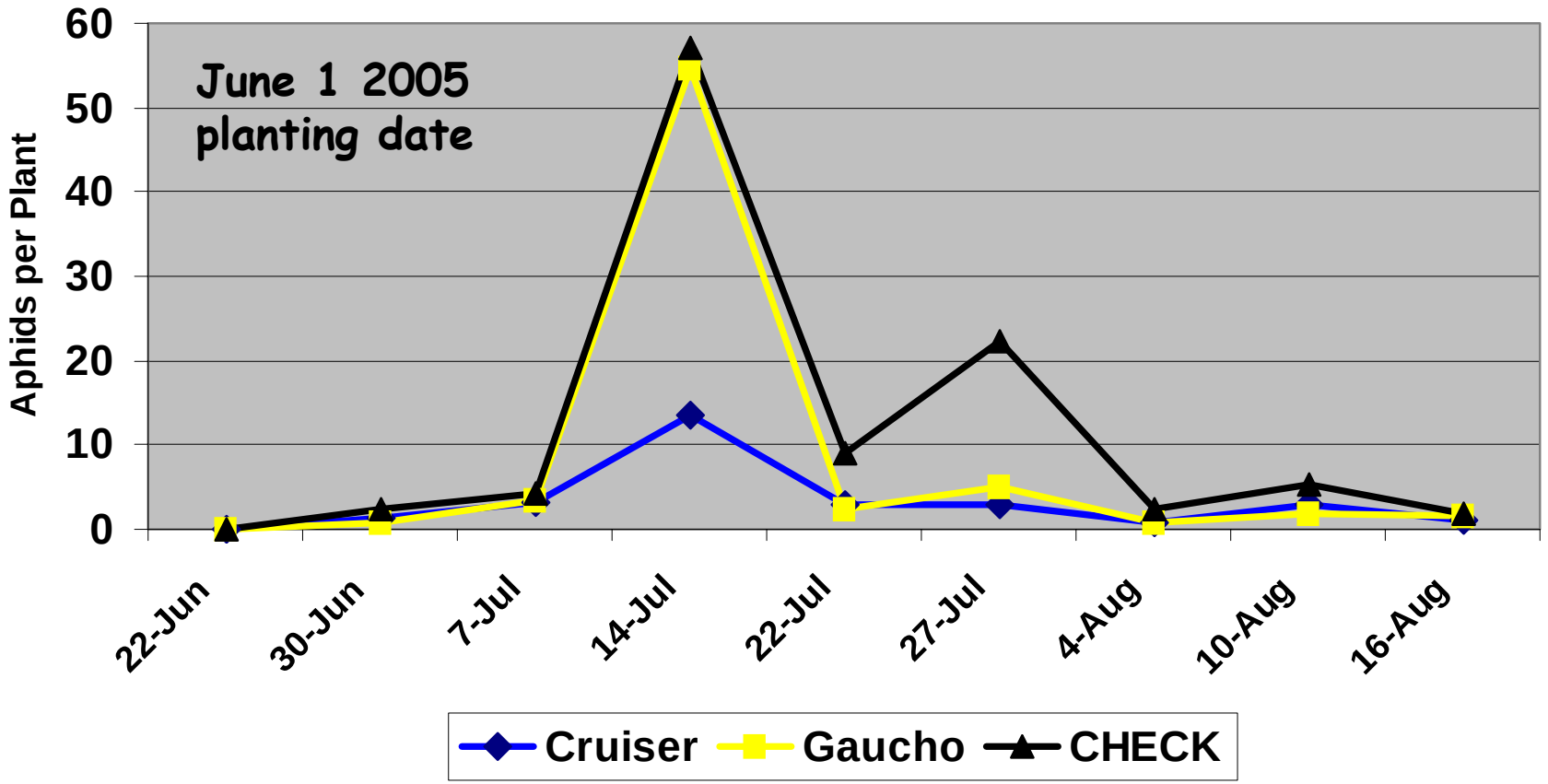

Scott Chapman, Bryan Jensen, Eileen Cullen
UW-Madison Entomology Department

2005 Soybean Seed Treatment Trials
Yield Results (Bu/Acre)
UW Madison Entomology - Arlington, WI

	May 9 Planting	**June 1 Planting**
Cruiser Maxx	62.6 a	57.6 a
Gaucho	56.0 a	58.9 a
CHECK	61.6 a	54.6 a
	(P = 0.0626)	**(P = 0.2531)**

Scott Chapman, Bryan Jensen, Eileen Cullen
UW-Madison Entomology Department

Soybean Host Plant Resistance/Tolerance

Soybean Genetics

Soybean breeding lines differ for aphid population density and symptom severity

➢Collaboration between soybean breeders and entomologists assessing the contribution of plant defenses on aphid dynamics.

<u>Outcome</u>: Aphid resistant or tolerant plants may allow biological control to be more effective -

- ❖Reduced frequency of insecticide treatment.
- ❖Maintain SBA density at acceptably low levels while providing prey to retain natural enemies in crop.

- **Hill et al. (2004)** *Crop Science* **44: 98-106.*****
- **Diaz-Montano and Reese (2004)** *ESA National Meeting, Salt Lake City, UT.*
- **Fan (1988)** *Soybean Science* **7(2): 167-169.**
  [english translation http://www.k-state.edu/issa/aphids/reporthtml/trans63.htm]

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Soybean Aphid Biological Control Short Course

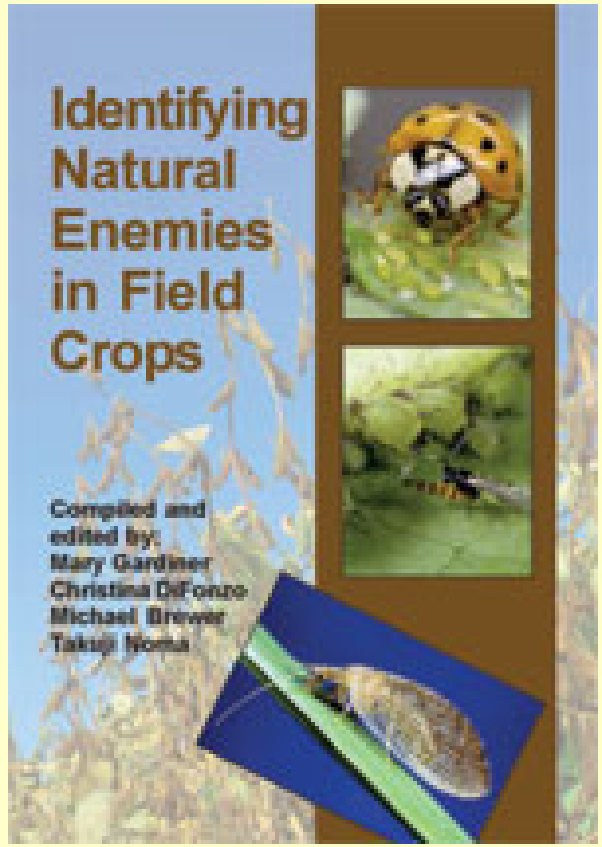
Delivered via distance education technology

March 6, 2007
8:30 am to 12:30 pm CST

IA, IL, WI, MN, SD …
Local Sites, check with County Extension Office

CCA CEUs applied for

Entomologists from multi-states



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- History/Biology of SBA
- Situation in Midwest
- Biological Control: What do we have to work with in U.S.?
- Predators, Parasitoids, Pathogens
- Conservation Natural Enemies
- Natural Enemy Releases
- Foreign Exploration
- Host Specificity Testing
- Studies with non-target aphids
- Outlook for 2007

NCSRP Soybean Aphid Biocontrol Website

www.entomology.wisc.edu/sabc/

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