

Soybean Aphid IPM - An Overview for 2007

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Wisconsin Fertilizer Aglime &
Pest Management Conference

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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



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.





United States Department of Agriculture

Pest Information Platform for Extension and Education

Getting Started

[Prev](#) [Next](#)

July - 2006

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23	24	25	26	27	28	29	
30	31						

August - 2006

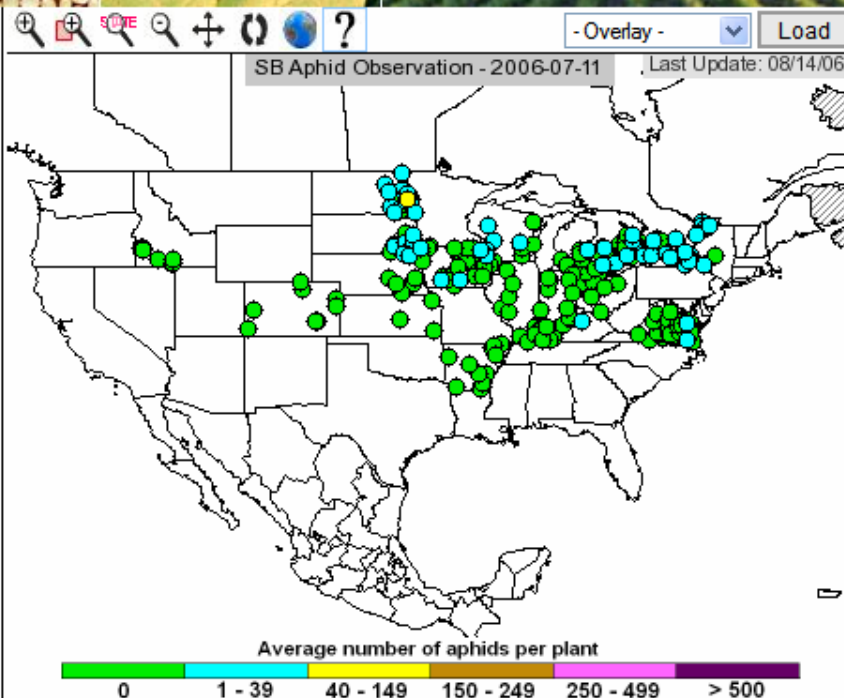
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September - 2006

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National Commentary

- [University SBA Sites](#)
- [USDA SBA Sites](#)
- [Private/Industry SBA Sites](#)
- [International SBA Sites](#)
- [Observation Animations](#)
- [Not Sure if it is Soybean Aphid](#)



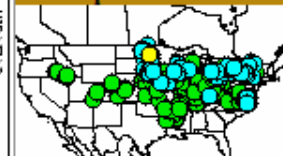
[Printable Map](#) [Threshold](#)

National Soybean Aphid Commentary (updated:)
National Map Commentary Not Available

Jul 11, 2006

Legumes/Kudzu
Soybean Aphid

SB Aphid Observation



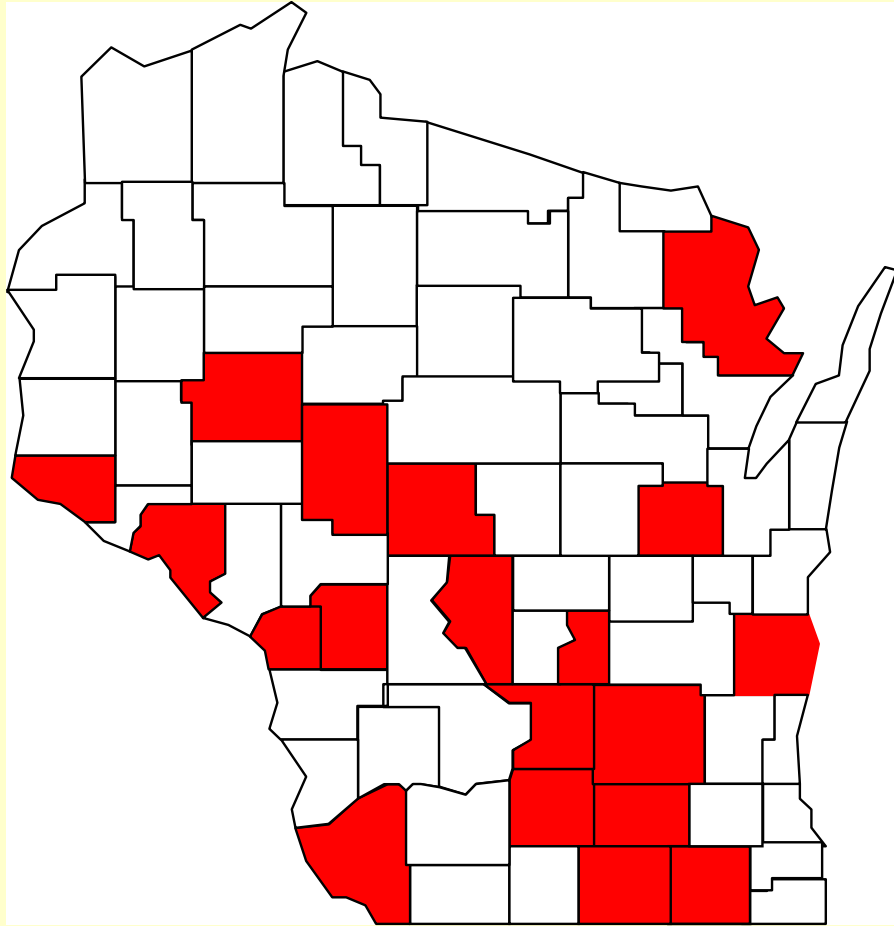
SB Aphid State Update



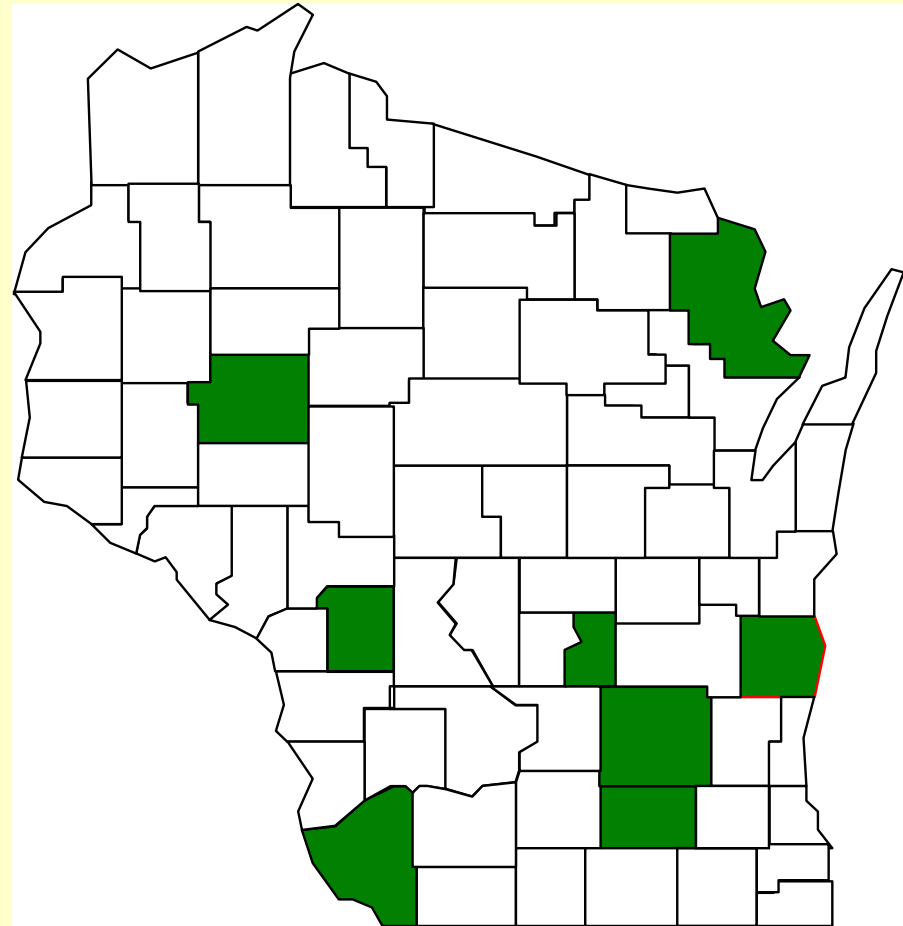
Management Toolbox

- [Guidelines - USA](#)
- [GFP Tool](#)
- [Insurance Docs](#)
- [Commentary Chron](#)

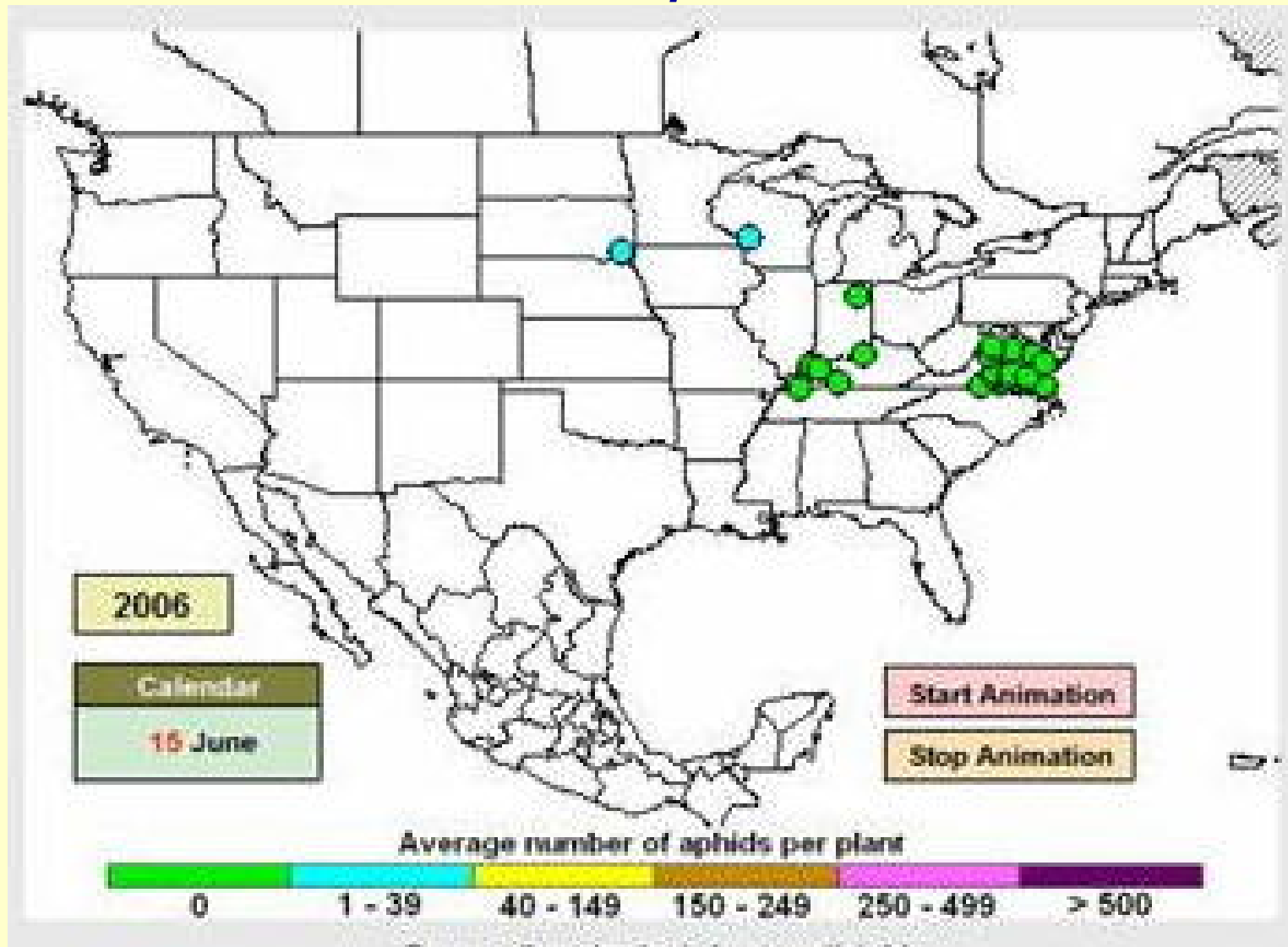
2006 WI Soybean Rust Sentinel Plots Reporting



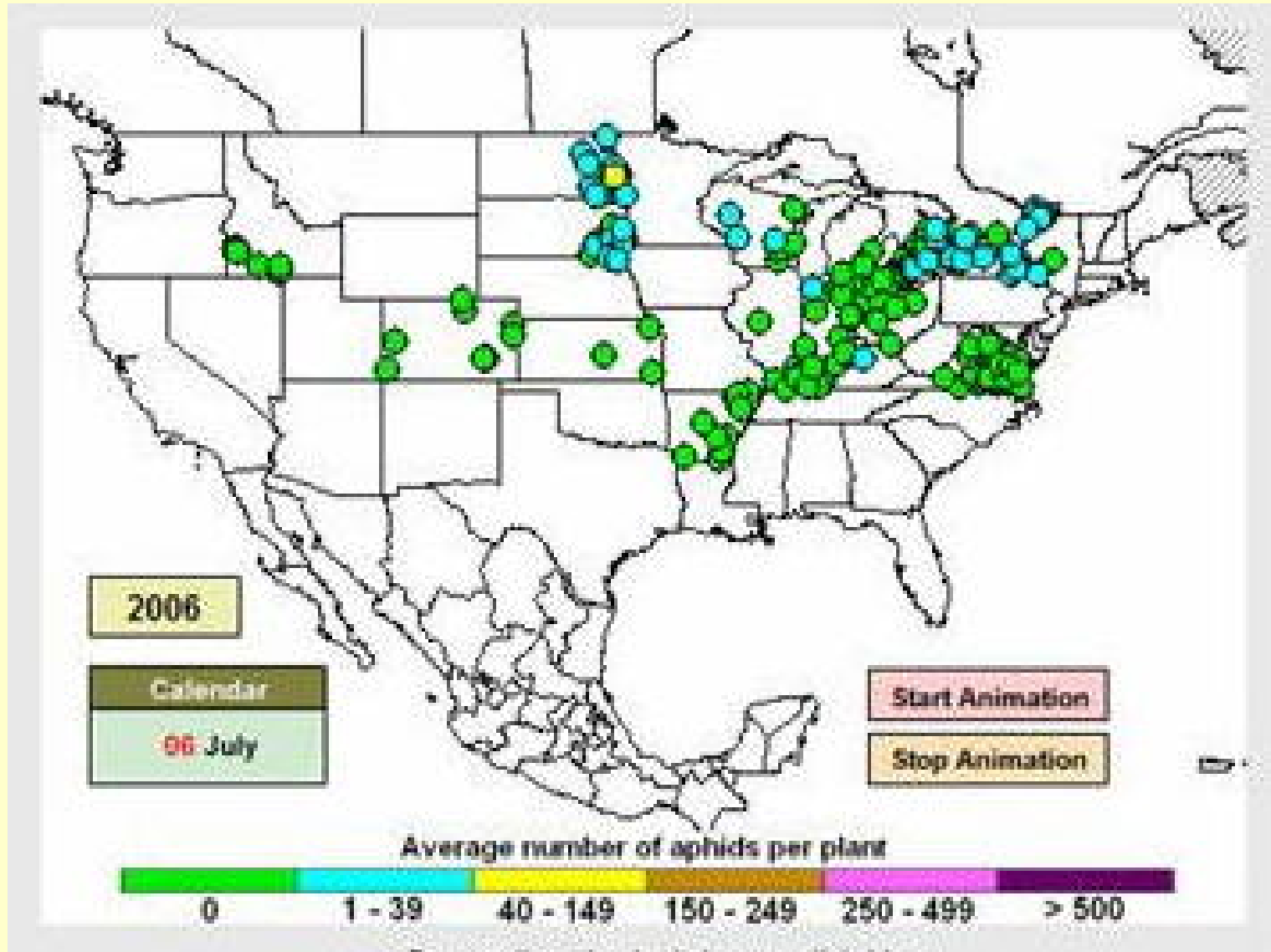
2006 WI Soybean Aphid Plots Reporting



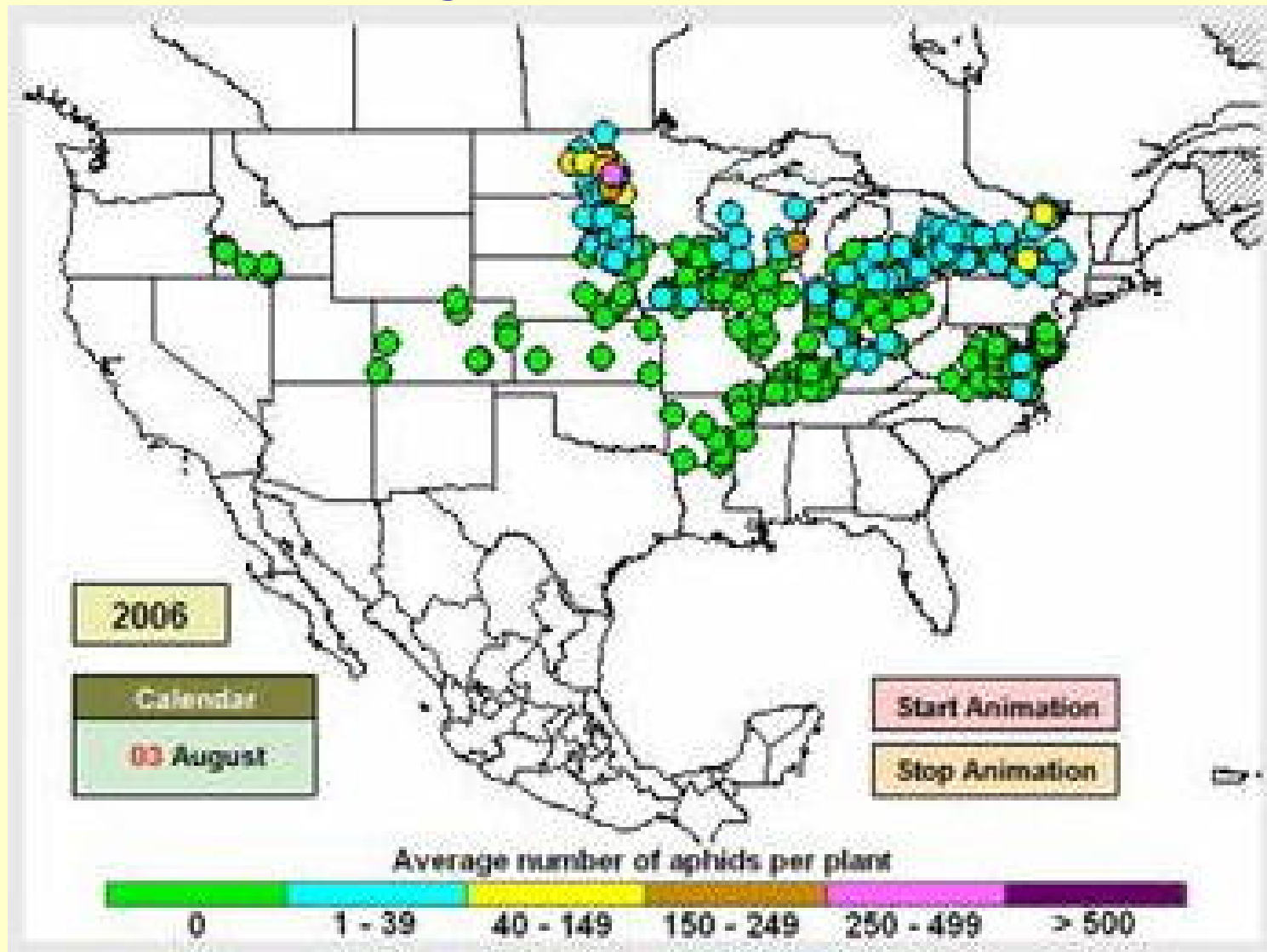
June 15, 2006



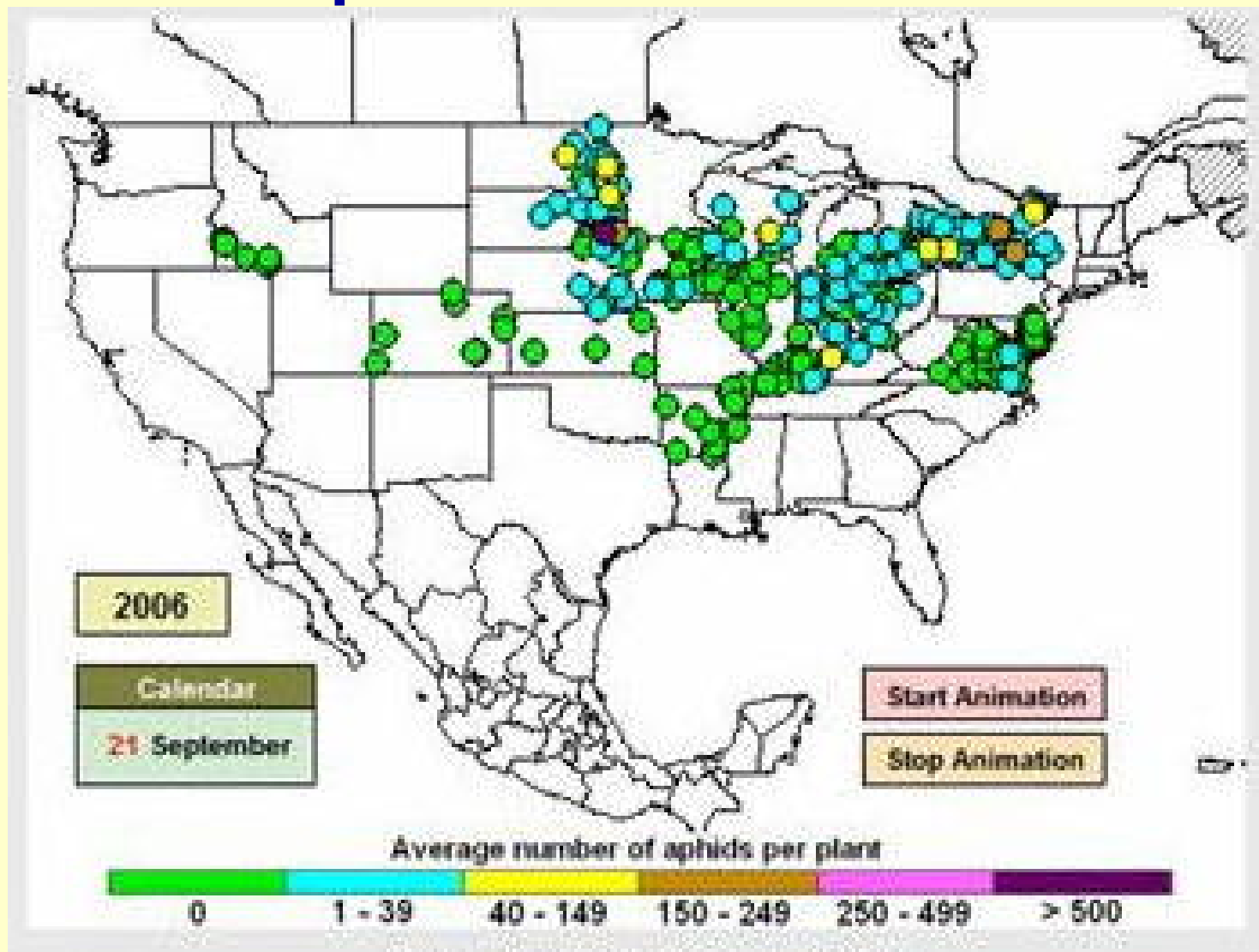
July 6, 2006



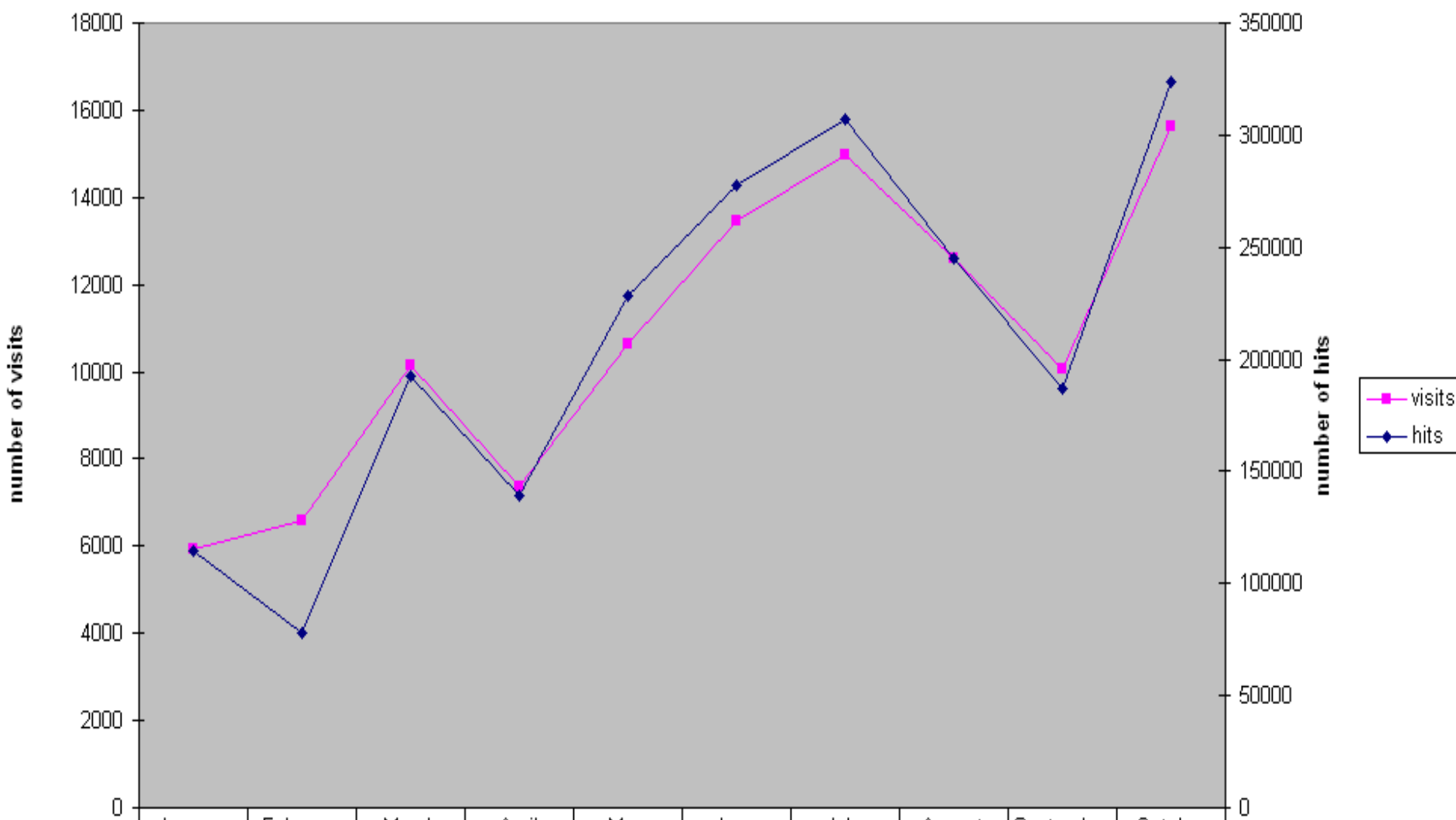
August 3, 2006



September 21, 2006

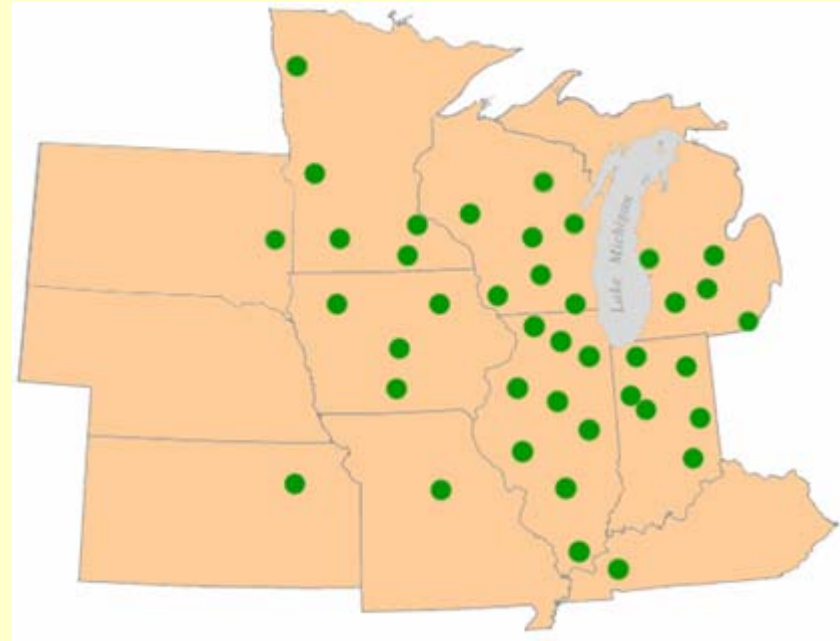


USDA Public PIPE Website Usage Statistics for 2006



visits	January	February	March	April	May	June	July	August	September	October
hits	5945	6574	10145	7357	10630	13469	14966	12594	10063	15632
	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.



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.



**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

¹Values 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”.



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)



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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	48.0
	CHECK	<i>Yield Return</i>	42.8

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2

			Yield @ 13% Bu/A
Plot #	Treatment	SBA/Plant	
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			44.4
			<i>+5.8 bu/A Yield Return</i>
CHECK			38.6

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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
<hr/>			
3 Replicate Averages	TREATED	+ 4.5 bu/A <i>Yield Return</i>	53.7
	CHECK		49.2

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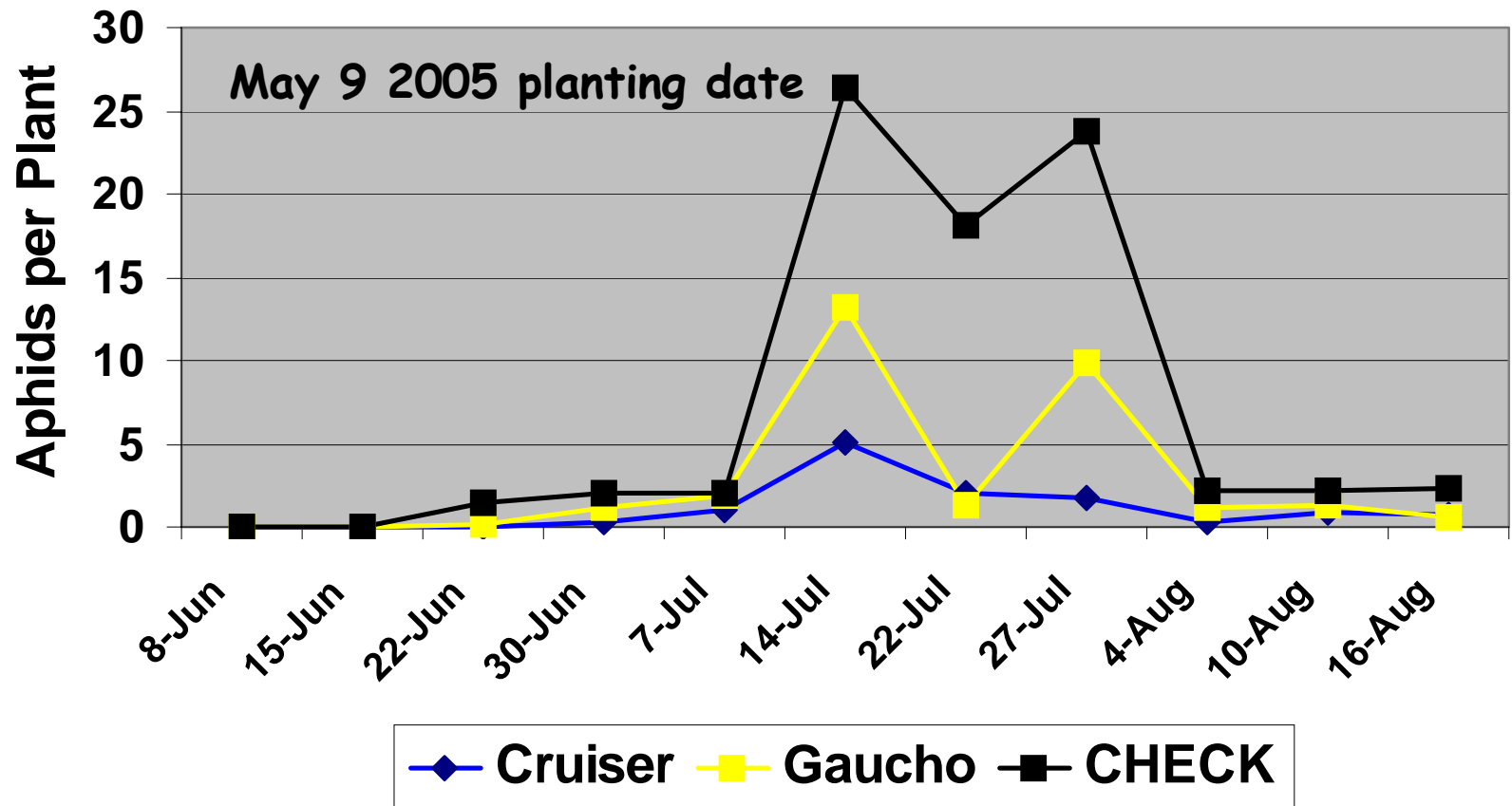
Total Crop Management LLC, 2006



2005 Soybean Seed Treatment Trials

Soybean Aphid

UW Madison Entomology - Arlington, WI



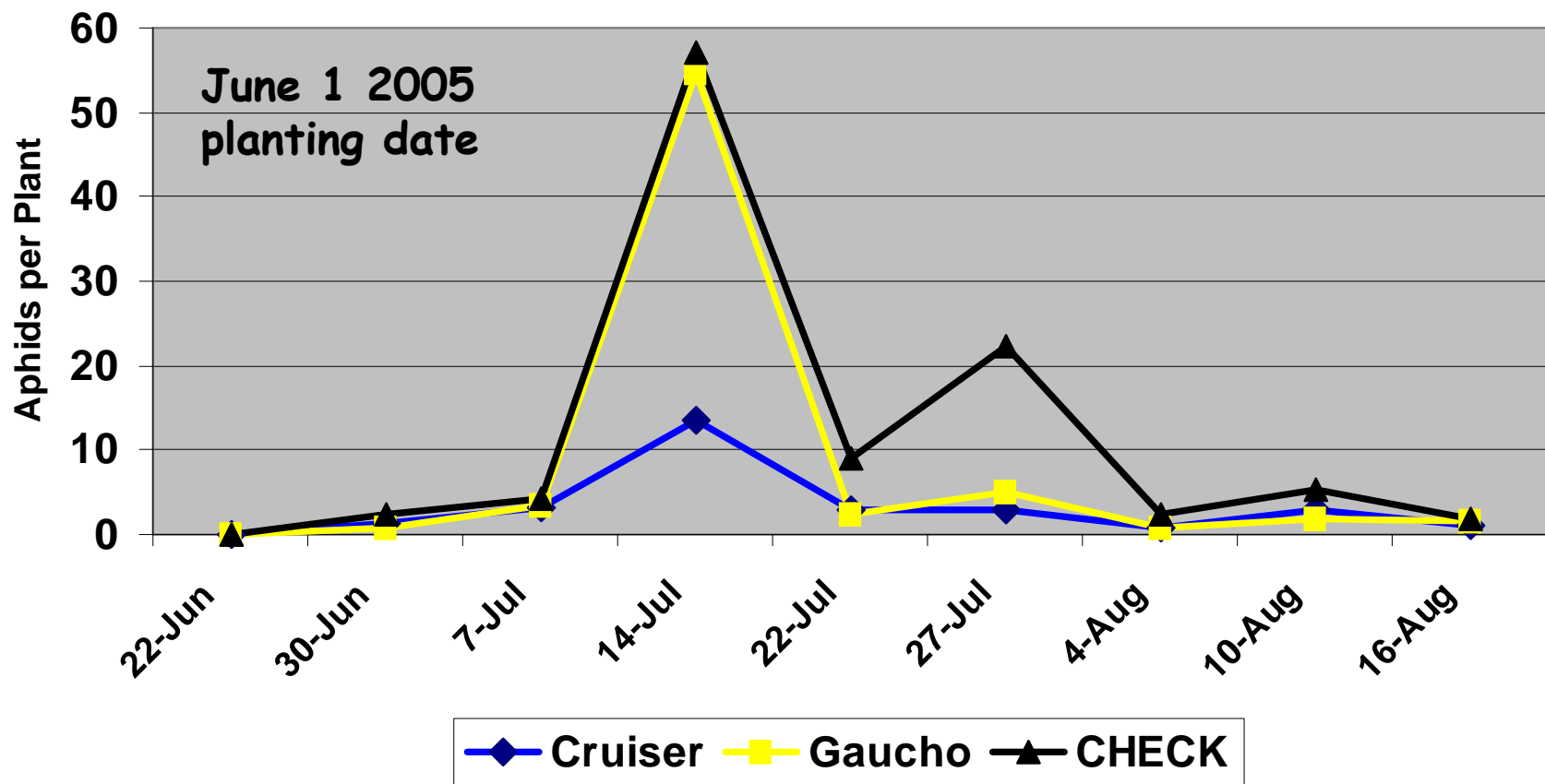
Scott Chapman, Bryan Jensen, Eileen Cullen
UW-Madison Entomology Department



2005 Soybean Seed Treatment Trials

Soybean Aphid

UW Madison Entomology - Arlington, WI



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
Gaucha	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.



Outcome: 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/reporhtml/trans63.htm>]



Soybean Aphid Biological Control Short Course

Delivered via distance
education technology

March 6, 2007

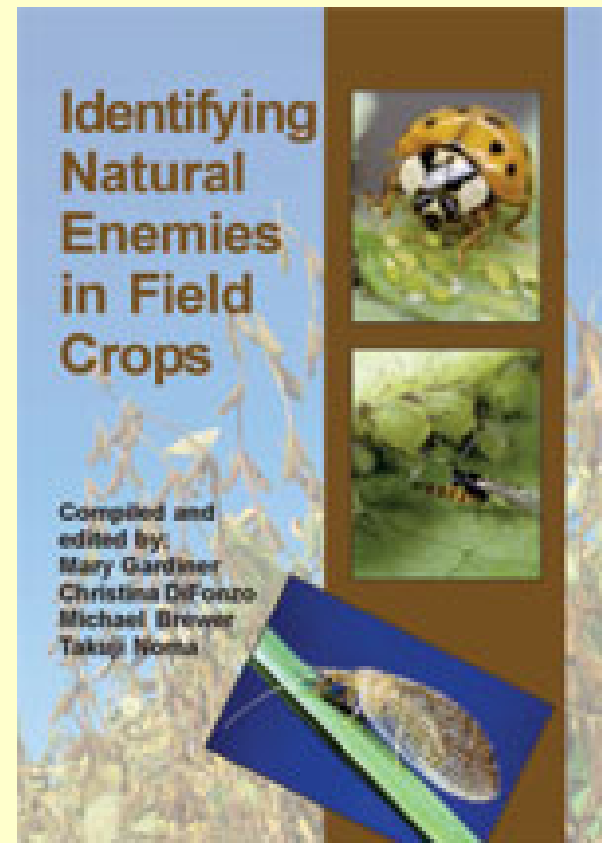
8:30 am to 12:30 pm CST

IA, IL, WI, MN, SD ...

Local Sites, check with
County Extension Office

CCA CEUs applied for

Entomologists from multi-states



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Peter J. Sonnentag,
UW Madison Entomology

- History/Biology of SBA
- Situation in Midwest
- Biological Control: What do we have to work with in U.S.?
- Predators, Parasitoids, Pathogens
- Conserving 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/



The screenshot shows a web browser window displaying the NCSRP Soybean Aphid Biocontrol Website. The browser's address bar shows the URL www.entomology.wisc.edu/sabc/. The website's header features the title "Soybean Aphid Biological Control" in green text, accompanied by two photographs: one of a single soybean aphid on a green leaf and another showing a cluster of aphids on a soybean plant. Below the header, a paragraph identifies the site as the "Official website of the North Central Regional project for the control of the soybean aphid, *Aphis glycines*, by importation biological control". The main content area is organized into two columns. The left column contains a list of links: "What is Biological Control?", "Soybean Aphid Natural Enemies", "Importation Biological Control Project", "Additional Soybean Aphid Biological Control", "IPM and Natural Enemies", and "Additional Resources". The right column contains two paragraphs of text. The first paragraph describes the soybean aphid's origin in Asia and its rapid spread across the United States, noting significant economic losses. The second paragraph details the 2005 research project funded by the USDA, which focuses on identifying and releasing natural enemies of the aphid. Below the main text, a row of logos represents the participating institutions: NCSRP, North Central Soybean Research Program, Michigan State University, Iowa State University, The University of Wisconsin-Madison, and UW Extension. At the bottom of the page, a navigation bar includes links for "contact", "about us", and "home", followed by a supporting statement from the University of Wisconsin-Madison Department of Entomology. The browser's status bar at the very bottom shows the "Internet" icon and the "nsion" logo.

Soybean Aphid Biological Control

Official website of the North Central Regional project for the control of the soybean aphid, *Aphis glycines*, by importation biological control

What is Biological Control?

Soybean Aphid Natural Enemies

Importation Biological Control Project

Additional Soybean Aphid Biological Control

IPM and Natural Enemies

Additional Resources

The soybean aphid, *Aphis glycines*, is native to Asia. The first North American record was from Wisconsin in 2000; later that same year significant infestations were also reported from Minnesota, Iowa, Missouri, Illinois, Indiana, and Michigan. By 2005 it had spread to 22 states and was resulting in millions of dollars of loss and management costs annually.

In 2005, a group of 12 scientists from five North Central regional states and the USDA received funding from the **North Central Soybean Research Program** to conduct research on **importation biological control** of soybean aphid, a process which identifies, locates, evaluates, and releases a pest's natural enemies that evolved with it in its native home, with the intent of significant long-term reduction of pest numbers.

At this website you will find background information on biological control in general, and biological control of the soybean aphid in particular. Further, through our regular updates of the site, growers, extension personnel, and scientists can track the progress of the importation biological control project.

NCSRP
NORTH CENTRAL SOYBEAN
RESEARCH PROGRAM

MICHIGAN STATE UNIVERSITY

IOWA STATE UNIVERSITY
Becoming the best.

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This website is supported by a grant from the North Central Soybean Research Program and is compiled and hosted by the Department of Entomology, University of Wisconsin – Madison .

Internet

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