# Where have all the Soybean Aphids gone?

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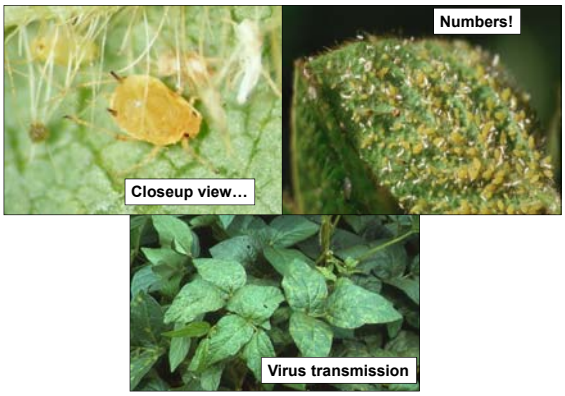
**UW Entomology**
**November 28, 2012**

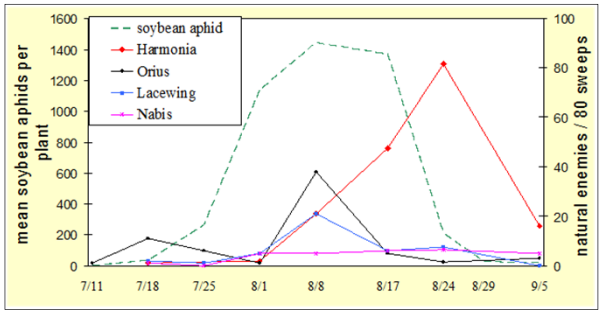
## 2000: A New Pest Arrives




## Grant County – August, 2000

(photo by John Wedberg)

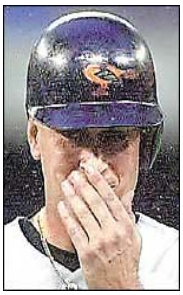
## Soybean Aphid and Natural Enemies 2001 - Arlington, WI




Bob Ellingson (fig. courtesy E. Cullen)

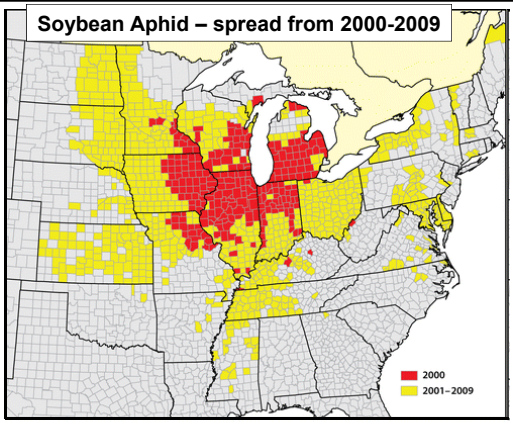
## Asian Lady Beetle (*Harmonia*)

## Soybean Aphids Descend on Toronto August 2-3, 2001



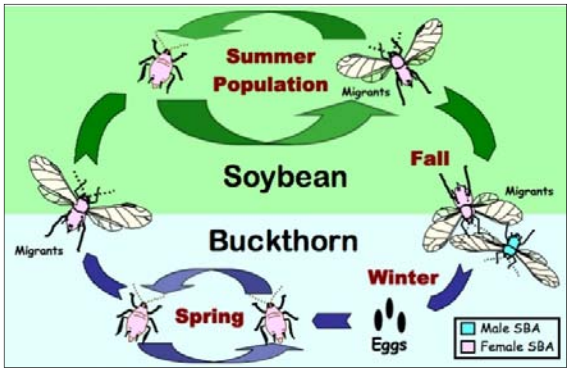
(photo credits Toronto Star)

## Soybean Aphid – spread from 2000-2009



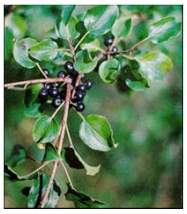

Ragsdale DW, et al. 2010.
Annu. Rev. Entomol. 56:375–99

## Soybean Aphid Seasonal History




Purdue University

## Common Buckthorn, *Rhamnus cathartica*

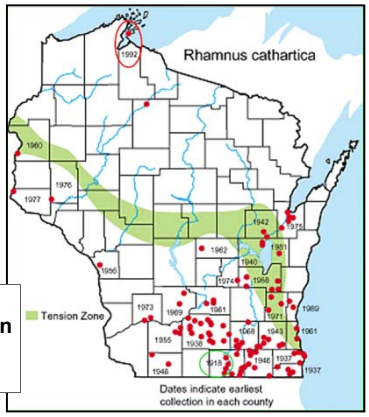


## Buckthorn – spring bud break

## *Rhamnus cathartica* distribution in Wisconsin

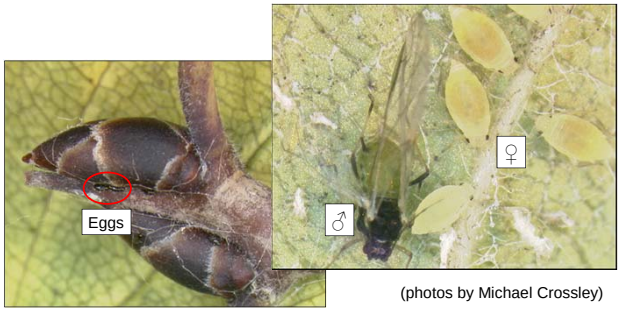
**Buckthorn is locally abundant (SC, SE)**

**<u>BUT</u> – spring surveys of buckthorn for SBA in 2001, 2009 came up empty!!**




## Soybean Aphid Survey (with David Voegtlin)

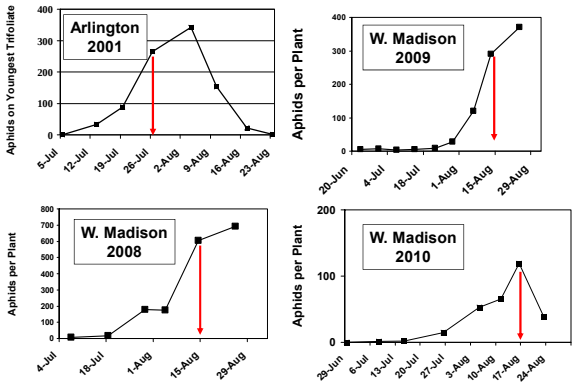
## Soybean Aphids on Common Buckthorn
## Rock Island IL
## October 2012




(photos by Michael Crossley)

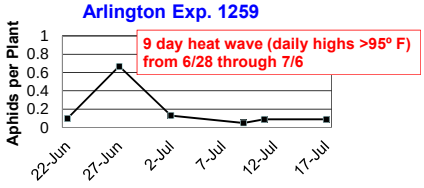
## Soybean Aphids on Common Buckthorn
## Rock Island IL
## April 2012

## Soybean Aphid Dynamics in Soybean Fields

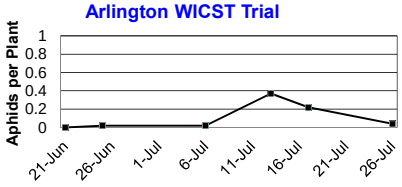



## 2012 – The roof caved in!

### Arlington Exp. 1259




### Arlington WICST Trial



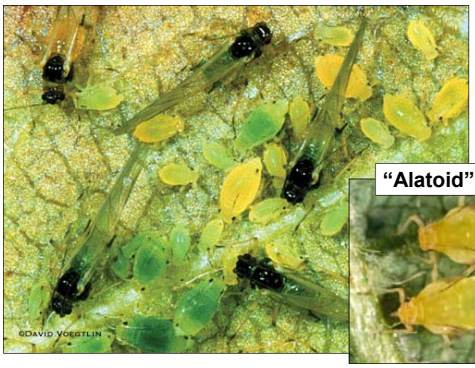
## What is driving the recent trends (later, declining densities) in soybean aphid dynamics?

- ❑ Weather? (overwintering period may be important)
- ❑ Natural enemies? (Asian lady beetle, "*Orius*" – minute pirate bug, fungal pathogens)




- ❑ Seed treatments? (may cut off the initial 7-10 days of aphid colonization)

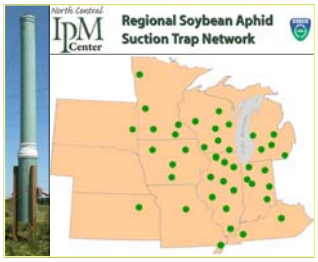
## Soybean Aphid - migratory (winged alatae) & stationary (wingless apterae) forms





## Seasonal Aphid Dispersal – Suction Trap Network

- ➢ Weekly captures of migrating aphid species
- ➢ Dr. David Voegtlin, Illinois Natural History Survey




| | |
|---|---|
| *Acyrthosiphon pisum* | "Pea aphid" |
| *Aphis craccivora* | "Black legume aphid" |
| ***Aphis glycines*** | **"Soybean aphid"** |
| *Aphis gossypii* | "Cotton- melon aphid" |
| *Aphis helianthi* | "Sunflower or dogwood aphid" |
| *Aphis nasturtii* | "Buckthorn - potato aphid" |
| *Aphis spiraecola* | "Spiraea aphid" |
| *Brachycaudus helichrysi* | "Leaf curling plum aphid" |
| *Lipaphis pseudobrassicae* | "Turnip aphid" |
| *Macrosiphum euphorbiae* | "Potato aphid" |
| *Myzus persicae* | "Peach potato aphid" |
| *Rhopalosiphum insertum* | "Apple grass aphid" |
| *Rhopalosiphum maidis* | "Corn leaf aphid" |
| *Rhopalosiphum padi* | "Bird cherry-oat aphid" |
| *Schizaphis graminum* | "Greenbug" |
| *Sitobion avenae* | "English grain aphid" |
| *Therioaphis trifolii* | "Spotted Alfalfa aphid" |

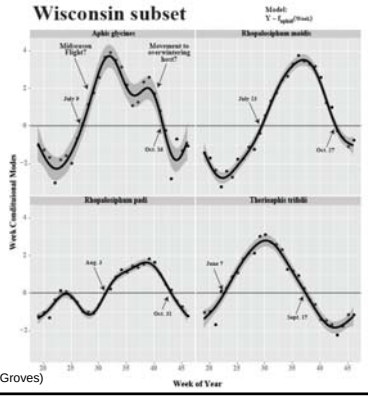
## Detection of seasonal trends in aphid movement

**Methods modified from Frost et. al. (2012)**

- ➢ Suction trap data were averaged for each year, location, and week combination
- ➢ Data were standardized using both a random effects models together with regression splines
- ➢ Cubic polynomials were fit to the resulting "conditional" or "deseasonalized" data (linear model) with generalized additive mixed models (GAMM's)

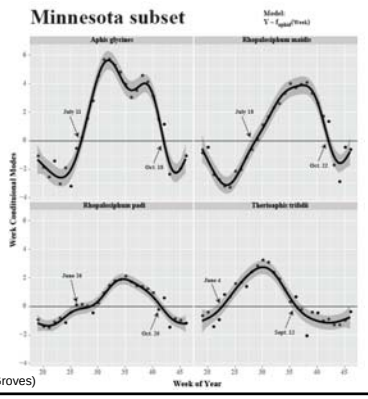
(slide courtesy of Russ Groves)

## Modeling Aphid Phenology: Wisconsin 2005-2011



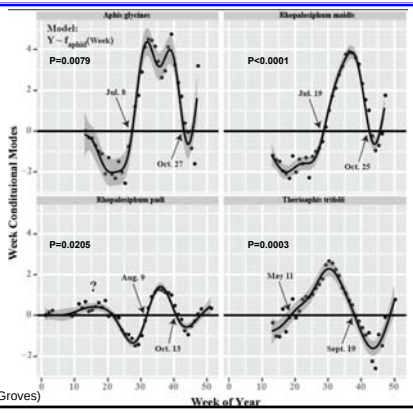

(slide courtesy of Russ Groves)

## Modeling Aphid Phenology: Minnesota 2005-2011




(slide courtesy of Russ Groves)

## Modeling Aphid Phenology: 2005-2011




(slide courtesy of Russ Groves)

## In Conclusion…

- Soybean aphid is alive and kicking, but not at the same level as before
  - Is this a brief hiatus or a long term trend?
- Some unresolved questions:
  - Why does soybean aphid apparently ignore Wisconsin buckthorn?
  - What is the spring migration pattern of soybean aphid from buckthorn to soybean?
  - Does seed treatment impact the regional dynamics of soybean aphid?

## Acknowledgements


- North Central Soybean Research Program
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- UW collaborators: Eileen Cullen, Claudio Gratton, Craig Grau, Russ Groves, Bryan Jensen, John Wedberg
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