Soybean Aphid – Status and Management

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UW Entomology

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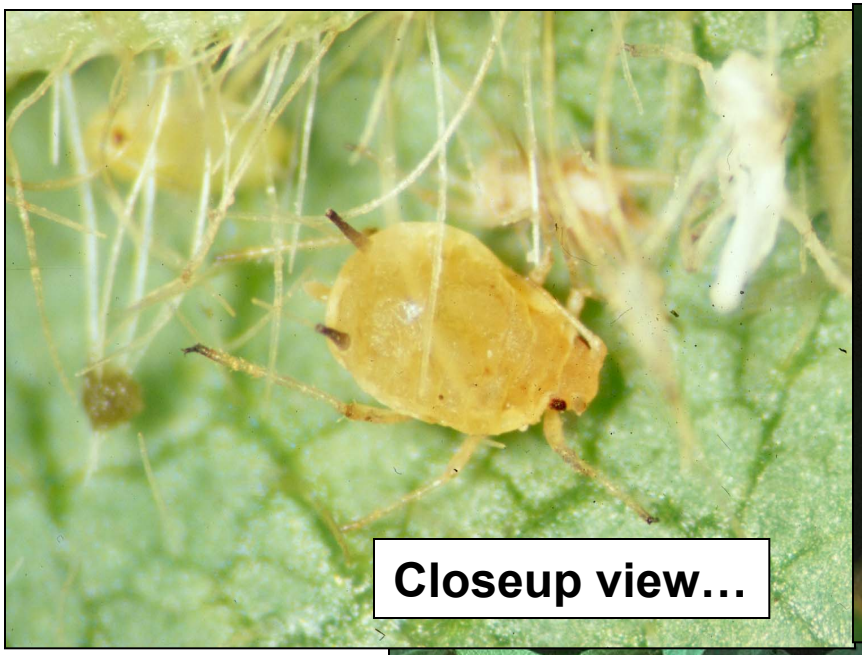
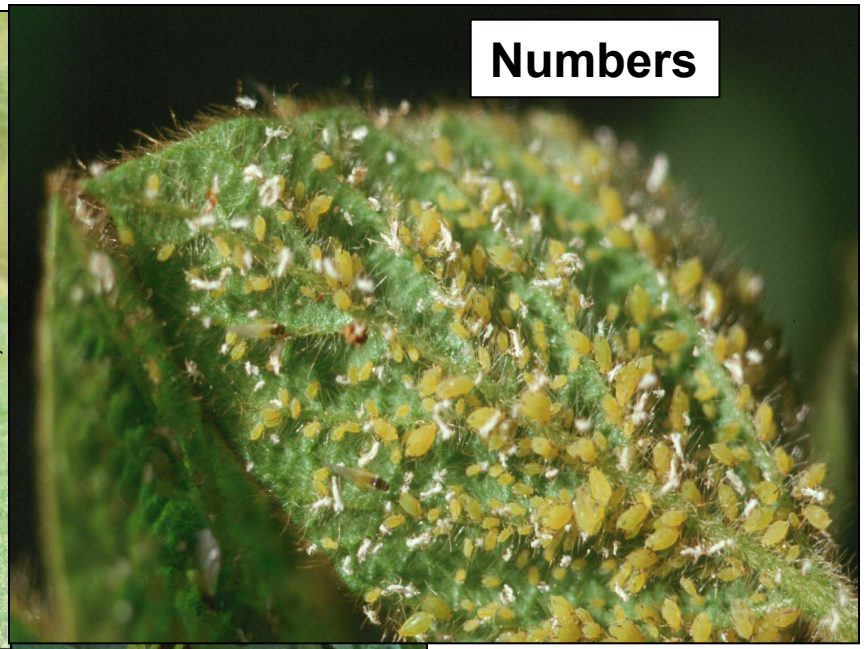
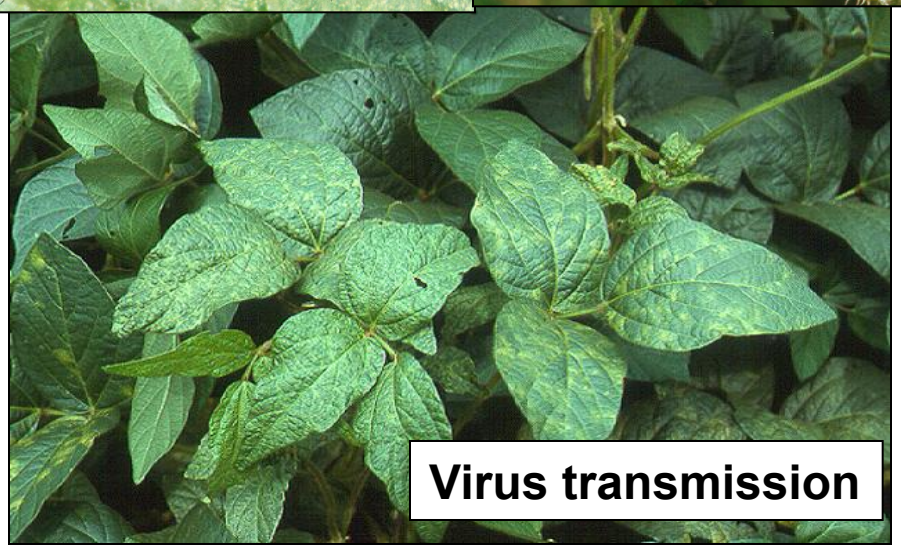
2000: A New Pest Arrives



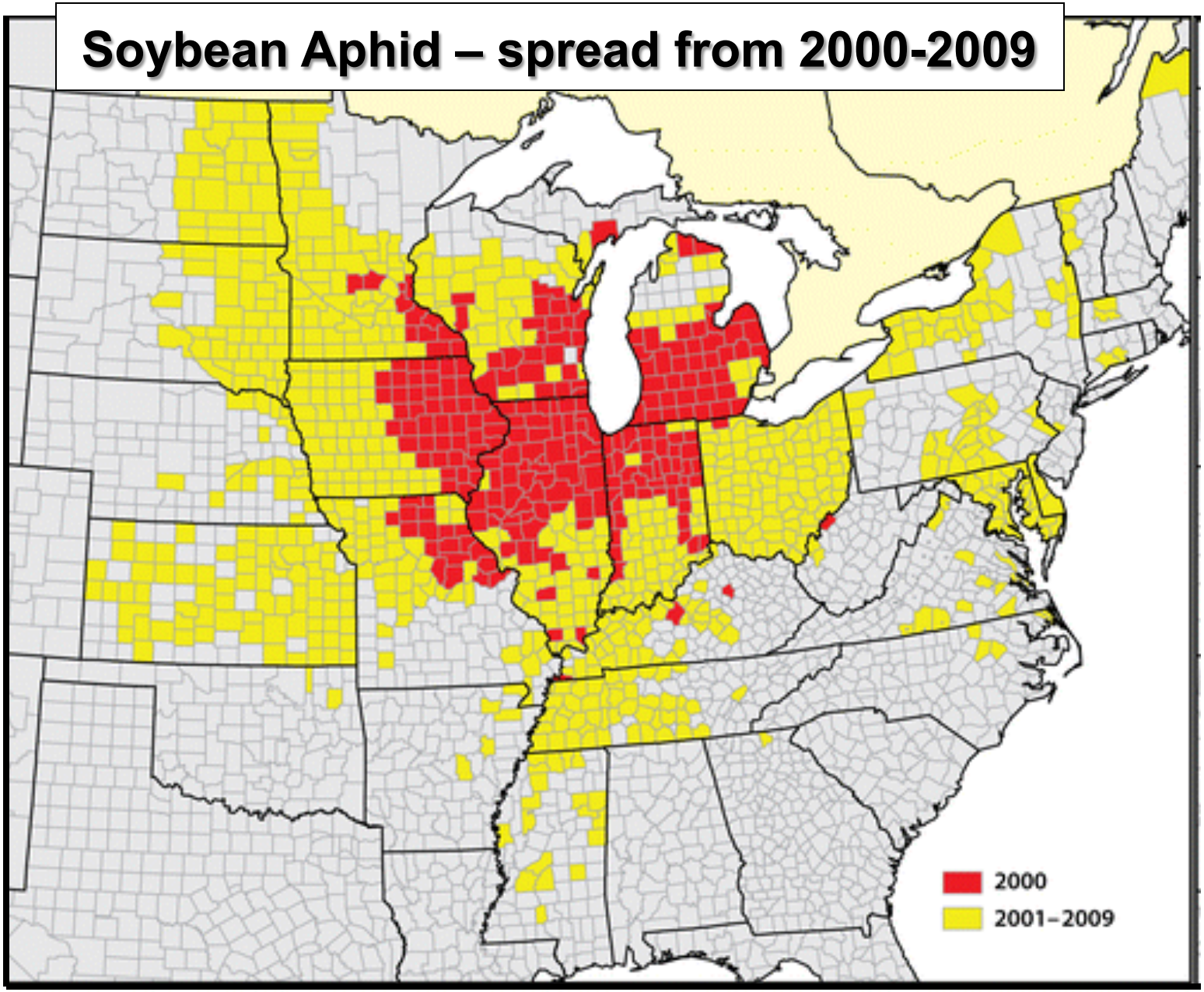




Grant County – August, 2000

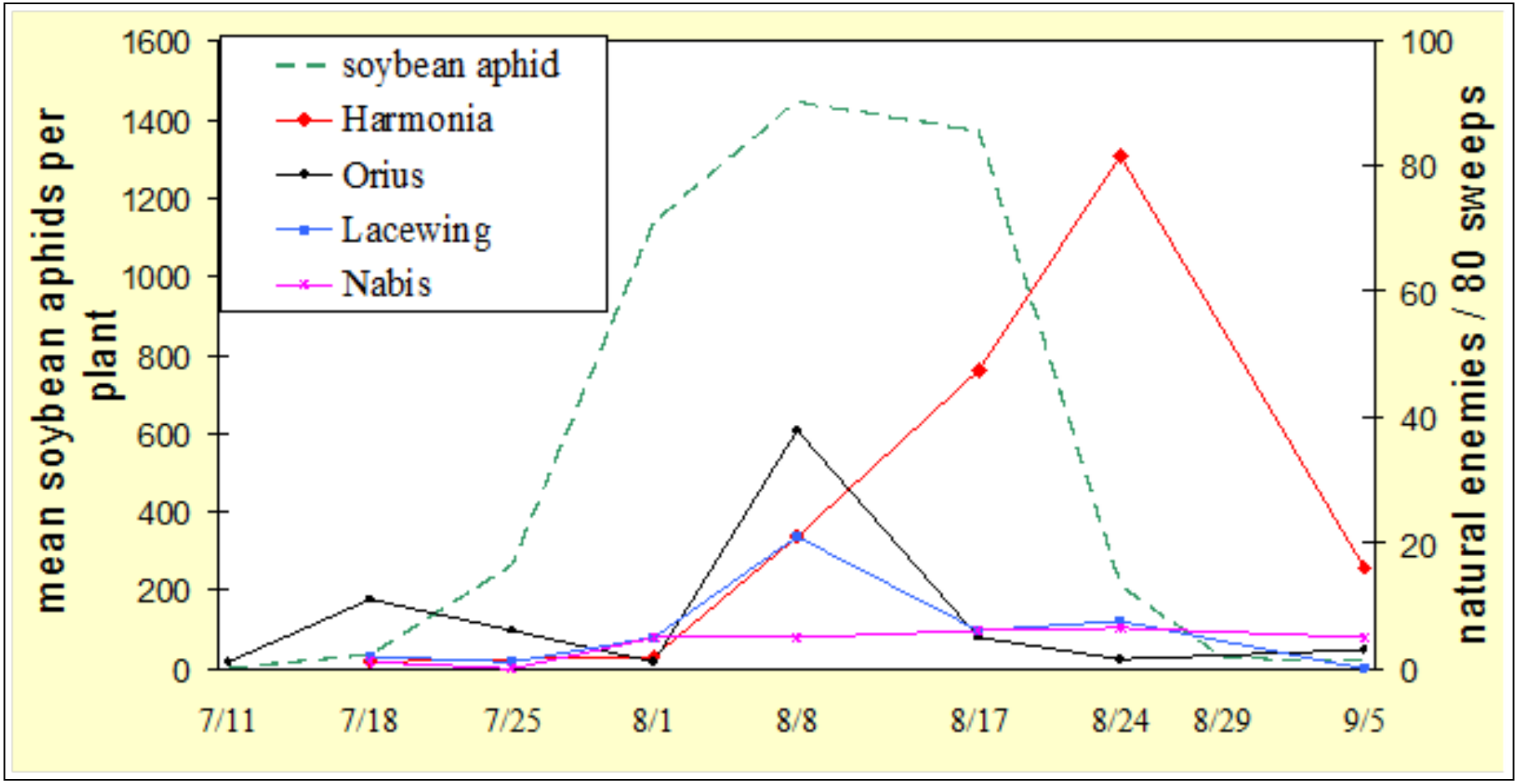
(photo by John Wedberg)

Soybean Aphid – spread from 2000-2009



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

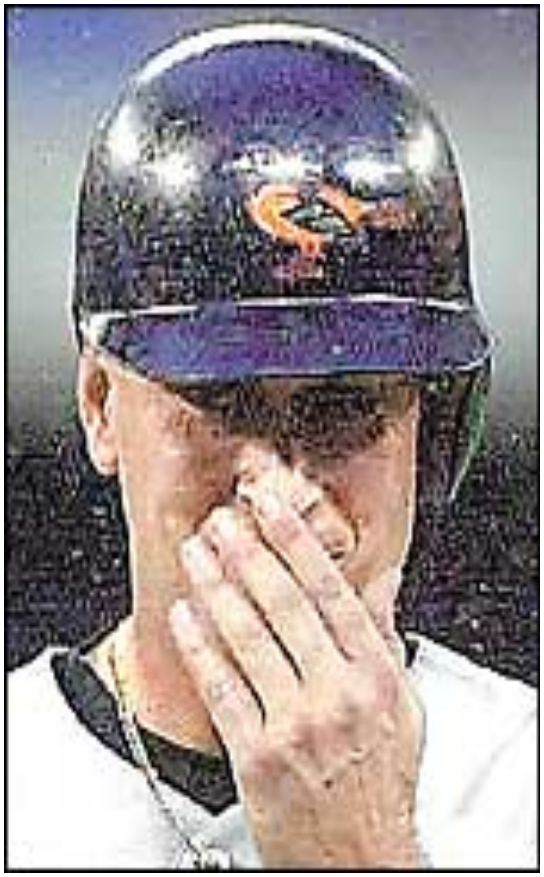
Soybean Aphid and Natural Enemies 2001 - Arlington, WI



Asian Lady Beetle (*Harmonia*)

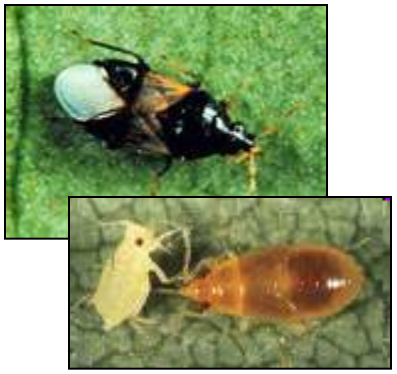
Soybean Aphids Descend on Toronto August 2-3, 2001

(photo credits Toronto Star)



Developing a management strategy for the SBA (NC502 & NCSRP)

- **Insecticide recommendations, economic threshold**
  - **Threshold = 250 aphids/plant, V – R5**
- **Biological Control**

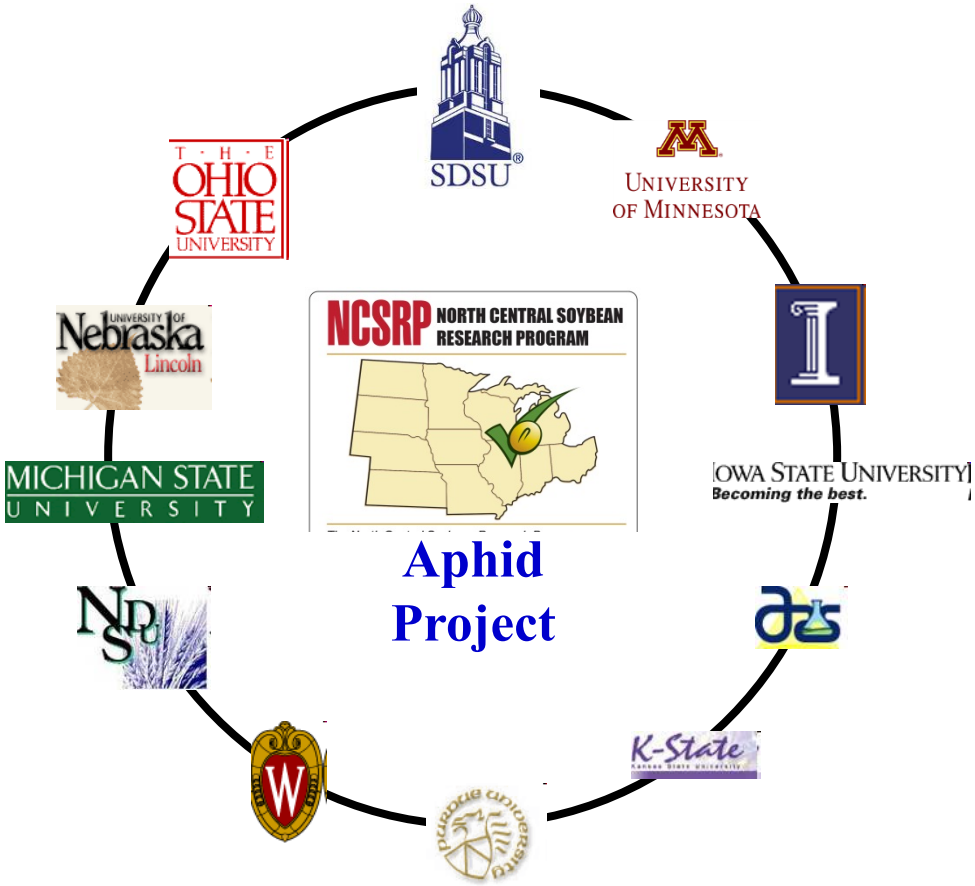




- **Host Plant Resistance (*Rag* genes)**

North Central Soybean Research Program
Multi-Disciplinary, Multi-State Aphid Project

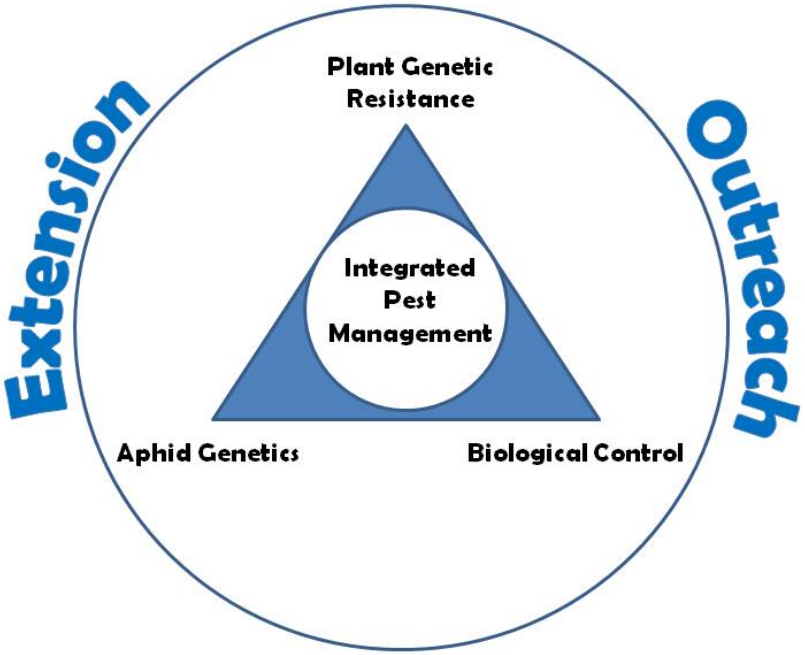
2012-2014

- 26 interdisciplinary collaborators throughout the North Central region
  - entomologists, plant breeders, molecular biologists, extension specialists, ag economist

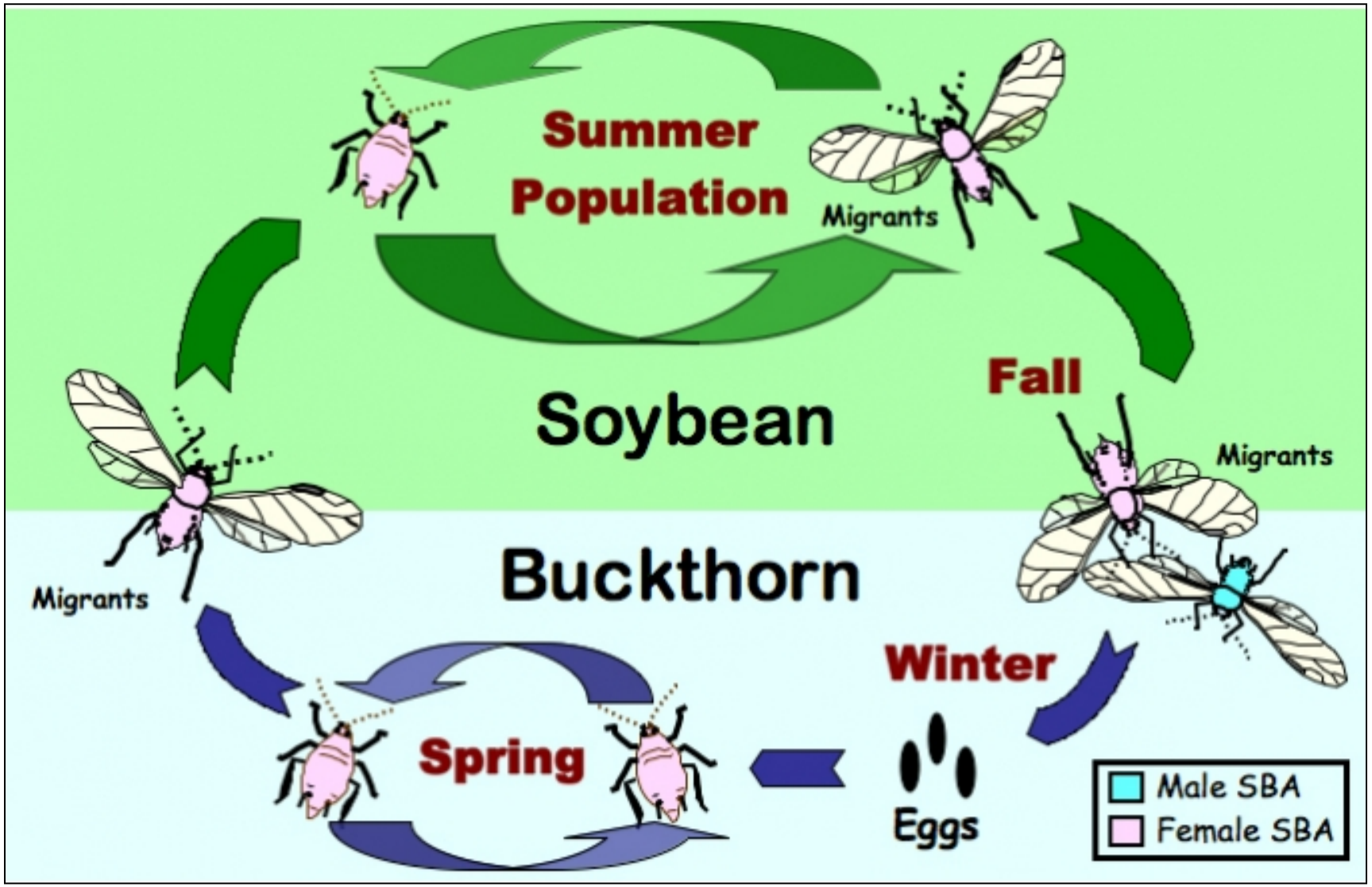


NCSRP Project Philosophy

- Multi-pronged approach
  - IPM, plant and aphid genetics, biological control
- Cost-saving efficiencies by coordinating objectives
- United by budgeted extension/outreach



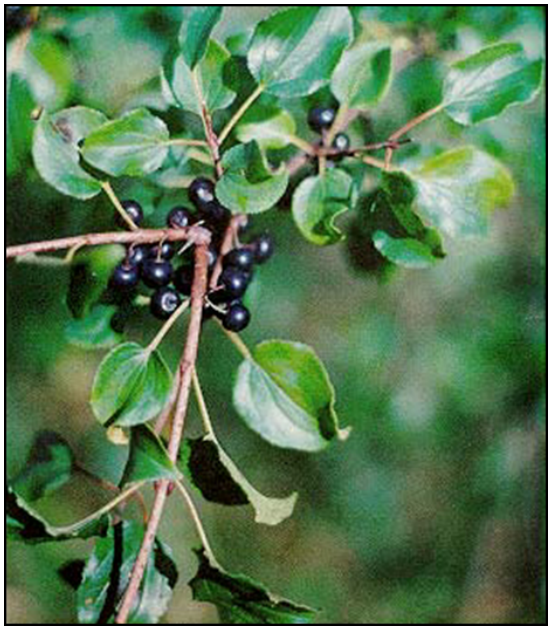
Soybean Aphid Seasonal History

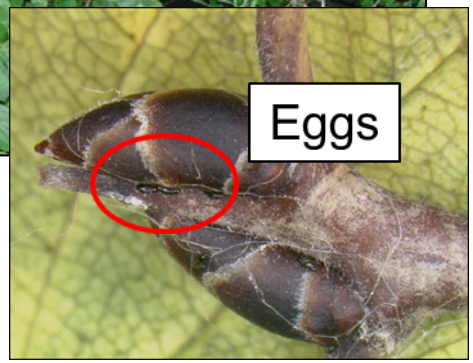


Purdue University

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

Common Buckthorn, *Rhamnus cathartica*



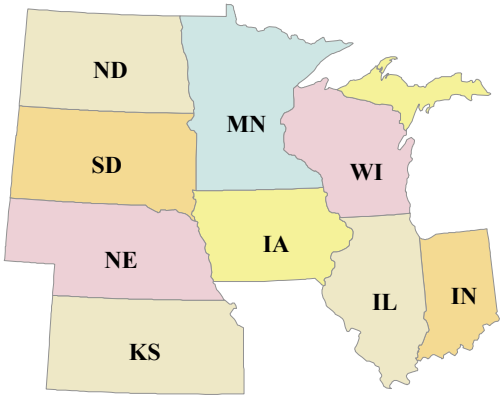


Fall migration to buckthorn

Buckthorn – spring bud break

NCSRP: Highlights of SBA Management Objective

- 14 investigators in 9 states involved in 1-3 projects each



Sub-Objectives:

- **Insecticide seed treatments**
- Aphid-resistant soybean varieties
- Aphid resistance to insecticides
- R6 thresholds
- Soil factors affecting aphids
- Regional aphid monitoring
- Aphid scouting tools

Insecticide Seed Treatments

Efficacy and value of seed treatments for aphids

- Neonicotinoids (e.g., Gaucho -- imidacloprid; Cruiser – thiamethoxam)
- Systemic activity protects plants from insect feeding
- Goal is to delay SBA colonization of soybean
- Research is mixed, but past University research casts doubt on efficacy for aphids

Insecticide Seed Treatments

Broad-scale study of insecticide seed treatments

- 7-state field study, 2 years (SD, ND, MN, IA, IN, WI, KS)
- Economic analysis by UW ag economist Paul Mitchell
- Cost/benefit analyses for producers that also incorporate uncertainty/risk and probability of high/low aphid populations

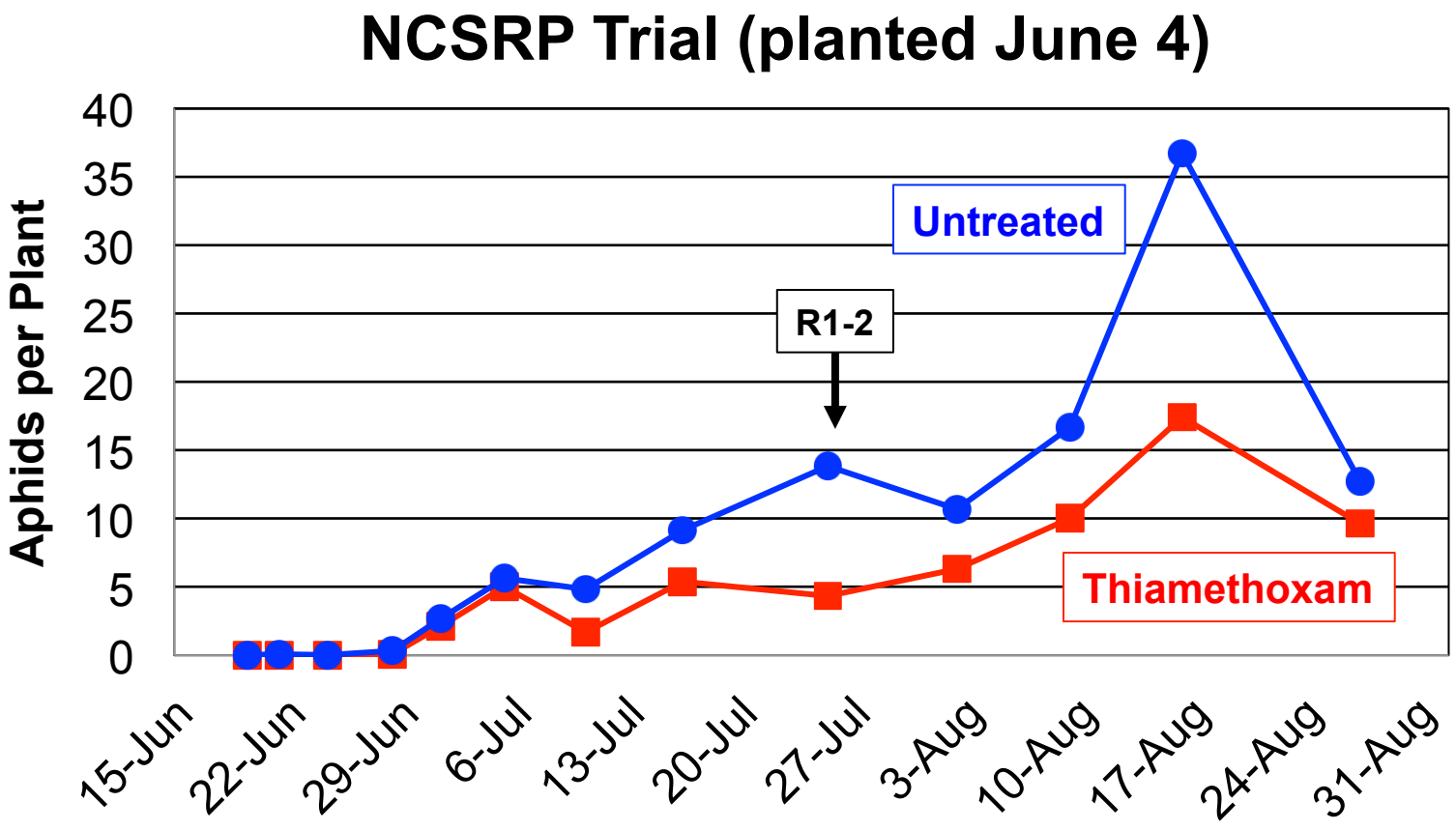
Insecticide Seed Treatments

Preliminary Results

- Plant tissue analyses
  - Sampling from wide range of locations and conditions
  - Thiamethoxam-treated seeds lose pest management efficacy within 3 weeks of planting
  - Thiamethoxam does not express in soybean pollen
- Aphid/yield analyses
  - 2012 drought year – no aphids, no yield benefit
  - 2013 aphid data still being combined and analyzed

Impact of Insecticide Seed Treatment on SBA Colonization & Dynamics

2013, Arlington WI



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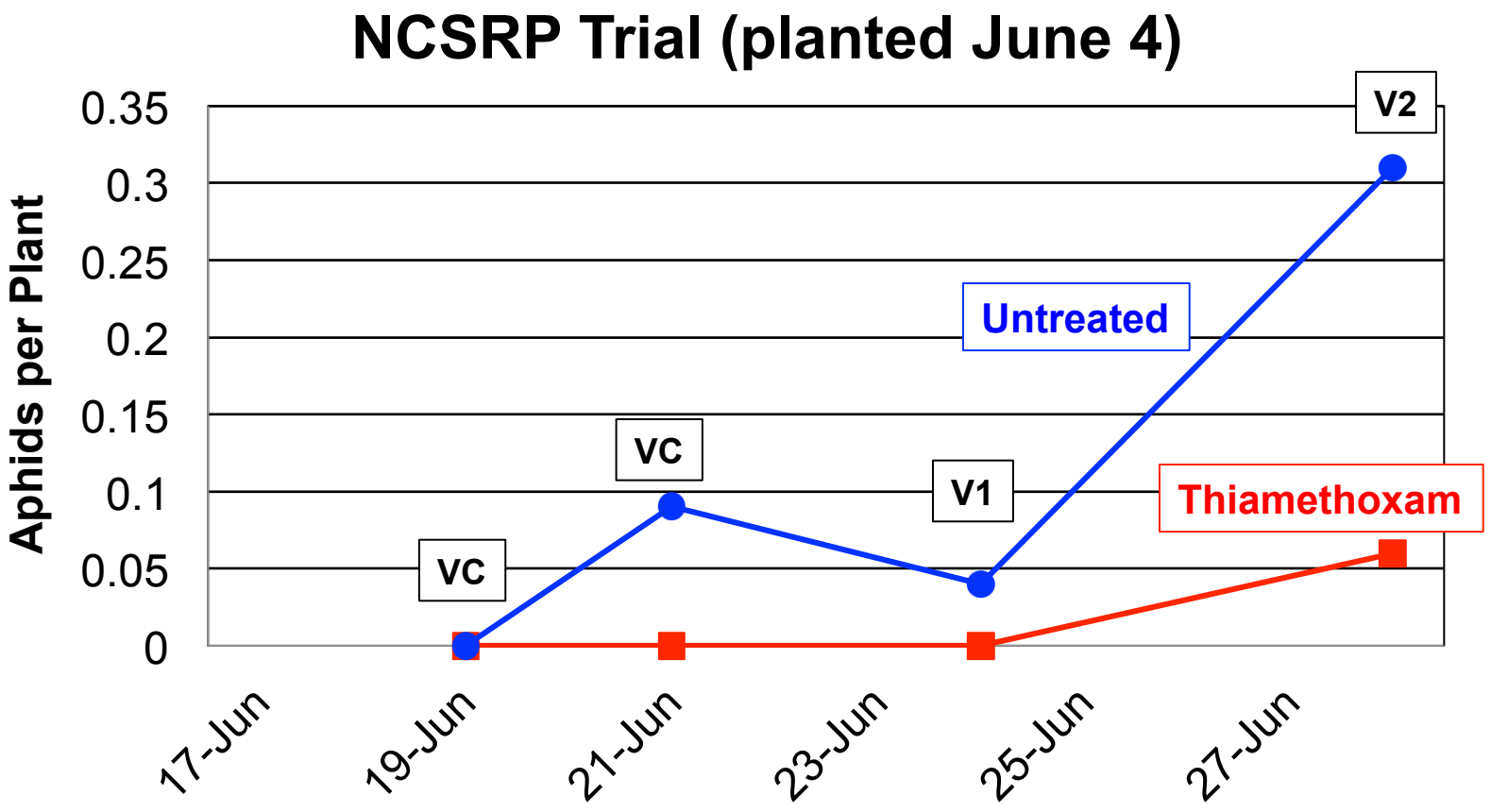

Insecticide Seed Treatment

Some Issues and Concerns

- **Efficacy** – is this preemptive approach cost effective? (Paul Mitchell)
- Potentially disruptive to the regional SBA population – soybean is SBA's only summer host, spring migration from buckthorn to soybean is critical to aphid success
- Disruptive effect on natural enemies
  - Lack of early season aphid prey

  - Predaceous bugs face "double jeopardy"

Insecticide Seed Treatment

Some Issues and Concerns

- **Long term sustainability** – evolution of SBA resistance

Aphid resistance to insecticides: only a matter of time?

NCSRP project includes a monitoring program for SBA resistance to insecticides

“Evolution” of SBA Dynamics: Later & Less