

The 2009 New York On-Farm Soybean Rust / Soybean Aphid Monitoring Network

Project Leaders:

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Objectives

- 1) Establish soybean sentinel sites to enable timely collection of soybean crop growth and development and specific pest data from representative areas of NY soybean production.
- 2) Share results of sentinel plot surveys with NY producers and national soybean rust and soybean aphid websites: USDA SBA/SBR PIPE (www.sbrusa.net) and Stop Soybean Rust www.stopsoybeanrust.com.

Background and Justification:

New York State soybean acreage has increased 10-fold since 1986. The USDA National Agriculture Statistics Service estimated that 252,000 acres of soybeans were grown in NY during 2009, the largest acreage on record to date. This trend of increasing acreage is expected to continue in the near term as local markets increase reflecting favorable yield potential and commodity prices, availability of commercial roasters and oil processing plants, and a continued increase in interest in production and marketing of soy biodiesel. As soybean acreage has increased, so have producer questions regarding crop protection.

Soybean pest concerns have historically been minimal in the Northeast, generally restricted to weed competition, with relatively few insect, disease and vertebrate pests affecting crop yields. Two new pest species, the Asian soybean aphid and Asian soybean rust, have however, recently been introduced into the US and threaten soybean production. Soybean aphid populations were first detected in the US in 2000 and observed in NY in 2001. Soybean rust was confirmed in the southeastern US in November 2004. Fortunately, this disease has not been detected in NY.

New York has participated in the national surveillance initiative (Soybean Rust ipmPIPE) since 2005. In 2006 monitoring efforts were expanded to include an assessment of soybean aphid populations. In 2006 and 2007, the number of sentinel plots scouted doubled from 10 in 2005 to 20 in 2007. Fewer sentinel sites were monitored in 2008 (16) and 2009 (9). All sentinel fields were monitored by volunteers from industry, Cornell University and Cornell Cooperative Extension. Plots were monitored from early vegetative growth stages (mid-June) through mid- to late pod fill (September). Foliar samples were collected for presence of diseases. All samples submitted from sentinel plots during this time period were not only examined for soybean rust but also for several foliar diseases including septoria brown spot, downy mildew, bacterial pustule, bacterial blight and frogeye leafspot. In addition to providing the New York soybean industry with an early detection and communication system for Asian soybean rust (SBR) and soybean aphid (SBA), the sentinel plot network also serves as a focal point for assessment and communication of broader pest management issues affecting soybean production. More

information on monitoring protocols and the USDA PIPE network is available at: www.sbrusa.net

Soybean Aphid Monitoring Program Procedures:

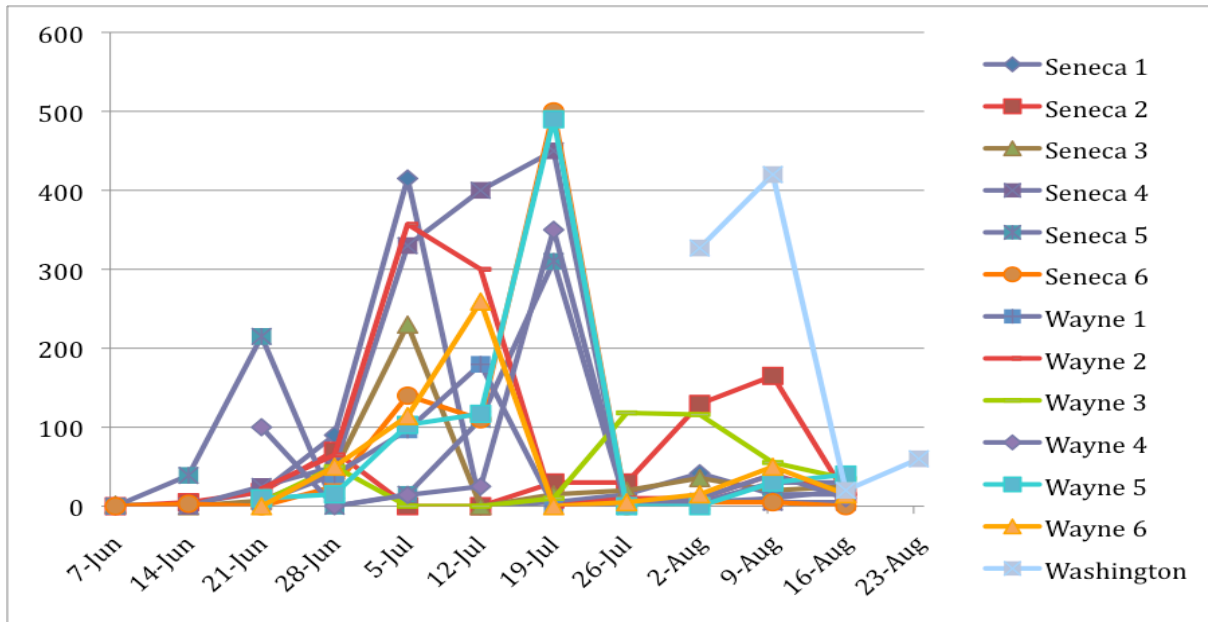
Cornell Cooperative Extension personnel in Jefferson, Seneca, Washington and Wayne counties were enlisted to participate in the 2009 weekly soybean aphid sentinel monitoring network. In addition soybean aphid (SBA) reports were solicited from extension, crop consultants, producers and others statewide. Protocols for sampling sentinel plots were provided by USDA and are available via the Soybean PIPE website. Sentinel plot monitoring began at early soybean vegetative growth stages (mid-June) and continued through mid- to late pod fill (September).

New York collaborators shared soybean aphid observations weekly. Soybean aphid data was summarized and regularly uploaded to the USDA IPM PIPE Database (www.sbrusa.net). In addition, SBA summaries were shared with New York clientele via the NYS IPM Program Weekly Field Crop Pest Report (<http://nysipm.cornell.edu/fieldcrops/tag/pestrpt/>).

Results and Discussion:

Soybean aphid (SBA) populations were high across a wide area of NY in 2009. Soybean aphids were first detected at 250 / plant in early vegetative (V2-V3) soybeans in central NY in late June. Cooler temperatures and generally wet conditions prevailed over the first half of the 2009 growing season. Temperatures in the low to mid 70's favored SBA population development and appeared to slow development of natural enemy populations. Soybean aphid populations continued to be problematic across the state through early September. Aphid populations crashed in late July in all but one sentinel site (Figure 1).

Figure 1 shows SBA numbers during 2009 at 14 locations across New York State.

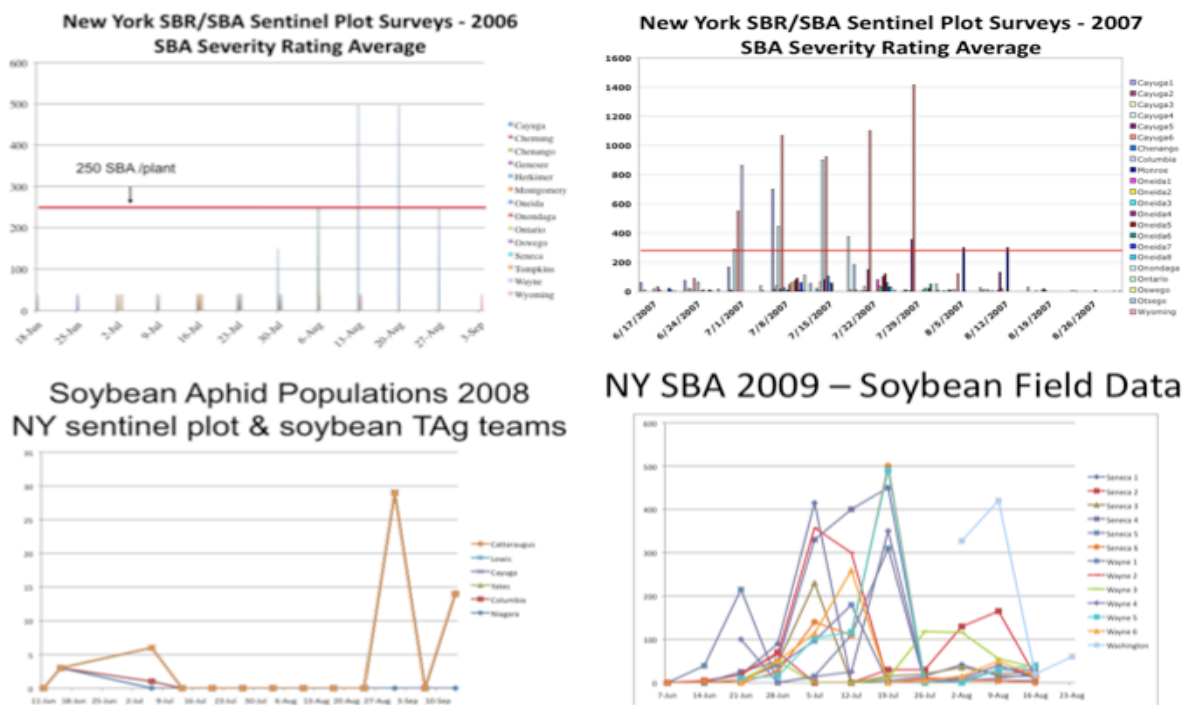


Populations of beneficial arthropods including coccinelids, syrphid flies, lacewings, parasitic wasps and fungal pathogens began to increase about mid July. Some fields with high SBA numbers plants exhibited stunting and crinkling/puckering of leaves. Some fields treated with insecticide earlier this season again reached threshold for SBA and were re-treated, in some cases only 2 - 3 weeks after initial treatment. Sentinel sites were helpful in providing a reliable source of timely information on aphid load, and plant growth and development.

2009 New York soybean aphid monitoring results are consistent with previous observations of a cyclical annual abundance level with higher SBA numbers in odd numbered years (Figure 2)

Figure 2. New York soybean aphid populations observed 2006 – 2009.

NY Soybean Aphid Populations 2006 - 2009



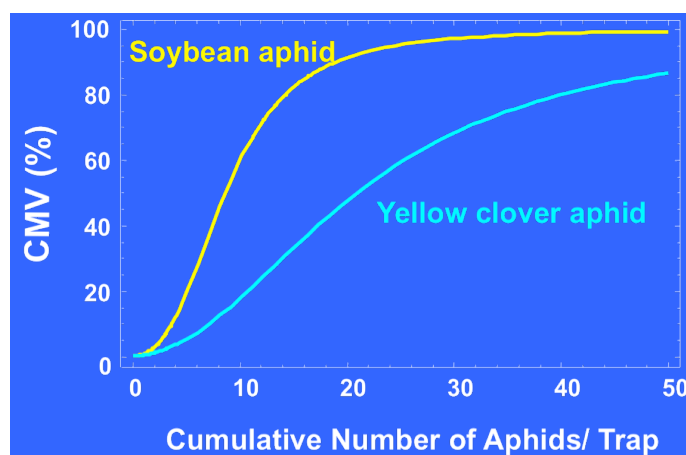
Enhancing Linkages, Strengthening Outreach

Soybean aphid : Snap and dry bean virus disease incidence.

Soybean pest monitoring insights:

High soybean aphid populations in 2009 raised questions regarding a link between aphid number and a high incidence of cucumber mosaic virus (CMV) in NY snap and dry beans. This possibility led to discussions with vegetable research and extension specialists. Soybean aphid and yellow clover aphid were the most highly associated aphid species with CMV prevalence in snap bean fields 2002-2006 (Figure 3, Nault, B. personal communication).

Figure 3. Relationship between CMV Prevalence and Aphid Activity in Snap Bean Fields (2002-2006) (Nault, B. et al)



Cornell Cooperative Extension vegetable specialist snap bean aphid and virus observations

Year	Cornell Cooperative Extension Vegetable Specialist Snap Bean Observations
2001	Catastrophic yield losses due to viruses observed in NY
2002	Systemic seed treatments (e.g., Gaucho and Cruiser) and foliar insecticide sprays not effective against viruses; Identified aphids and viruses in fields
2003	CMV can be seed transmitted, but uncommon; Identified aphids and viruses in fields
2004	Search for CMV-tolerant cultivars; Identified aphids and CMV incidence in fields; Determined transmission efficiency by aphids
2005	Again, catastrophic yield losses observed due to CMV; Search for CMV-tolerant cultivars; Identified aphids and CMV incidence in fields
2006	Extremely low virus pressure observed in NY
2007	Perhaps, worst epidemic of CMV experienced in NY; Search for CMV-tolerant cultivars

New York soybean PIPE monitoring results for those years with high SBA numbers coincide with observations for high CMV incidence in NY snap and dry beans. These observations will encourage a closer working relationship between field crop and vegetable extension specialists.

Soybean aphid outreach linkage:

New York soybean pest information was enhanced by frequent contributions by CCE personnel from soybean producing regions across the state. One particularly helpful group were CCE personnel involved in a Northeast Soybean Promotion Board funded project “On-Farm Soybean IPM Education Programs: Cultivating Enhanced Soybean Management” also known as “Soybean Tactical Agriculture teams” or Soybean TAg.

In 2009, soybean TAg programs were implemented on eighteen farms by Cornell Cooperative extension personnel working with twenty producers in 3 NYS counties. Three of the 2009 NY soybean sentinel sites were located on farms participating in this TAg program. The soybean TAg program provided an additional opportunity to closely monitor and document soybean pests and crop development. Additional soybean producer field meetings were held in Cortland, Chenango, Otsego, Oswego, Tompkins counties. These field meetings extended the reach of soybean IPM and ICM on-farm education beyond the more intensive TAg groups to 70 soybean producers in areas where soybean acreage is expanding. More information on Tactical Agriculture (TAg) teams can be found at: www.nysipm.cornell.edu in the field crops section. The 2009 Soybean TAg report can be found at: <http://www.nysipm.cornell.edu/reports/>.

Another source of exchange of timely soybean pest management information was a weekly IPM conference call among field crop extension educators from across the state. These calls provided an opportunity for individuals to share updates of local crop and pest observations. Highlights of pest information from TAG programs and the weekly conference call were summarized and included in the on-line Weekly Field Crop Pest report distributed via Cornell field crop list serves and the NYS IPM Program website at: <http://nysipm.cornell.edu/fieldcrops/tag/pestrpt/>.

Literature Cited:

Bergstrom, G.C. and M.E. McKellar. 2009. An Early Warning System for Soybean Rust. http://www.cals.cornell.edu/cals/css/extension/cropping-up-archive/wcu_vol19no3_20094soybeanrust.pdf)

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