

Comparison of Soybean Aphid Abundance and Yield Impact on NY Soybean Varieties and Survey of Soybean Aphid Natural Enemies, 2002.

Progress Report

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Comparison of Soybean Aphid Abundance and Yield Impact on NY Soybean Varieties

Weekly surveys for soybean aphid were conducted in five locations from July 7th through September 10, 2002 by summer assistants Lee Macomber and Megan Edlund in soybean variety trials that included 50 varieties. Several cooperative extension educators (Dr. Michael Stanyard and Mr. Jim Capron of the WNY Dairy and Field Crop Team), Cornell Crop and Soil Science personnel (Dr. William Cox and Mr. Dill Otis) and an industry representative (Mr. Donald Specker, Pioneer Hi-Bred International, Inc.) cooperated in this study, lending their variety trials for regular monitoring for soybean aphids. Locations for these trials were in the central and western soybean growing regions of the state: Aurora, Interlaken, Mt. Morris (Sonyea), and Waterloo.

In each soybean variety plot, we measured the relative abundance and yield impacts of soybean aphid, *Aphis glycines* Matsumura. Sampling procedures were as recommended by the North Central Region soybean aphid research committee NC-502 – Cooperative State Research Education and Extension Service (CSREES) USDA (personal communication: Dr. David Ragsdale, U of MN and Dr. Mike Gray, U of IL) and USDA APHIS CAPS, (USDA 2001).

Our analysis of soybean aphid populations and yield data has shown that there were differences in both soybean aphid levels and yields between locations. In addition, there was a significant relationship between aphid level and yield across locations. When compared across varieties, aphid levels were higher on Non-RoundUp Ready varieties than aphid levels on RoundUp Ready varieties of both early and medium maturity groups, and only two RoundUp Ready varieties differed from each other. We are working on separating the effects of soybean variety, aphid level, and location on yield to determine if aphids in the relatively low population levels we saw in 2002 had an effect on yield. This analysis will allow us to determine if tolerance to aphid feeding is an important factor in choosing soybean varieties in New York. There were no reports of soybean aphid causing economic effects in NY in 2002.

Survey of Soybean Aphid Natural Enemies.

Surveys to determine the identity of natural enemies (predators, parasitoids and fungal pathogens) affecting soybean aphid in New York State were also conducted at the five variety trial locations. We aimed to evaluate the importance of these natural enemies for controlling soybean aphids while soybean plants grow and soybeans develop. Each site was visited weekly. It was especially important to sample numerous times because insect predators and parasitoids as well as fungal infections can change in abundance very rapidly through the season. Abundance of fungal infections, in particular, can be affected by the amount of rainfall or humidity.

Information about the major parasitoid species and fungal pathogens as well as their relative importance will be important for future management.

At each location, four sets of ten sweep samples were taken and three 3-minute visual transects were taken to assess predator density and diversity. Voucher samples were brought back to the laboratory. One hundred aphids were collected and maintained in cold chests until they could be processed in the laboratory. All aphids were placed in groups of 4-5 on soybean leaves in 1 oz plastic cups containing 3% water agar at 20 degrees C. For 10 days, aphids in cups were checked every second day for mummification or death due to fungal infection. Those aphids that became parasitoid mummies were placed individually in gelatin capsules within humid chambers for emergence. If parasitoids were aphelinids, they were placed in Hoyer's on microscope slides. If they were aphidiids (or hyperparasitoids), they were pointed. All parasitoids are being sent to systematists specializing in the appropriate groups for identification. For any aphids that looked like they've died from fungal infections, cadavers were placed over microscope slides in a humid chamber for 24 hours so that fungal spores showered onto the microscope slide. For identification of fungi, fungal spores were stained with lactophenol cotton blue and observed under a compound microscope for identification. We used the key of Balazy (1993) for identification, with confirmation by Dr. Richard Humber, USDA, ARS, PPRU stationed on Cornell campus.

Three parasitoid wasps, two at Mt. Morris (7/31, 8/14) and one at Aurora (7/15) were found emerging from soybean aphids collected so far. They are all from the family Aphidiidae. Rick Hoebeke is comparing these wasps with *Lysiphlebus testaceipes*, the species found in MN on soybean aphid, to see if ours are different. If they are, they will need to be sent out for identification. For a picture of the MN wasp:
<http://www.nysaes.cornell.edu/ent/biocontrol/parasitoids/lysiphlebus.html>

Unfortunately, no pathogens of soybean aphid were recovered in 2002. The dry weather was not conducive to fostering an epizootic. However, based on Bob O'Neil's observations of soybean aphid in Japan we expect to find fungal pathogens in a year with normal rainfall.

Outreach - Cooperative extension, consultants, agricultural business field personnel, producers and other appropriate clientele are being informed of soybean aphid survey activities and are engaged to contribute information to help identify soybean fields at potential risk.

2002 Soybean Aphid Survey Information has been shared with:

National Pest Survey Agencies:

New York State Coordinator Ms Carolyn Klass (Cornell, for the Cooperative Agricultural Pest Survey (CAPS) {NY liaison to the National Agricultural Pest Information System (NAPIS)}).

2002 Soybean Aphid Watch website (www.pmcenters.org/northcentral/saphid/Aphidindex.htm)

Producers, CCE and Crop Advisors:

Meetings:

Cornell Cooperative Extension (CCE) Educators and Specialists, CCE Educator InService, Cornell, Ithaca, 11/28/01, Subject: Soybean Aphid in NY – Update to CCE Field Staff.

Producers, Field Personnel, WNY CCE Soybean Congress, Waterloo, NY, Seneca County, 2/13/02, and Batavia, NY, Genesee County, 2/14/02, Subject: Soybean Aphid in NY.

Soybean aphid (SBA) project growers, CCE cooperators and IPM personnel, July 5 and 8, 2002, Waterloo, Interlaken, Aurora, NY. Subject: Soybean Aphid – Training and Trial Visit.

Crop Management Personnel, Mid-Atlantic Crop Management School, Ocean City, MD, 11/21/02, Subject: Soybean Aphids 2002: Regional Curiosity or Cause for Concern?

Producers, Field Personnel, WNY CCE Soybean Congress, Waterloo, NY, Seneca County, 2/5/03, and Batavia, NY, Genesee County, 2/5/03, Subject: Soybean Aphids 2002 Implications for 2003.

CCE Listserve outreach:

Cornell CCE Field Crop Educators Listserve (CCE, Producers, Ag Industry Personnel), 6/20/02, Subject: Soybean Aphids - It's Time to Begin Looking.

Cornell CCE Field Crop Educators Listserve (CCE, Producers, Ag Industry Personnel), 6/27/02, Subject: 2002 Soybean Aphid in NYS ~ Current Status?