

Bean and Beet Farm Report

2008 Field season

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a. Soybean aphid host plant resistance study

The first soybean aphid host plant resistance trial was conducted in 2007 at the Farm, testing a susceptible and a resistant soybean line with the RAG1 gene discovered at the University of Illinois. In 2008, the study was repeated with the susceptible and resistant lines from Illinois, plus susceptible (Titan RR) and resistant (E06901, E06905, E06906) lines developed by Dr. Dechun Wang's program at MSU. Plots were 30 (12 rows) and 50 feet, replicated four times. Half (6 rows) of each plot was treated with Warrior to keep the plants aphid-free; this allowed us to compare yield of aphid-infested versus aphid-free plants. Natural aphid populations were counted weekly. In addition, individual plants in each plot were marked, infested with 10 aphids, then covered with a cage left open or closed. These individual plants were counted after two weeks and saved for yield. This allowed us to compare populations and yield from plants with and without aphid-predation.

Soybean aphid was first found on 12 June in susceptible Titan plots. The RAG 1 line had a significantly lower percentage of plants infested than its susceptible partner. However, both lines were infested by aphids to some extent. Titan, the susceptible parent in the MSU breeding program, had the highest infestation across the season of the six lines. The MSU resistant lines performed well, with significantly lower infestation than the parent and Illinois lines. SBA were sometimes difficult to find on the MSU resistant lines.

Line	Breeding program	SBA resistant?*	% SBA 26 June	% SBA 16 July	% SBA 7 August	% SBA 20 August
SD01-76R	Illinois	No	0	40	60	60
LD0516060	Illinois	RAG 1	0	13	35	30
Titan RR	MSU	No	8	23	75	80
E06901	MSU	Yes	0	3	5	5
E06905	MSU	Yes	0	8	0	0
E06906	MSU	Yes	0	0	0	0

* The resistance genes in the MSU material are still being identified.

In open cages, predators such as ladybugs and lacewing larvae consumed soybean aphids, so SBA populations were low on all lines. In closed cages, aphids multiplied in the absence of predators on the two susceptible lines. Aphids did increase, but to a lower level, on the RAG 1 line. Aphids died on the MSU line.

Line	Open cage (Predation)	Closed cage (predator-free)
SD01-76R	7	178
LD0516060	8	55
Titan RR	8	603
E06901	0	0
E06905	0	0
E06906	3	3

For all lines, yield did not differ between sprayed and unsprayed rows. Aphid numbers in general were low in 2008, so yield differences were not expected due to aphid feeding.

b. Recovery – 2007 parasitoid release for soybean aphid

A parasitoid release for soybean aphid control was made on the farm in 2007. The Asian parasitoid, *Binodoxys communis* was released in multiple states, including nine locations in Michigan under a permit from USDA and MDA. These releases were the first classical biocontrol introductions for soybean aphid control. In 2008, we attempted to recover the parasitoid by placing aphid-infested plants at the release location in early July. No parasitoids were recovered at the Saginaw Valley farm or any of the other locations. If parasitoids are available in 2009, we may do a release at the new farm location.

c. Aphid suction trap

The Bean and Beet Farm hosts one of the traps in the Northcentral Regional Aphid Suction Trap Network, which has over 40 sites in the Midwest. The suction trap is a 24-foot tall pipe that draws air as well as migrating aphids into a collection jar. The jar is changed each week and sent to the University of Illinois for sorting and identification. This year, the trap at the Saginaw Valley Farm recorded a large flight of soybean aphids moving from soybean back to their overwintering host, buckthorn. This assists us in predicting an aphid outbreak in 2009. The trap will be moved to the new farm location for 2009.

