

Biological Control of the Soybean Aphid, *Aphis glycines*

Purpose:

The objective of this project is to identify and assess the potential of native parasitoids, predators and pathogens to control soybean aphids. The long term objective is to implement biological control as part of a soybean aphid IPM program in Ontario.

Methods:

Field surveys for native natural enemies were conducted in southwestern Ontario from June to September 2003. 100 plant samples (1 sample = top, middle and bottom trifoliolate) and 200 sweeps (50 sweeps x 4 areas) per week were taken at 4 soybean fields (Mitchell's Bay [2], Arva and Ballymote, Ontario). All material was collected in ziploc bags (plant samples) and collection cages (sweep samples) and were brought into the lab for assessment. Each sample was examined for the number of aphids and the insect stage, parasitized aphids, dead aphids due to fungus, all predators and parasitoids. These numbers were recorded and voucher specimens were prepared for identification.

Results:

Figure 1. Proportion of natural enemy abundance in plant and sweep samples at all locations in 2003.

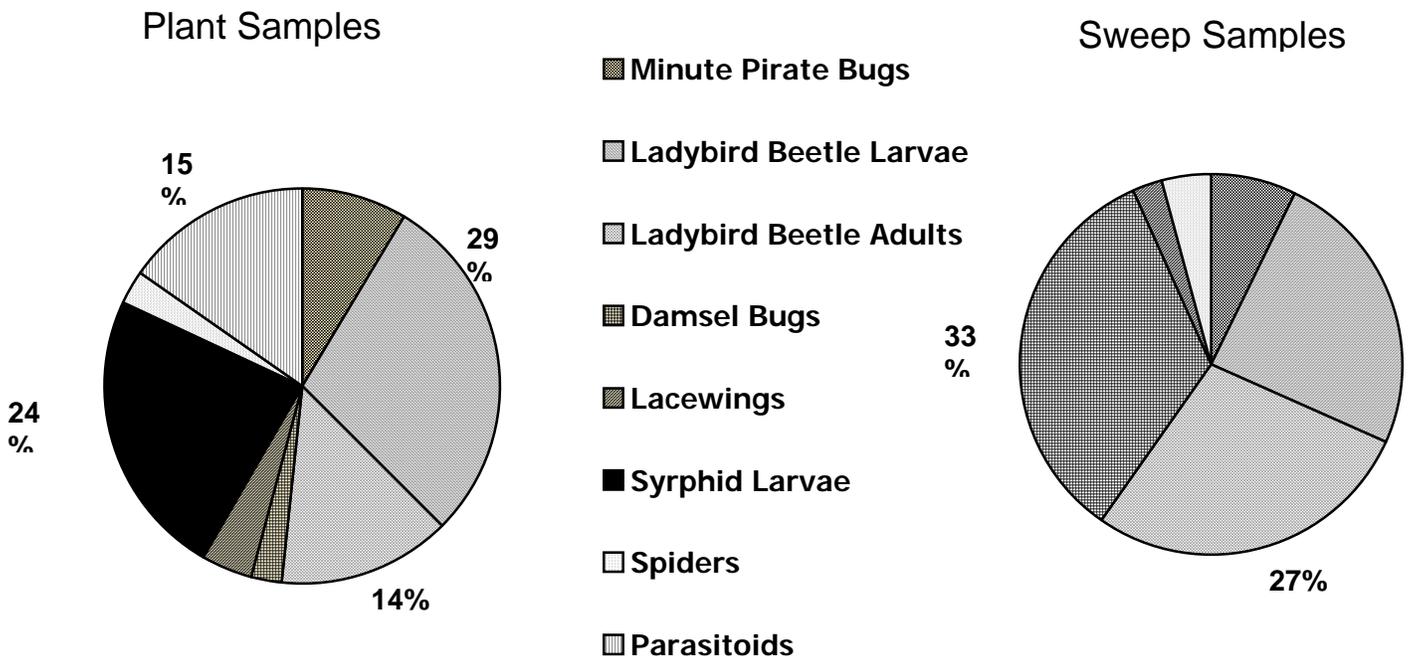
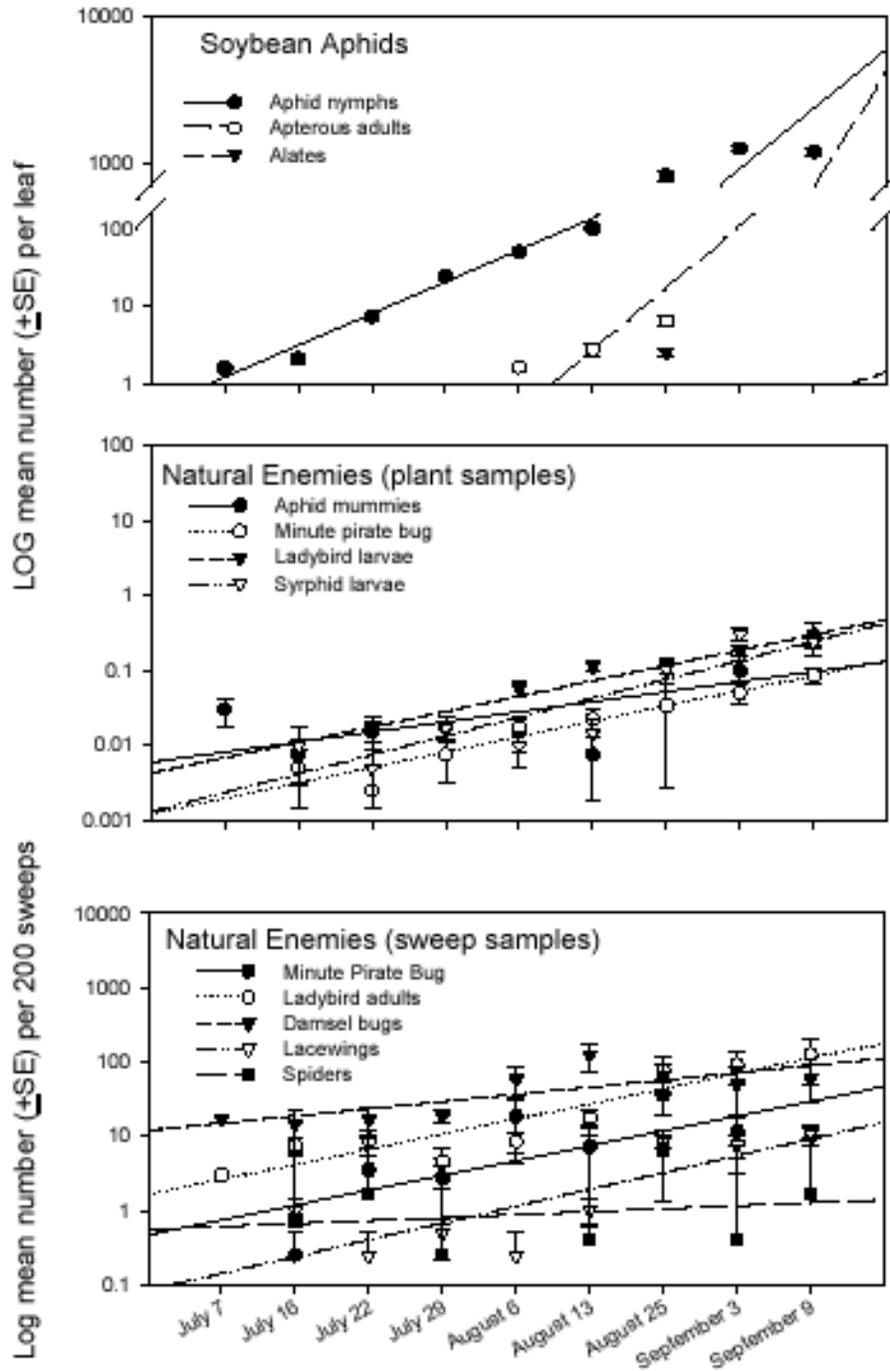


Figure 2. Mean numbers of soybean aphid and natural enemies collected in southwestern Ontario soybean fields in 2003 (Linear regression).



Summary:

Soybean aphid populations increased steadily through the season with a mean peak infestation of 815 aphids per trifoliolate occurring the week of August 25th. Predators were the dominant natural enemies collected (Figure 1). Ladybird beetles represented 43.2% (28.9% larvae and 14.3% adults), followed by syrphid larvae (23.6%) as the dominant predators in plant leaf samples. In sweep samples, damsel bugs (32.9%) were most abundant followed by ladybird beetle adults (27.4%). Weekly responses of these natural enemies were documented (Figure 2). These results suggest that at high populations (i.e. >269 aphids per plant leaf) ladybird beetles, damsel bugs, and syrphid larvae are the most important predators when compared to low population results from 2002. Syrphid fly larvae, damsel bugs and ladybird beetle larvae numbers increased in response to aphid populations, with ladybird larvae increasing the most rapidly. Spiders (families Salticidae, Thomisidae, Theriidae, Tetragnathidae and Araneae) were also abundant (up to 5%) and analysis of their importance as an aphid predator is underway. Aphid parasitoids (still being identified but probably *Aphidius* sp.), not present in 2002, represented 15.3% of natural enemies in plant leaf samples. No pathogens were recovered in 2003.

Next Steps:

The role of natural enemy refuge habitats will need to be determined. Laboratory studies will be conducted to assess the impact of important predator and parasitoid species found during field surveys. Prey consumption and host preference will be assessed for each predator and parasite. Laboratory studies will be conducted to assess the potential of field-collected and commercially available pathogens for soybean aphid control. Field studies will be conducted to verify impacts predicted by laboratory experiments of promising predators, parasitoids and pathogens identified.

Acknowledgements:

Research collaborators include Bruce Broadbent, AAFC London, Peter Mason, AAFC Ottawa and Henri Goulet, AAFC Ottawa. Funding was provided by the Ontario Soybean Growers and the AAFC Matching Investments Initiative. Dawn Campbell, Connie Chan, Ana Maria Farmakis, Lola Gualtieri, Mike Sarazin, Jocelyn Smith, Laura Timms and Cheryl Van Herk provided technical assistance.

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Location of Project Final Report

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