Midwest Aphid Suction Trap Network

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Introduction

The Suction Trap Network (STN) has continued through 2015 from the beginning of June to the end of October. The Midwest states that still are in the network are Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, South Dakota, and Wisconsin. The STN has been funded again by the North Central Soybean Research Program in a grant to Glen Hartman and Doris Lagos-Kutz. The objective of the STN is to keep an eye on aphids of agricultural interest and detection of invasive species. Also, to track the phenology of thrips that feed on soybeans and are vectors of Soybean Vein Necrosis Virus. Punya Nachappa at Purdue University conducts this research.

Materials and Methods

The suction traps located in Iowa are Ames, supervised by Erin Hodgson; McNay (Chariton), supervised by Nick Piekema; Nashua, supervised by Ken Pecinovsky; and Sutherland, supervised by Josh Sievers. Their collaboration through the suction trap's season is the most consistent across the Midwest STN. But for this coming year 2016, the suction trap located at McNay will be moved to Kanawha and will be supervised by Matt Schnabel. The suction traps were collected weekly and sent to David Voegtlin from the end of May through the end of October 2015. Voegtlin has done all the aphid identifications. The suction trap samples were processed and documented by the end of February 2016.

Results and Discussion

In 2015, the following aphids of agricultural interest were under the scope: *Acyrthosiphum pisum*, *Aphis craccivora*, *A. glyines*, *A. gossypii*, *A. nasturtii*, *A. spiraecola*, *Brachysiphum helichrysi*, *Lipaphis pseudobrassicae*, *Macrosiphum euphorbiae*, *Myzus persicae*, *Rhopalosiphum insertum*, *R. maidis*, *R. padi*, *R. rufiabdominale*, *Schizaphis graminis*, *Sitobion avenae,* and *Therioaphis trifolii*. These aphids are both direct pests as well as vectors of both persistent and non-persistent viruses. Also, the invasive species *Shivaphis celti* (Asian Hackberry Aphid), *Tinocallis saltans,* and *Melanaphis sacchari*, (sugar cane aphid) are noteworthy. The first two species have been recorded in Iowa since 2006, and continue spreading in low numbers. The sugar cane aphid is a major pest in southern areas of the continent that grow sorghum. It has been found in abundance in Kansas and two other traps in Monmouth, Illinois and Antigo, Wisconsin.

In general, the species listed above remain in low numbers compared with the 2014 field growing season. The numbers of soybean aphids, *Aphis glycines*, continue to decrease and the phenology is the same for August and late September for peaks of summer and fall migration, respectively (Figure 1). It seems the IPM implemented to control this pest is working well. Soybean aphid field collections in Illinois (Monmouth and Peoria), Indiana (Lafayette and Tippecanoe), Minnesota (Lamberton), Missouri (Columbia), Ohio (Wooster), and Wisconsin (Antigo and Hancock) during late July, August, and September 2015 were heavily infested by a Hymenoptera parasitoid, *Aphelinus certus.* Multiple samples of soybean aphid mummies

were sent to Keith Hopper for parasitoid identification. Also, preliminary phenotyping results of the soybean aphid field populations mentioned above are more aggressive to Williams 82 soybeans than to the soybean genotypes with *Rag* genes, which stands for Resistant to *Aphis glycines*.

The cereal aphids are the largest part of the trap catches. In this group are the Corn Leaf Aphid, *Rhopalosiphum maidis*, the Oat–Bird Cherry Aphid, *Rhopalosiphum padi*, the English Grain Aphid, *Sitobion avenae*, and the Rice Root Aphid, *Rhopalosiphum rufiabdominale.* The most abundant and the ones that show a very interesting pattern through the years are *R. padi*, *R. maidis,* and *S. avenae*. Figure 2 shows *R. padi* being the most abundant species. The population of *R. maid* is declining to almost zero in 2015.

In communication with Dr. Mo Way, (Texas A&M extension), he noted there has been extensive spraying for the sugar cane aphid on sorghum in Texas. Sorghum is a favored plant of the corn leaf aphid and it migrates north each summer from the southern states. We believe it is possible the decline in *R. maidis* in the Midwest over the past few years may be due to the heavy spraying of sorghum in the south, thus limiting the potential source of corn leaf aphid migrants. The English grain aphid grew in population, especially in Ames, Nashua, and Sutherland. This aphid also is becoming abundant in all suction trap locations in Minnesota (Crookston, Lamberton, Morris, and Rosemount).

The suction trap data collected until 2014 has been compiled by Christie Bahlai at Michigan State University and incorporated as part of the data set of the Kellogg Biological Station, a Long Term Ecological Research site (http://lter.kbs.msu.edu/datatables/122). Bahlai will continue compiling the suction trap data for at least the next three years.

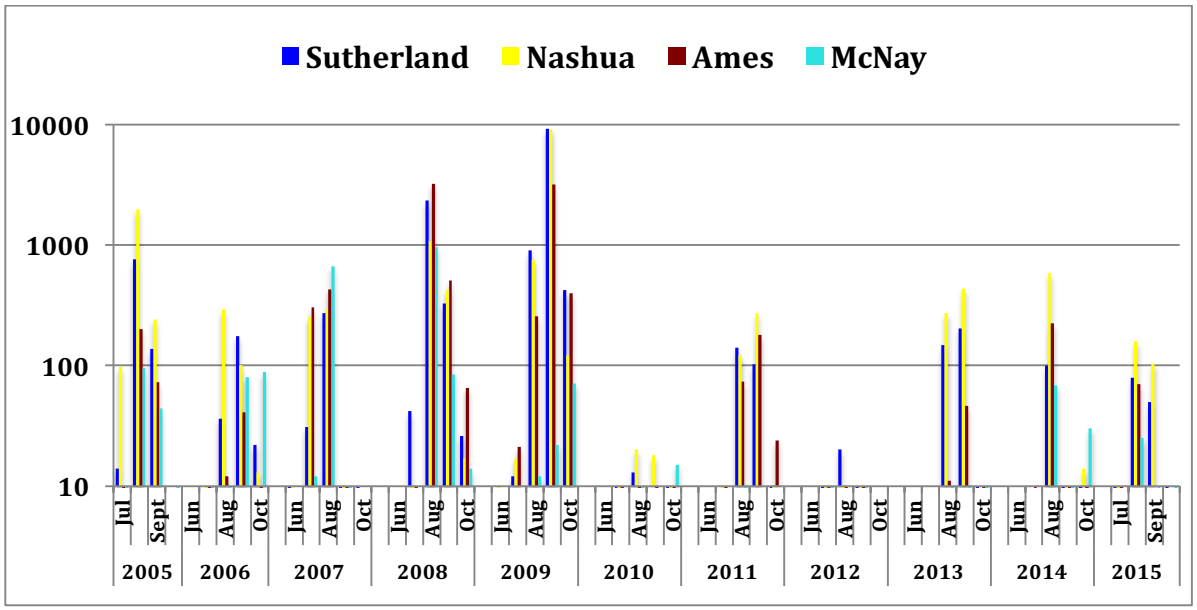

Figure 1. Population dynamics of the soybean aphids in Iowa collected between 2005 and 2015. The X axis corresponds to the period when the suction traps were in operation, and the Y axis corresponds to the counts in logarithmic scale. Note: McNay Research Farm is near Chariton, IA.

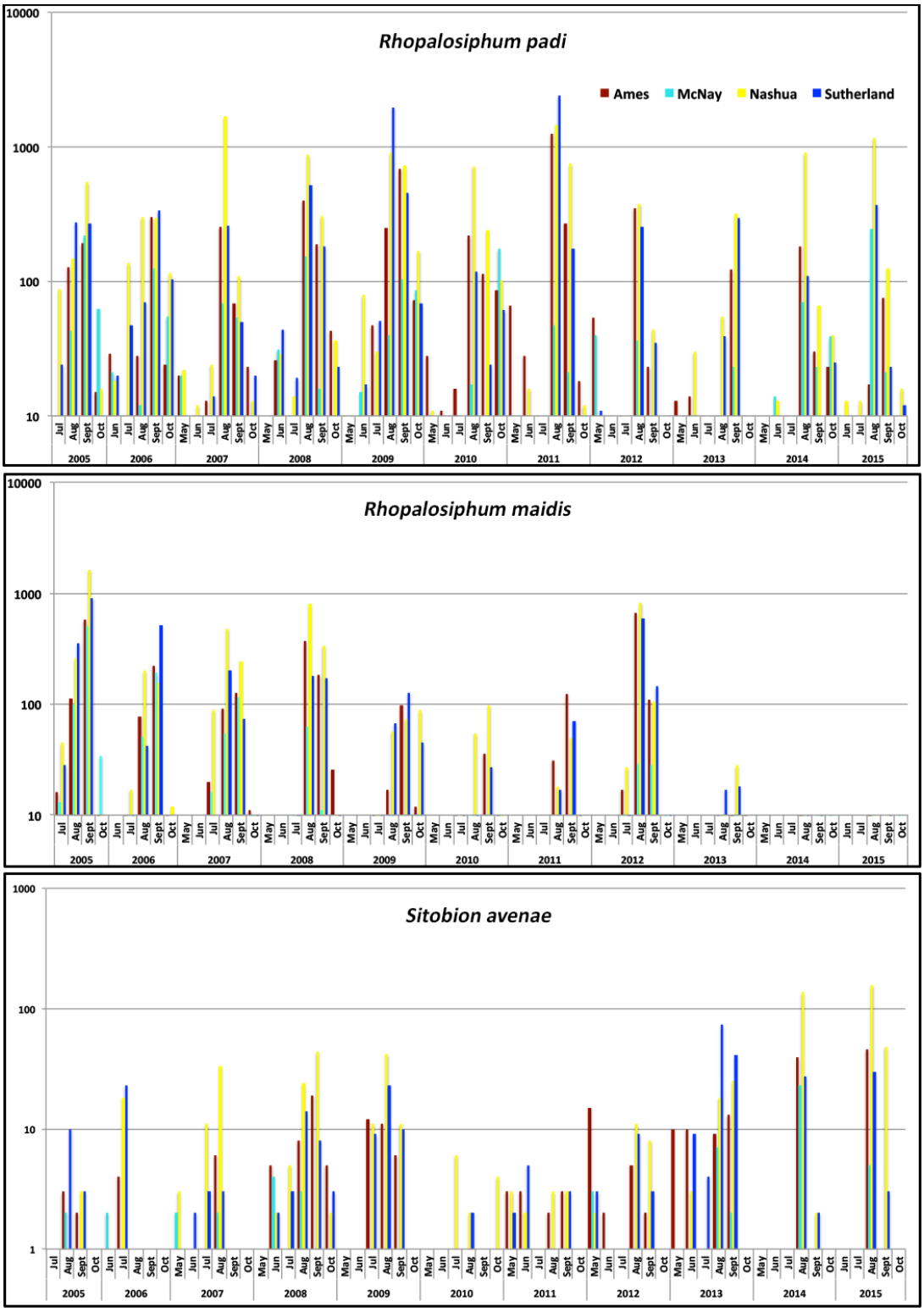

Figure 2. Population dynamics of some cereal aphids in Iowa collected between 2005 and 2015. The X axis corresponds to the period when the suction traps were in operation, and the Y axis corresponds to the counts in logarithmic scale. Note: McNay Research Farm is near Chariton, IA.