North Dakota Soybean Council
Mid-year Report – December 2022

Title: Soybean Gall Midge Survey in North Dakota

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Co-Investigators: Patrick Beauzay, IPM State Coordinator and Research Specialist
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Objectives:

1) To conduct survey work for the detection of the invasive soybean gall midge.
2) To develop extension outreach material on soybean insect pests for NSDC and growers.

Completed Work & Preliminary Results

Objective One: Survey work for the detection of the invasive soybean gall midge.

A total of 436 soybean fields in 45 counties was surveyed to detect soybean gall midge larvae from early June to mid-September in ND in 2022 (Fig. 1). The most intense survey was conducted in counties of the central and eastern part of the state. This year, the only counties that were not surveyed were Dunn, Billings, Golden Valley, Slope, and Bowman (Fig. 1). Soybean crop stages were between VE (cotyledon emergence) and R7 (beginning maturity).

Results from the 2022 soybean gall midge survey were negative for 435 soybean fields in the state (Fig. 1). However, suspect soybean gall midge larvae were observed from a soybean field near Gwinner (Sargent County); however, the DNA results are **still pending for its identification confirmation**. Brandon Schulzetenberg, Centrol Crop Consulting, reported the suspect soybean gall midge and sent us a photo (Fig. 2) showing two bright orange larvae on a soybean stem lesion on 16 August 2022. After looking at the pictures of larvae in the stem lesion and the lack of white mold infection on soybean stem, we visited the field to collect larvae for DNA typing the next day. After scouting for a total of 8 hours, we finally found one stem with a lesion on the field edge that had about 10 tiny white to orange-reddish larvae. The infestation was obviously very low due to the difficulties in

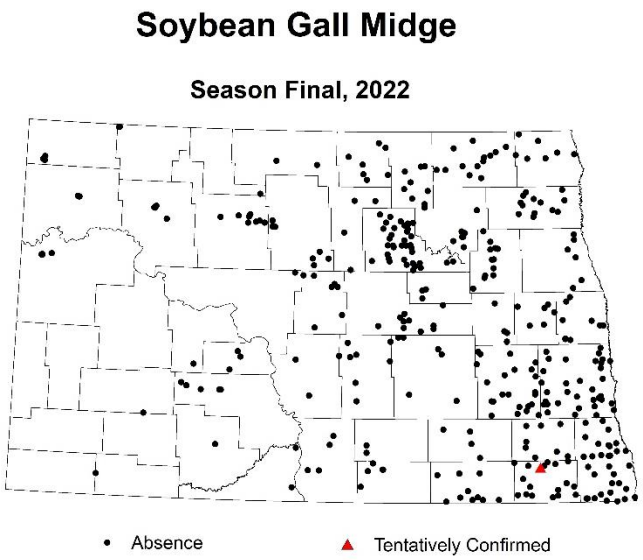

Figure 1. Survey of soybean gall midge in soybean fields 2022.

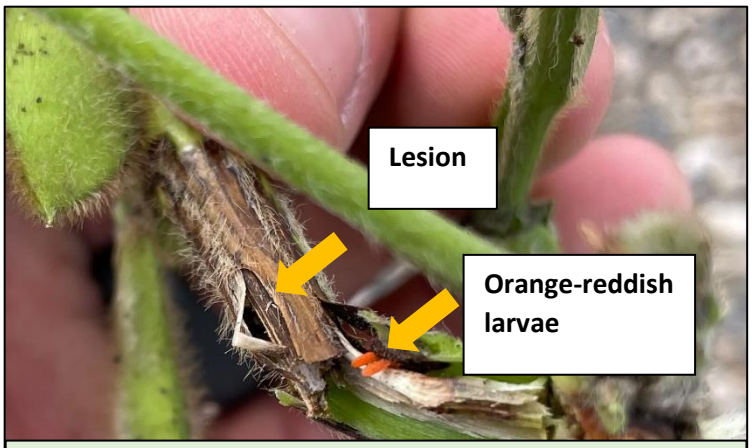

Figure 2. Soybean stem infested with 'suspect' soybean gall midge larvae from Sargent County, ND (B. Schulzetenberg, Centrol Crop Consulting)

finding one midge-infested stem. The lesion was located mid-plant, which suggests that this was the second generation of soybean gall midge. Larvae were collected and carefully placed in a 95% alcohol vial, and then sent to Dr. Justin McMechan's laboratory at the University of Nebraska for DNA testing on whether it is a positive match for soybean gall midge or white-mold gall midge. **DNA results matched soybean gall midge DNA by 92%.** However, geneticists like to have a 96% match to positively confirm the species identification. DNA tests for the white-mold gall midge were also conducted and were 100% negative. White-mold gall midge is a common gall midge in North Dakota soybean fields infected with *Sclerotinia* white mold. Next year, we plan to continue surveying soybean fields to detect soybean gall midge presence in new locations and to determine its distribution in North Dakota soybeans.

Survey field data were mapped using ArcMap to show its absence/presence. Maps were posted weekly on the IPM website - Soybeans.

Objective Two: To develop extension outreach material on soybean insect pests for NSDC and growers.

A large banner titled 'Integrated Pest Management (IPM) of Soybean Arthropod Pests' was completed, and is available for outreach to soybean growers (Fig. 3). The large banner discusses IPM of soybean aphids, two-spotted spider mites, and grasshoppers in soybean fields. Three of these banners were printed; one was given to the NDSC office, one for NDSU Extension Entomology outreach in Fargo and the other for NDSU Extension outreach at the NCREC in Minot.

Figure 3. New Soybean Arthropod Pest banner at the ND Corn-Soybean Expo in Fargo on February 21, 2022.

Outputs:

Calles Torrez, V., P. Beauzay, and J. Knodel. 2022. Soybean gall midge – 'tentatively' confirmed in North Dakota. North Dakota State University Extension *Crop & Pest Report* No. 18, 1-2 (22 September 2022).

Knodel, J. P. Beauzay, and V. Calles Torrez. 2022. Soybean production field guide for North Dakota: Insect management in soybean, *section*: Soybean gall midge (Diptera: Cecidomyiidae: *Resseliella maxima* Gagné). Bull. A1172 (Revised). North Dakota State Univ. Ext. Serv., Fargo, ND.

Work to be completed:

Objective Two: To develop extension outreach material on soybean insect pests for NSDC and growers.

The *Soybean Insect Diagnostic Series* is in progress and should be available the summer of 2023. The *Soybean Insect Diagnostic Series* will cover IPM of the major insect and mite pests including soybean aphids, spider mites, foliage-feeding caterpillars, bean leaf beetles and grasshoppers.