Research and Extension on Emerging Soybean Pests in the North Central Region

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Overview of Project Objectives

This project continues to holistic and programmatic approach to integrated insect pest management, and involves collaborative work on soybean gall midge, stink bugs, and management of aphid-resistant soybean varieties. The team will expand the soybean gall midge emergence monitoring program and screen germplasm for midge resistance traits to help with breeding soybean varieties that are midge-resistant. They will explore mowing and tillage as cultural controls and conduct surveys in new areas to determine the midges' range. The team will also review sticky traps and pheromone lures for stink bugs for better scouting, and test new insecticide chemistries for aphid management.

Key Results

The team monitored 20 sites for soybean gall midge, and found the first emergence of adults was 10 days earlier than anticipated. Midge-resistant soybean germplasm data was collected on 110 accession lines, with 19 studied in greater detail. In the tillage and mowing research, soybean plant injury from gall midge was reduced when adjacent to mowed grass compared to un-mowed areas. Tilling prior to planting soybean reduced the presence of midge larvae and subsequent plant injury. Burying gall midge-infested soybean stems is an effective way to track adult activity and three sites were set up in Nebraska to test the impact of fall and spring tillage on overwintering larvae in the soil. Field surveys revealed a total of eight new counties with soybean gall midge presence. Midges were likely found in North Dakota, but confirmation was inconclusive due to poor sample quality.

Stink bug pheromone lures and sticky trap tests for easier scouting methods were conducted across 12 states. Data from 2022 and 2023 are being analyzed for a manuscript that will be submitted in 2024.

Three soybean aphid populations were tested for resistance to Transform, Sefina, and Sivanto insecticides. In the soybean pest suction trap monitoring network, 30 suction traps were in operation, with 137,800 insects counted. Of this total, 4,531 were predators or beneficial insects. Some species, such as whiteflies, ants, and hoverflies, will be sent to labs for species identification and further research. Soybean aphids collected from the suction trap network will be tested for pyrethroid resistance.

A new edition of Stink Bugs of the North Central Region was developed and 3,800 guides were distributed to 13 universities and 15 state checkoff boards. A PDF is also available on SRIN. A guide was developed with 3D-printed leaf examples to help farmers

determine defoliation levels in soybean. Users were, on average, 30% more accurate with the guide. SRIN printed 30,000 guides for distribution to QSSBs around the country, showing the leveraging effect of this investment. The guides will now be packaged for extension educators throughout the North Central region. It is the most asked-for item at farmer events. A QR code with the material leads clients to the database for the entomology project, which has received 2,740 views, helping to further disseminate information about NCSRP-funded projects.

Benefit to Farmers

The research team worked with farmers to identify their top priorities for pest management, which included the emerging threat of soybean gall midge; lack of threshold use because of the time and effort needed to scout; soybean aphid insecticide resistance; the need for pest monitoring and alerts; and the importance of communicating unbiased, research-based pest management information to farmers and their consultants. Addressing these objectives will help farmers to be better informed about the pest problems in their fields and the best way to monitor and manage them most profitably.

Links

Research and Extension on Emerging Soybean Pests in the North Central Region
USB National Soybean Checkoff Research Database

3D Scouting Tool Improves Accuracy of Soybean Defoliation Estimates
SRIN article