Soybean entomology research and Extension in the North Central region

Funding: $368,406

Principal Investigator

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Overview of project objectives

This project involves collaborative research among 25 researchers in 13 states, working on four main program areas:

I. Extension/outreach and farmer feedback
II. Insect management and profitability
III. Aphid resistant varieties and virulence management
IV. Insect monitoring.

The objectives within these programs address the efficient, cost-effective management of defoliating (chewing) insects; the role of cover crops relative to insects in soybean production; aphid resistance to insecticides (a documented and growing problem in the region); a new objective focusing on soybean stem borer (Dectes); the ability of honey bees to improve soybean yield; a public-private partnership with Corteva to advance aphid-resistant soybean varieties for wide scale commercialization; advances in soybean breeding for aphid resistant varieties; regional monitoring programs for pest and beneficial insects; and a survey program to assess farmer priorities and needs to inform future research and Extension. In addition, we have an Extension objective with a dedicated budget line to produce deliverables and disseminate project results.

Key results

Work has begun on the updated, second edition of the "Stink Bugs of the North Central Region" field guide. Electronic versions of several other publications are being prepared including a publication on pollinators found in soybean in the North Central region. Field samples were taken in six states in preparation for a guide on defoliating insects in soybeans.

Work on the component of pest and beneficial insects in cereal rye cover crop prior to soybean was conducted in 2020, but the number of sites were reduced because of the COVID-19 pandemic. No significant pest pressure was reported at any of the sites; increased insect activity was seen where cover crop termination was delayed.

Two colonies of honey bees were installed near the center of six soybean fields in Ohio to evaluate the effect of bee pollination on soybean seed production. Colonies in four fields had significant honey buildup during soybean bloom. Bee visitation frequency was recorded for the floral attractiveness traits in soybeans. Cage experiments were done with two highly attractive and two unattractive soybean varieties. This was done to evaluate honey bee foraging preferences and to quantify the effect of honey bee pollination on soybean yield. Yield differences are being studied between the four varieties.

Studies were done on insecticide-resistant soybean aphids as well as the soybean stem borer and data are being finalized for both areas. Studies are also being conducted with breeding aphid-resistant soybean varieties. The varieties were field-tested in four states with aphid populations found to be significantly below the threshold on the resistant cultivars.

Benefit to farmers

The objectives within this research project address efficient, cost-effective insect management for farmers. Soybean insect pests not only reduce yield, but can reduce grain quality, altering oil and protein content and thus affect soybean value. The collaborative work for this project includes state Extension outreach and farmer feedback, insect monitoring and management and exploring aphid-resistant varieties.

Links

Soybean Entomology Research and Extension in the North Central Region *USB National Soybean Checkoff Research Database*