# Cost Benefits of Common Insecticide Practices Used to Prevent Soybean Pest Problems in Delaware

## Progress report for ONE19-344

Project Type: Partnership
Funds awarded in 2019: $28,221.00
Projected End Date: 12/31/2021
Grant Recipient: University of Delaware Cooperative Extension
Region: Northeast
State: Delaware
Project Leader:

Dr. David Owens
University of Delaware

## Project Information

Project Objectives:

This project seeks to demonstrate under which circumstances prophylactic insecticides are or are not likely to pay for themselves in terms of yield protection in both full season and double crop soybean. It is expected that a large, field-scale data set will be a powerful tool for extension information delivery to reduce wasteful, environmentally disruptive insecticide applications. Probability analysis will demonstrate to farmers which inputs can be safely reduced or eliminated, improving their operational and environmental sustainability.

Introduction:

Many farmers mix an insecticide in with applications that are already being applied to the crop, usually a vegetative stage herbicide and a reproductive stage fungicide. Even though this applications are cheap, they may not be timed in a way that will result in a yield advantage over using an IPM approach. Insecticide applications can disrupt the in-field ecology, removing natural enemies, and potentially permitting pest populations to increase. Insect pest populations can be patchy in the mid-Atlantic, therefore, to investigate the risks and returns associated with prophylactic insecticide usage, farmers and extension will partner together to treat fields with and without prophylactic insecticides, yield data will be collected and analyzed for the probability of economic return on application. Pest and beneficial insect, including pollinator abundance, will be collected during the season from each treatment area. By conducting on-farm research with field size plots and from numerous locations on Delmarva and planting windows (full season and double crop), a strong extension message about the utility or disadvantage of prophylactic insecticides can be delivered to area farmers, potentially saving input costs that affect farm and environmental sustainability.

## Cooperators


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## Research

Materials and methods:

Farmer strip trials will be installed during the 2020 growing season when the farmer is going over the field with a non-insecticide application. In half of the strips, a pyrethroid will be included while in the other half, a pyrethroid will be excluded. Strips will be sampled weekly and harvest data collected by the farmer.

Annual Report, January 2021
The objective of this study is to determine if prophylactic insecticide application in soybeans are worthwhile when herbicide or fungicide are applied during typical application times. In 2020, five farmers participated in the study applying strips, blocks, or applying to paired fields during other pesticide application times.

Most of the fields sampled in 2020 were double crop soybean fields which are expected to have greater numbers of pest insects and less ability to compensate for defoliation. Over all fields sampled, samples from each location were averaged by number of sweep samples taken. The difference between untreated strips and pyrethroid treated strips were tested against a hypothesized mean value of 0 (no difference). A negative number means that there were, overall, greater numbers in the Untreated, and positive numbers mean there were greater numbers in the Pyrethroid treated strips. Highlighted boxes are sampling dates and pests for which there appeared to be a stronger trend. Of note, stink bug values (SB) varied quite a bit and were not consistent. Soybean looper also tended to be in greater abundance in pyrethroid treated strips. In no field did the insect pest complex reach threshold, with a possible exception of one site that had a fairly high but brief count of green cloverworm. Yield data is still being collected from participants. However, the data that has been collected thus far does not indicate a yield advantage to the prophylactic treatments. This result was expected. Implications of the first year of this project will be discussed during winter extension meetings, the largest of which is Delaware AgWeek. As soon as yield results are in, summarized results and farmer specific data will be sent to each participant.

| Date (number of sampled locations) | BLB | GCW | JB | SB | DSB | BEB | GH | SL | CEW |
|---|---|---|---|---|---|---|---|---|---|
| July1 (1) | NS - | NS - | 0 | NS - | 0 | 0 | 0 | 0 | 0 |
| July 2 (2) | -1.4 P = 0.177 | NS - | NS - | NS + | 0 | NS - | NS - | 0 | 0 |
| July 3 (1) | NS + | NS - | NS + | NS - | 0 | NS - | 0 | 0 | 0 |
| July4 (1) | 0 | NS - | NS- | 0 | 0 | NS + | NS + | 0 | 0 |
| Aug1 (3) | NS + | NS - | 0 | 0.194 P = 0.141 | 0 | 0 | NS - | NS + | 0 |
| Aug 3 (4) | NS + | -1.98 P = 0.125 | 0 | -0.08 P = 0.188 | 0 | 0 | NS - | NS + | NS + |
| Aug4 (5) | NS + | NS - | 0 | NS + | 0 | NS - | NS - | NS + | NS + |
| Sep1 (5) | NS | 0 | 0 | 0.11 P = 0.195 | 0 | 0 | -0.48 P = 0.138 | NS | 0 |
| Sep2 (1) | 0 | 0 | 0 | 0.2 | 0 | 0 | 0.2 | 0 | 0 |
| Sep3 (4) | NS | 0 | 0 | NS | 0 | 0 | NS + | NS | NS |
| Sep4 (2) | NS | 0 | 0 | NS | 0 | 0 | NS | 0.62; P = 0.217 | NS |

BLB = bean leaf beetle; GCW = green cloverworm; JB = Japanese beetle; SB = stink bug; DSB = Dectes stem borer; BEB = big eyed bug; GH = grasshopper; SL = soybean looper; CEW = corn earworm

The primary challenges to the execution of the project as originally planned was one planned location decided not to participate in 2020, and covid restrictions put in place limited the number of supporting personnel required to acquire data for the project. Thus the number of field locations had to be scaled back. This complicated the statistical analysis for 2020. In 2021, a limited term researcher will be brought on board to coordinate the project with participants and oversee data collection. We plan to increase the number of participant farms to increase statistical power

Research results and discussion:

Data will be collected beginning in May 2020.

**Participation Summary**

**6** Farmers participating in research




US Department of Agriculture


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