

SCSB Final Report

General Information

Principal Investigator(s) Name(s): Jeremy Greene

Organization: Clemson University

Date: 14 January 2019

Quarter: Final

Proposal Information

Title: Spatial Associations of Soil and Crop Characteristics, Insect and Nematode Abundance and Injury, and Yield Deficit Analyses in Soybean

Amount Expended to Date: \$9,333.30 out of \$10,000.00 (all graduate student stipend + fringe)

Project Summary

Report the progress toward the situation described in the proposal summary. Include progress against budget, timeline and scope.

Seasonal sampling for insects (pests and beneficials), injury (defoliation), and plant measurements (NDVI, plant height, growth stage, yield, etc.) at flagged locations arranged spatially across each of two experimental fields at the Edisto Research and Education Center has been completed. Frozen samples of arthropods continue to be processed in the laboratory. Data continue to be entered into a spreadsheet and statistical software for analyses. Progress continues to match with the project timeline. Data collected in 2017 have been examined, and data from 2018 will be processed similarly in the next few weeks.

Kudzu bugs were the most abundant insect captured in samples, followed by soybean looper and velvetbean caterpillar (Figure 1). Kudzu bugs were strongly associated with field edges (Figures 2 and 4), and velvetbean caterpillars were associated with higher field elevations and taller plants (Figure 3).

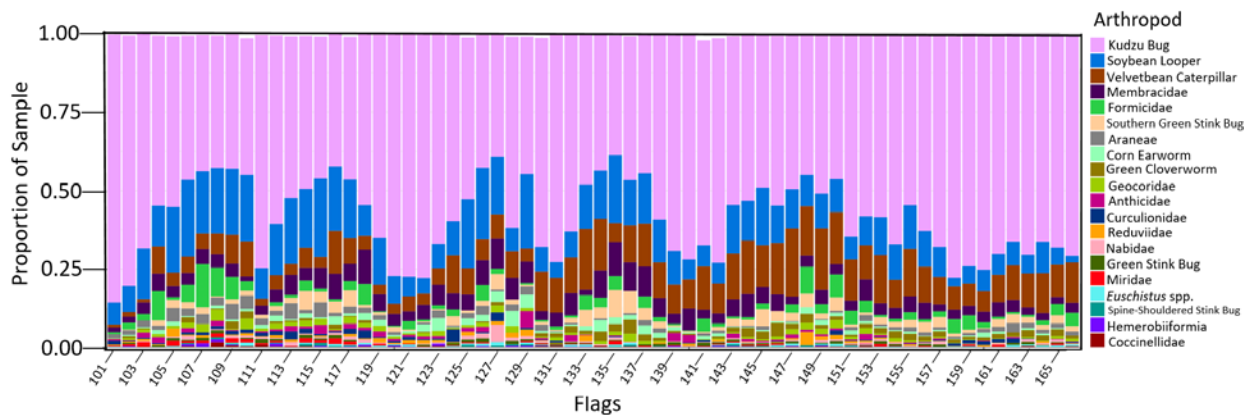


Figure 1. Abundance of taxa at each grid point in drop-cloth samples.

Grid Point Cumulative Totals: Kudzu Bug

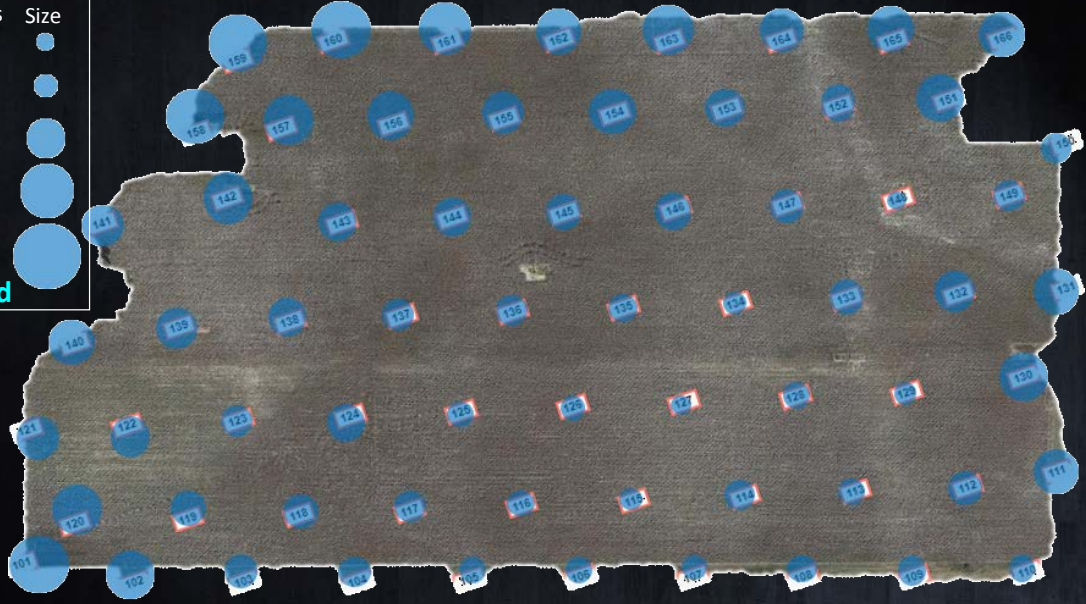


Figure 2. Cumulative total abundance of kudzu bugs in sweep-net samples.

Grid Point Cumulative Totals: Velvetbean Caterpillar

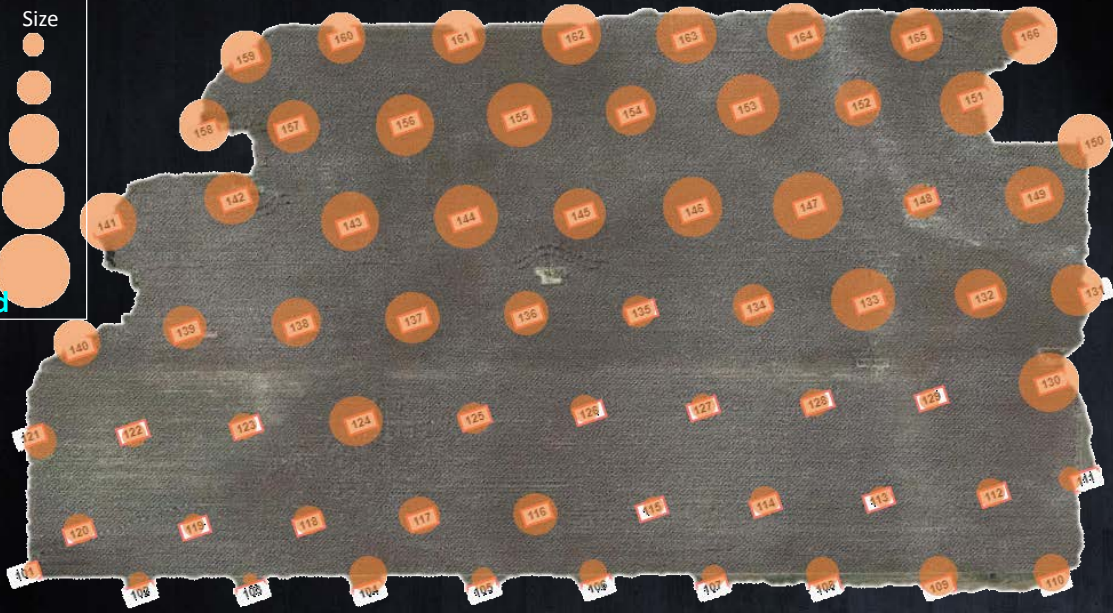


Figure 3. Cumulative abundance of velvetbean caterpillar in sweep-net samples.

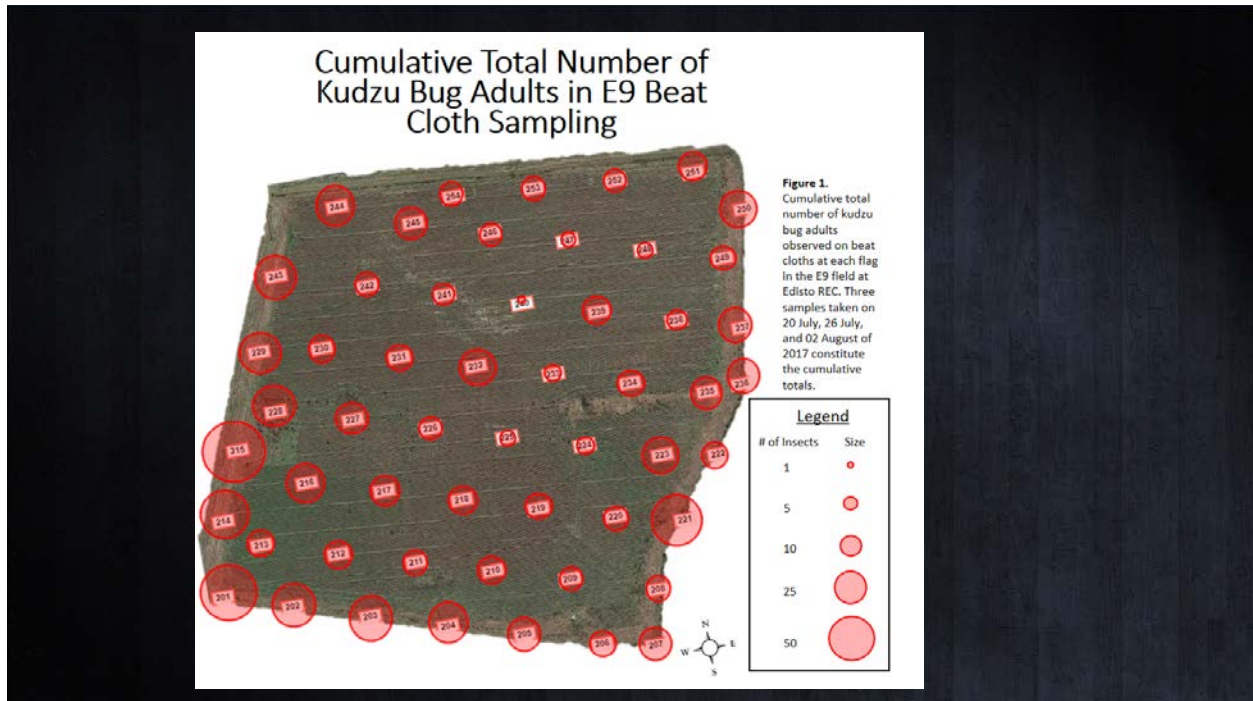


Figure 4. Cumulative abundance of kudzu bugs in drop-cloth samples.

Pearson's correlation coefficient was calculated for the variables: VBC, Plant Heights, NDVI, TCAH (Adults + Nymphs), Araneae, Distance from field edge, SBL, KB adults, and KB nymphs. Significant correlations ($p < 0.05$) between pairs after correction for multiple comparisons (Holm's) are shown below. Positive correlations are in green while negative ones are in red.

For E9, Plant Heights and Distance as well as Plant Heights and NDVI had strong positive relationships throughout the season, with the exception of the middle of August. Kudzu bug adults were negatively correlated with distance from the field edge in the beginning of the season, whereas spiders were negatively correlated with distance towards the end of the season. TCAH was positively associated with distance early in the season.

For B10, significant correlations decreased throughout the season. Plant Heights and NDVI along with Plant Heights and Loopers were significantly correlated in the first half of the season. Kudzu bug adults had more positive associations with their conspecific nymphs towards the end of the season.

Negative associations were always between arthropod abundance and distance, with the exception being the negative correlation found between NDVI and VBC at the end of the season in field B10. These negatively associated arthropods were either spiders or kudzu bugs (adults or nymphs). Interestingly, TCAH and Distance had positive correlations in both fields at various times during the season.

Key Performance Indicators

What KPI(s) are being used to measure project success? How are KPI(s) being measured? Will KPI(s) not be met? Are KPI(s) on track? Will KPI(s) be exceeded? Explain the key circumstances that are impacting achieving or not achieving KPI(s).

The KPI of sampling fields and collecting data for identification of associations for pests and sensed data that can potentially be exploited in precision management of the pests to save producers input costs has been achieved.

Next Steps

Explain the next steps of the projects and what you hope to achieve during the next quarter.
Further analyses of project data will continue in 2019, as the data were extensive and analyses complicated.

Additional Information

Provide all additional supporting information, facts or figures here.
No additional supporting information on this report.

Prior to submission, reports should be saved as a pdf document using the following naming convention; 2018Date(yrmoday)_(PI Last Name)_(Abbreviated Proposal Title)_Final.