Examining the role of cover-cash crop rotations on arthropod community dynamics in LRGV

Adegboyega Fajemisin[1], Satinderpal Kaur[2], Alexis Racelis[1,2] and Rupesh Kariyat[2]

School of Earth, Environmental and Marine Sciences, The University of Texas Rio Grande Valley, Edinburg, United States 78539.

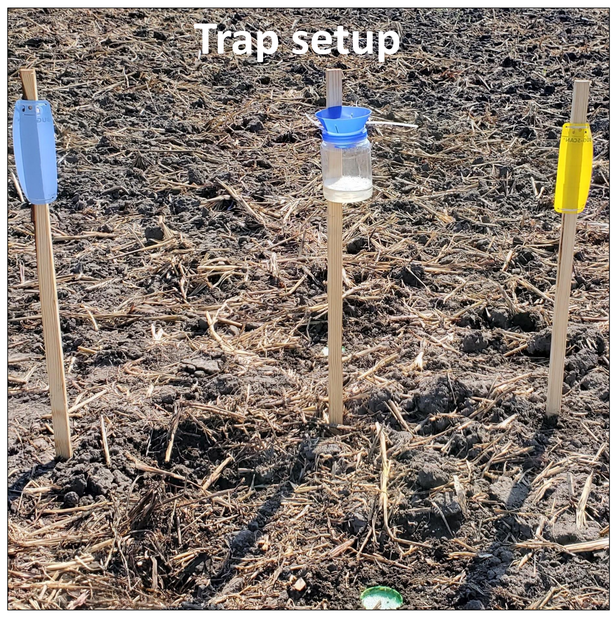
Department of Biology, The University of Texas Rio Grande Valley, Edinburg, United States 78539.

Introduction

- Ecological principles-based farming such as the adoption of biological control of herbivores can improve the resilience of the agroecosystem
- Cover crops provide a potentially cost-effective method of improving habitats to increase the populations of beneficial arthropods and thus reduce pest incidence
- The impact of cover crops on the arthropod community dynamics in the management of pest populations is poorly understood
- The objective of this study is to investigate the role of cover-cash crop rotations on arthropod community dynamics

Research question

- Will cover crops be successful in increasing the population of natural enemies thereby reducing the population of herbivores ?



Hypothesis

- Cover crop treatments would attract beneficial insects such as predators, parasitoids and pollinators
- The parasitoids as natural enemies would repel/reduce herbivory thereby benefitting the subsequent cash crop

Experiments

Insect diversity

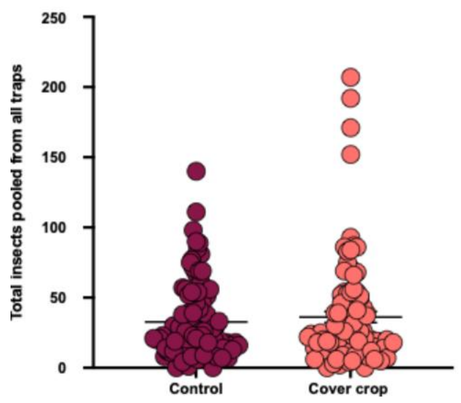
- Insect diversity on the cover and control plots were assessed on 4 farms in the Hidalgo county of the LRGV
- Insects' populations were assessed using pit fall traps, sticky traps (blue and yellow), and pollinator traps
- The collected traps were brought back to the lab and the insects were classified based on their respective orders
- Statistical analysis was performed using Generalized Linear Models with Poisson distribution

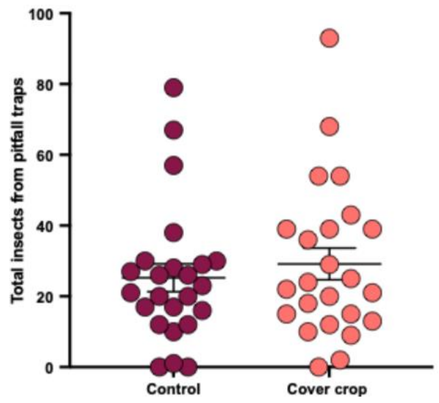
Results

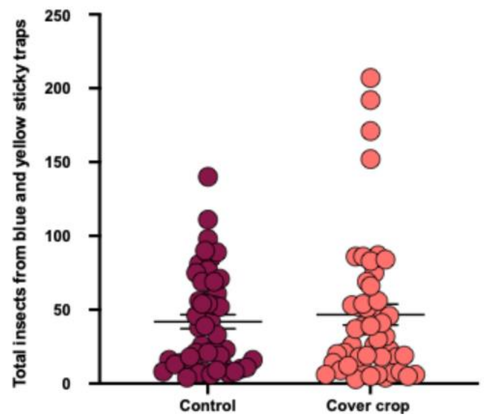
- About 6,615 insects were collected and have been classified to their order
- Arthropod community did not vary across the four fields
- There was no significant difference between the population of the pollinators in the cover crop and the control treatments yet.
- There was no significant difference in the population of non-pollinators across the field
- Aphids, earwigs, and *Megachile* bees were common in the sticky, pitfall, and the pollinator traps respectively across the four fields

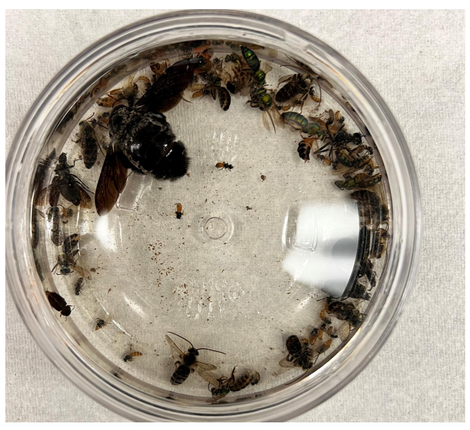
Conclusion

- Our preliminary result shows that there is a significant difference in the population of the arthropods based on their feeding guild
- Preliminary analyses also show no treatment differences for arthropod community dynamics
- We speculate that the community composition will vary based on cover crop stand later in the season
- Additional trapping and analyses are in progress

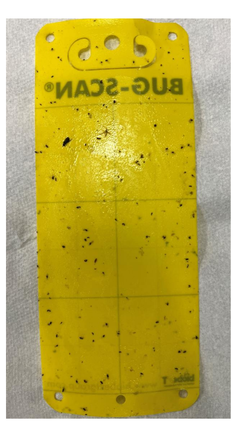








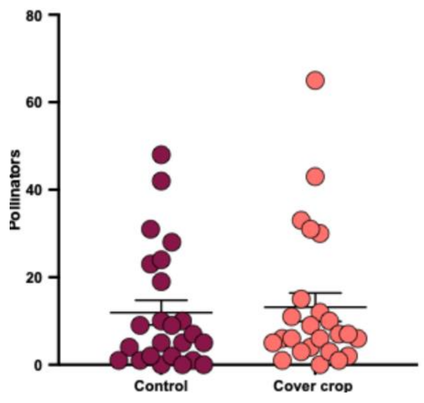
Arthropods from pollinator traps

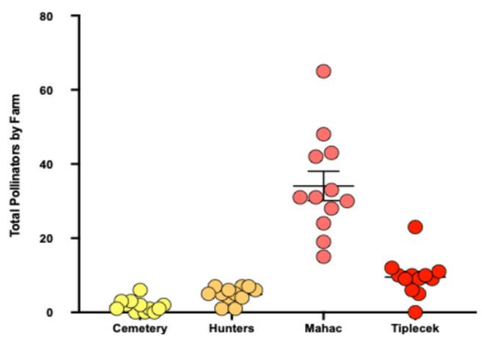


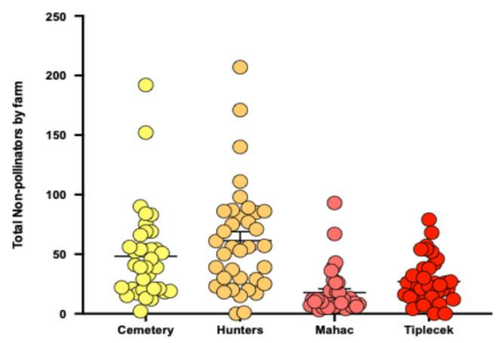
Arthropods on Yellow sticky traps

Arthropods on Blue sticky traps

Arthropods from pitfall traps







Acknowledgement & Funding

- The authors thank Daphne Zapsas, Manish Gautam, Juan Raygoza and Cruz Salinas for field work and USDA for funding

Reference

- Martinez L., Soti P., Kaur J., Racelis A., and Kariyat R. (2020) Impact of covers crops on insect community dynamics in organic farming. *Agriculture,* 10(6). doi: 10.3390/agriculture10060209