Effectiveness of Indian Mustard *(Brassica juncea)* as a trap crop for the striped flea beetle (*Phyllotreta Striolata)* on Poc Choi (*Brassica rapa var. chinensis)*

Andrew W. Quick
West Virginia University

Introduction

Poc Choi (*Brassica rapa subsp. chinensis*), a popular leafy vegetable known for its crisp texture and mild flavor, is vulnerable to various pests that can inflict substantial damage and reduce crop yield. Among these pests, the striped flea beetle *(Phyllotreta striolata*) poses a significant threat to Poc Choi cultivation. One method to reduce crop damage from pests is to implement a trap crop system. In these systems trap crops lure and divert pests away from the main crop. *Brassica juncea* (AKA,-mustard greens or Indian mustard) is attractive to certain insects, drawing the pests away from the Poc Choi plants.

This research aims to investigate the efficacy of utilizing *B. juncea* as a trap crop for controlling striped flea beetle infestations in Poc Choi cultivation. By studying the interaction between *B. juncea*, Poc Choi, and the striped flea beetle, we seek to evaluate the trap crop's potential to mitigate pest damage while reducing the reliance on chemical pesticides.

Through this study, we aim to shed light on the benefits and practical implications of incorporating *B. juncea* as a trap crop in Poc Choi production systems. The findings will contribute to sustainable and eco-friendly pest management practices, minimizing the economic losses caused by the striped flea beetle while promoting the overall health and productivity of the Poc Choi crop.

Objectives

The objectives of the study include:

1.Assessing the attractiveness of Indian Mustard to the striped flea beetle under field conditions.
2.Measuring the effectiveness of Indian Mustard in reducing striped flea beetle infestation on Poc Choi plants.
3.Evaluating the impact of the trap crop on the growth and yield of Poc Choi.

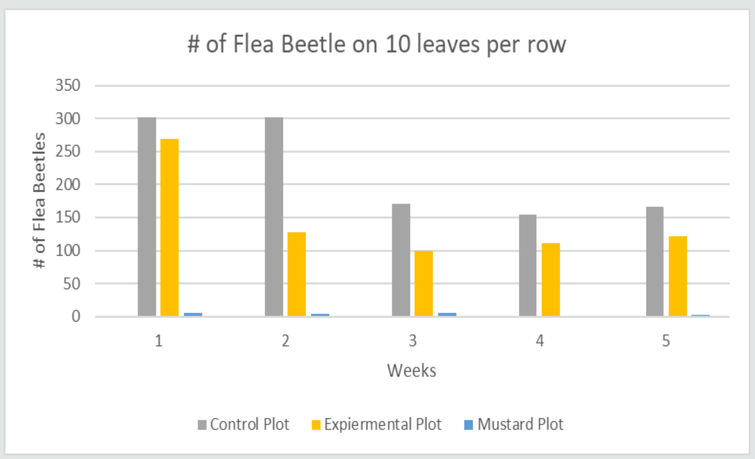

Figure 4. Number of Flea Beetles per week

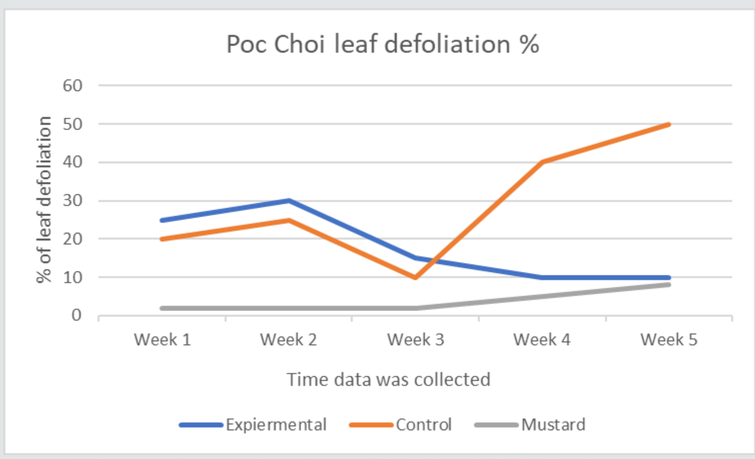

Figure 6. Weekly Poc Choi leaf defoliation

Literature Cited

Figure 5. “How to Assess Leaf Area Loss from Flea Beetles.” n.d. *The Canola Council of Canada* (blog). Accessed July 20, 2023. https://www.canolacouncil.org/canola-watch/fundamentals/how-to-assess-leaf-area-loss-from-flea-beetles/.

“Fig. 3. Diagrammatic Scale of Cabbage Wrapper Leaves Used to Quantify...” n.d. ResearchGate. Accessed July 20, 2023. https://www.researchgate.net/figure/Diagrammatic-scale-of-cabbage-wrapper-leaves-used-to-quantify-the-herbivore-leaf-chewing_fig3_347490323.

Methods

- Ten leaves per row were selected randomly each week for manual enumeration of flea beetles.
- Two diagrammatic defoliation charts were used to quantify the percentage of leaf damage.
- For comparative analysis with the defoliation charts, a single leaf was randomly selected from each plot.
- The total yield of Poc Choi plats from each plot was determined by weight.
- In each row, the Poc Choi plants are spaced at intervals of 18 inches in rows 2 feet apart. These standardized dimensions apply uniformly to both the control and experimental plots.
- Two ounces of mustard seeds were sown via broadcast method.

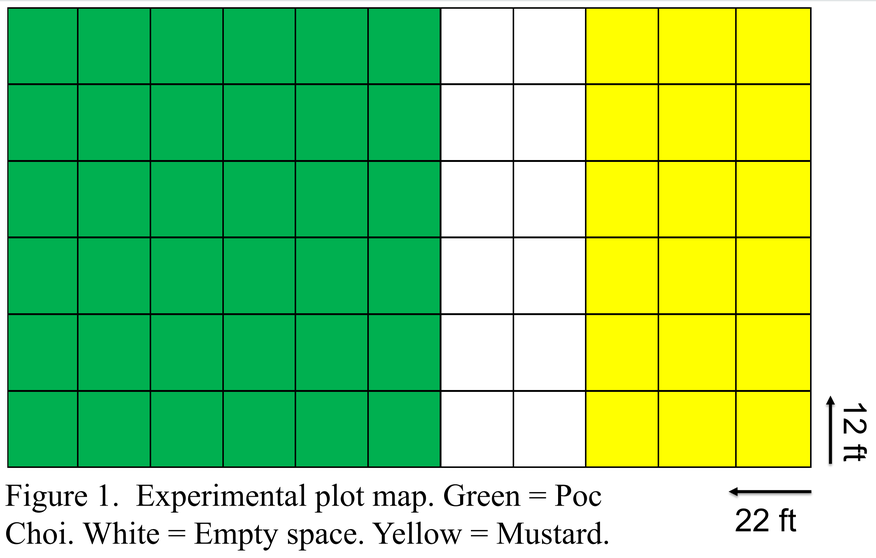

Figure 1. Experimental plot map. Green = Poc Choi. White = Empty space. Yellow = Mustard.

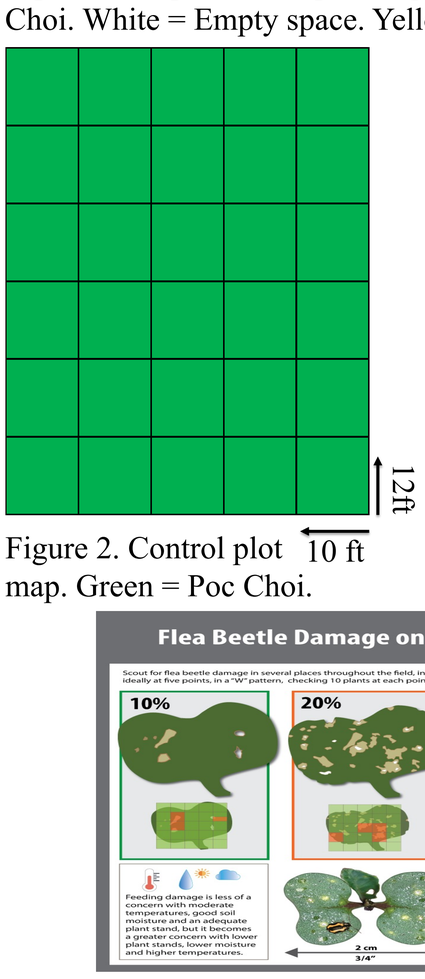

Figure 2. Control plot map. Green = Poc Choi.

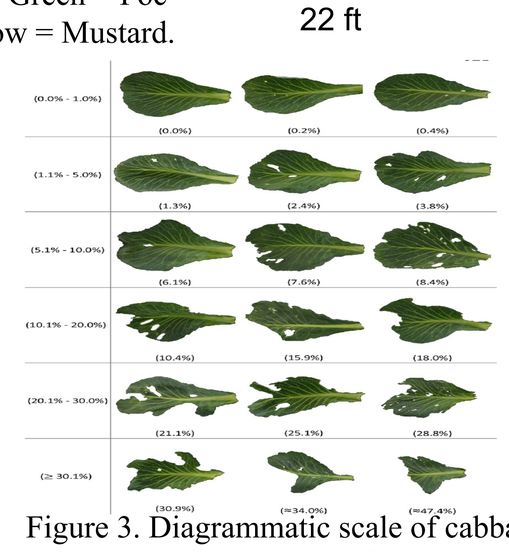

Figure 3. Diagrammatic scale of cabbage wrapper leaves “ResearchGate. Accessed July 20, 2023”

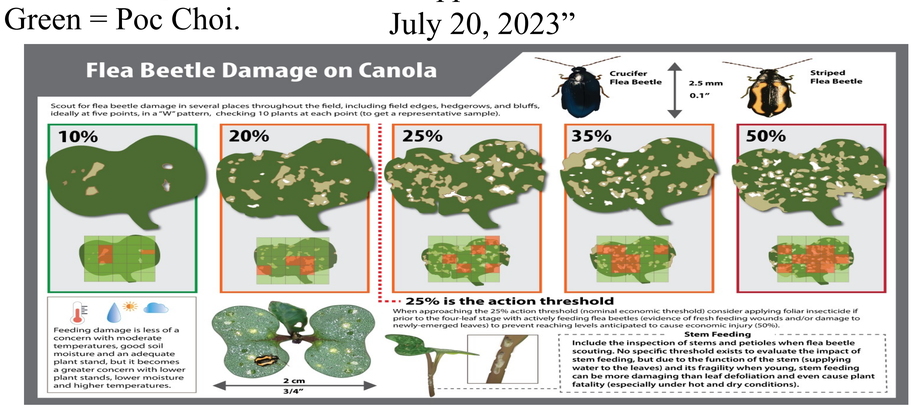

Figure 5. How to assess Flea Beetle damage on Canola . “*The Canola Council of Canada* (blog). Accessed July 20, 2023”

Figure 7. Defoliation on Poc Choi in control plot week 5.

Figure 8. Defoliation on Poc Choi in experimental plot week 5.

Figure 9. Defoliation on mustard week 5

Analysis

The control plot consistently harbored a higher average number of flea beetles per week to the experimental plot. Both plots suffered noticeable damage. The mustard plot displayed only a negligible presence of flea beetles and damage.

The control plot for Poc Choi was situated close to a large area where brassicas were already established and growing. This adjacency could have contributed to the higher overall flea beetle count in the control plot. The surrounding environment might have played a significant role in influencing the flea beetle population dynamics.

The experimental plot produced 39 plants with a total yield of 25.9 Kg, whereas the control plot yielded 41.28 Kg from 33 plants. Several factors, such as weed pressure, pest pressure, and soil composition, could have contributed to the disparity in yield between the two plots.

The mustard plot acted as a magnet for pollinators during its flowering period, indicating its potential value in attracting beneficial insects for future agricultural practices. To improve the experimental setup, the mustard plot should be fully integrated and enclose the Poc Choi, rather than being grown in a strip adjacent to it.

Given the spatial constraints faced during this study, only two plots were used. To enhance the reliability of future investigations, it is recommended to conduct at least six replications in separate locations.

Lastly, an unexpected discovery during the study was the presence of a considerable number of Harlequin bugs (*Murgantia histrionica*) when the mustard plants were uprooted. The prior year witnessed substantial Harlequin bug damage throughout a significant portion of the market garden. The observation suggests that the mustard plot might have served effectively as a trap crop for this insect species.

In conclusion, the experimental plot showed a lower flea beetle count, but it also yielded a lower produce weight compared to the control plot. The mustard plot demonstrated potential benefits as a pollinator attractant and a possible trap crop for Harlequin bugs. Future studies incorporating the suggested improvements can provide more comprehensive insights into pest management strategies and crop productivity in diverse agricultural settings.

Acknowledgments

- Support for this project came from the WVU Organic Farm Discretionary Fund
- Special thanks to all the support from the WVU Organic Farm Staff and WVU faculty.