Development of Sustainable Strategies for Managing Bacterial Diseases and Improving Tree Health in the Peach Production System

Ashlin Goergen, Junaed Ahmed, Anna Sara Hill, Enoch Noh, Hehe Wang

Edisto Research and Education Center, Clemson University

Background

Behind California, South Carolina and Georgia are among the top three largest states in United States peach production. These two states produced around 122,700 tons in 2021 (USDA, 2022). Unfortunately, the Southeast's warm, humid climate allows bacterial diseases to flourish, negatively impacting peach production.

Bacterial spot caused by Xanthomonas arboricola pv. pruni (Xap), is one of the major diseases impacting peach production. The presence of bacterial spots on fruit reduces their marketability. Bacterial spot on leaves lead to premature defoliation and reduced tree health.

Southeastern growers routinely spray copper and antibiotic for bacterial spot management but they lead to the development of resistant pathogens and have harmful effects on the environment. This study focuses on evaluating biopesticides as more sustainable methods to manage this disease and improve peach production.

Objective

- Evaluate different biopesticides for managing bacterial spot.

Materials and Methods

Greenhouse Trial:

- Individual branches received a different spray treatment, each with four replicates.
- Untreated branches served as the control
- After initial biopesticide application leaves were spray-inoculated with Xap.
- Disease and phytotoxicity ratings were collected weekly after inoculation.

Research Field Trial:

- Individual trees received spray treatments of biopesticides or copper, each with four replicates.
- Untreated trees served as the control.
- Disease and phytotoxicity ratings of five randomly selected branches per tree were collected biweekly.

Data Analysis:

- Area under the disease progress curve (AUDPC) was calculated for disease and phytotoxicity ratings.
- Statistical analysis was conducted in MiniTab v20.

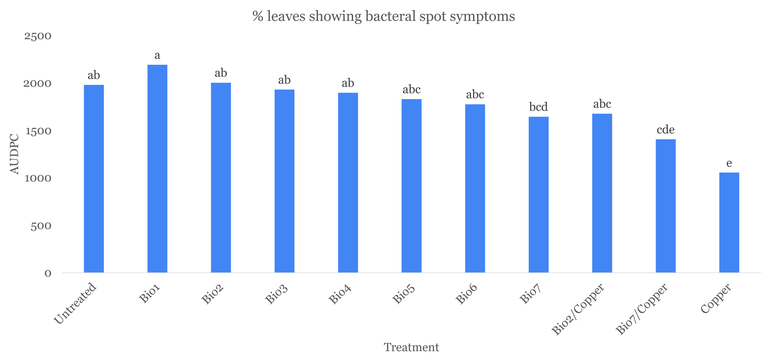

Figure 1: Percent of leaves with bacterial spot symptoms per treatment

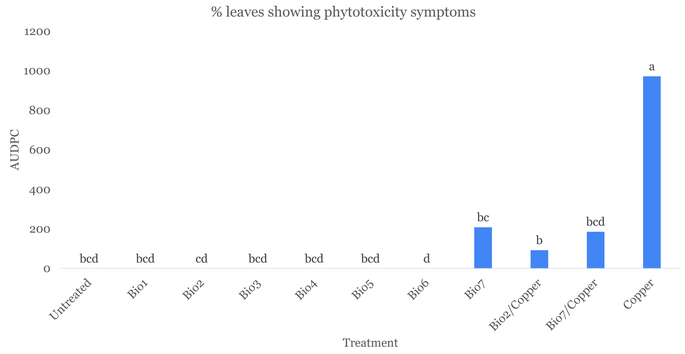

Figure 2: Percent of leaves with phytotoxicity symptoms per treatment

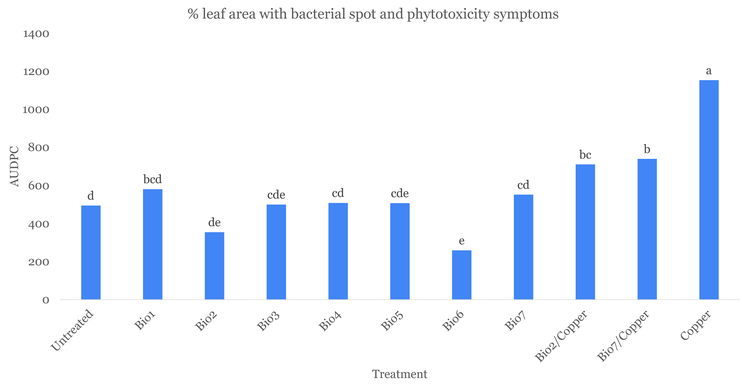

Figure 3: Mean percent area of leaves containing bacterial spot and phytotoxicity symptoms for each treatment

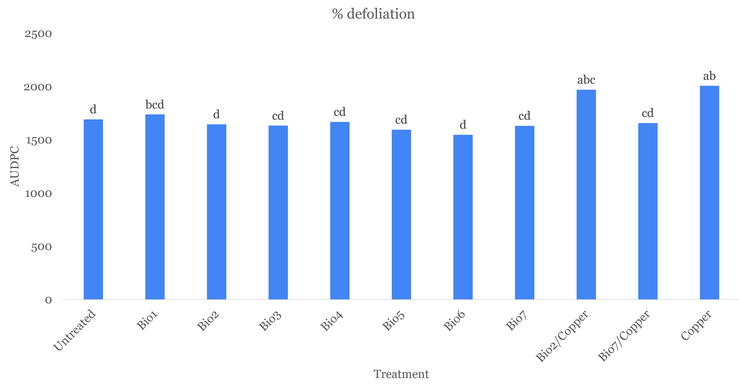

Figure 4: Percent of leaves defoliated from the trees for each treatment

Conclusion

- The most effective treatment for reducing bacterial spot was copper, but it resulted in significant phytotoxicity on the peach leaves.
- Taking bacterial spot and phytotoxicity into consideration, the treatment with the least symptoms was the bio6 treatment. All treatments with copper had significantly more symptoms compared to the untreated control.
- The copper treatment had the highest amount of defoliation, which indicates phytotoxicity contributed more towards defoliation than bacterial spot.

Reference

USDA, National Agricultural Statistics Service. (2022). *Noncitrus Fruits and Nuts: 2021 Summary*

Acknowledgements

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