



Can vermicompost mitigate water stress & pest pressure on zucchini?



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INTRODUCTION

- Urban agriculture faces numerous challenges; particularly water access and pest pressure.
- Vermicompost might mitigate water stress by enhancing organic matter and humic acids that improve water retention¹, and relieve pest pressure by enhancing plant defensive chemistry.²
- In this experiment, we examine how water stress and vermicompost interactively shape pest attraction.

METHODS

To examine interactions between vermicompost and water stress on insects, we manipulated two experimental treatments on zucchini plants in the greenhouse:

1. Vermicompost:

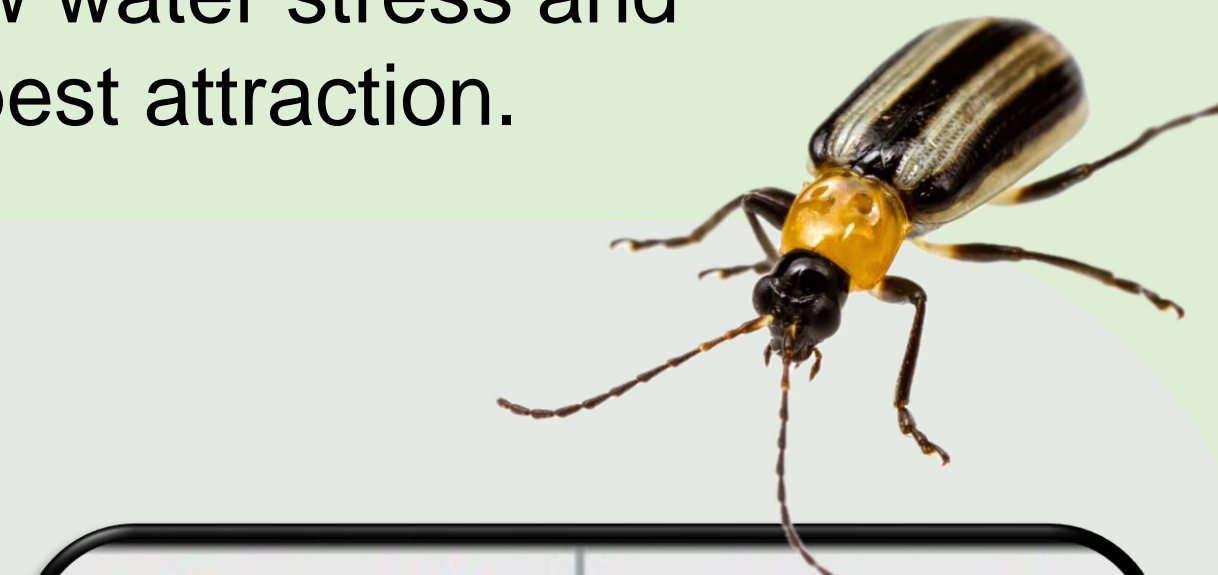
Vermicompost-amended plants were grown in a 25% blend with potting mix, and control plants were grown in 100% potting mix.

2. Water stress: Well-watered treatments received 237 mL every 72 h, and water stress treatments received 118 mL.

Sampling: We counted whiteflies that colonized plants in the greenhouse over two weeks

Herbivore preference assays:

We used a y-tube olfactometer to determine which water stress and vermicompost treatments were most preferred. We examined three paired treatments and for each treatment we ran preference trials on 20 cucumber beetles and 20 squash bugs across three replicate plants.



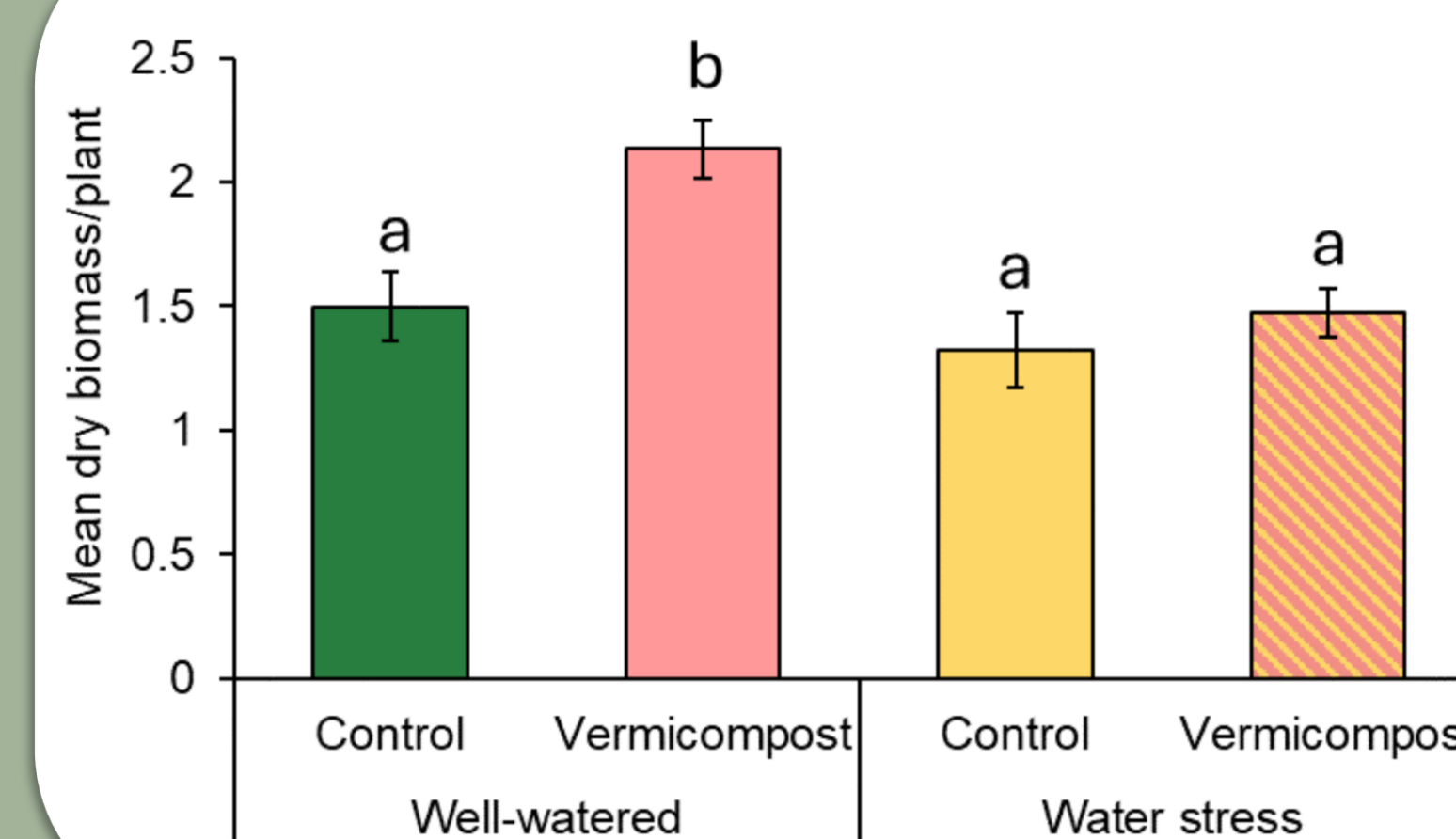
REFERENCES

- Celican, F., Kocak, M. Z., & Kulak, M. (2021). Vermicompost applications on growth, nutrition uptake and secondary metabolites of *Ocimum basilicum* L. under water stress: A comprehensive analysis. *Industrial Crops and Products*, 171, 113973.
- Souffront, D. K. S., Salazar-Amoretti, D., & Jayachandran, K. (2022). Influence of vermicompost tea on secondary metabolite production in tomato crop. *Scientia Horticulturae*, 301, 111135.

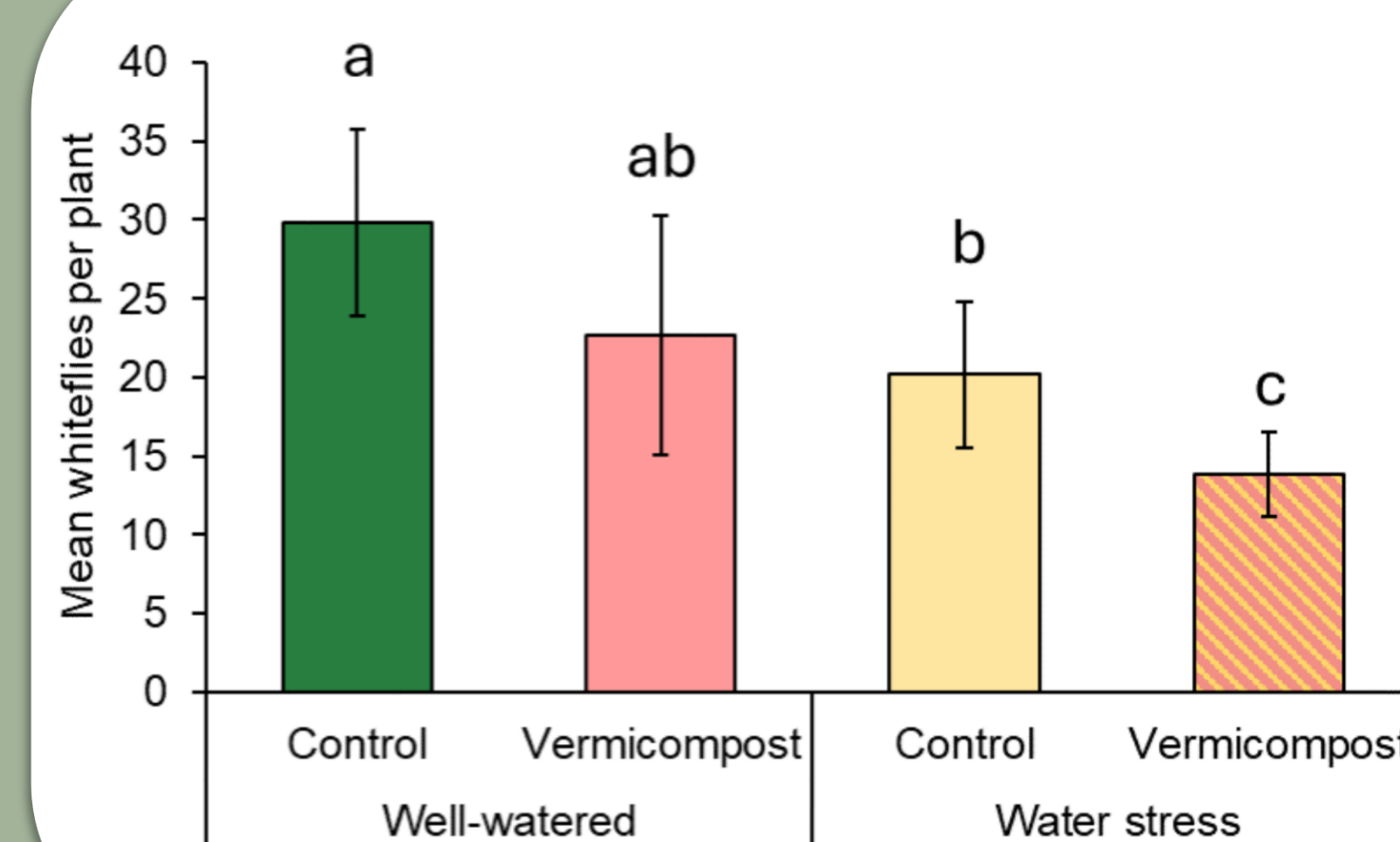
PREDICTIONS

- Water stress will reduce plant growth and decrease insect attraction.
- Vermicompost will accelerate plant growth and decrease insect attraction.
- Vermicompost will mitigate water-stress effects on plants.

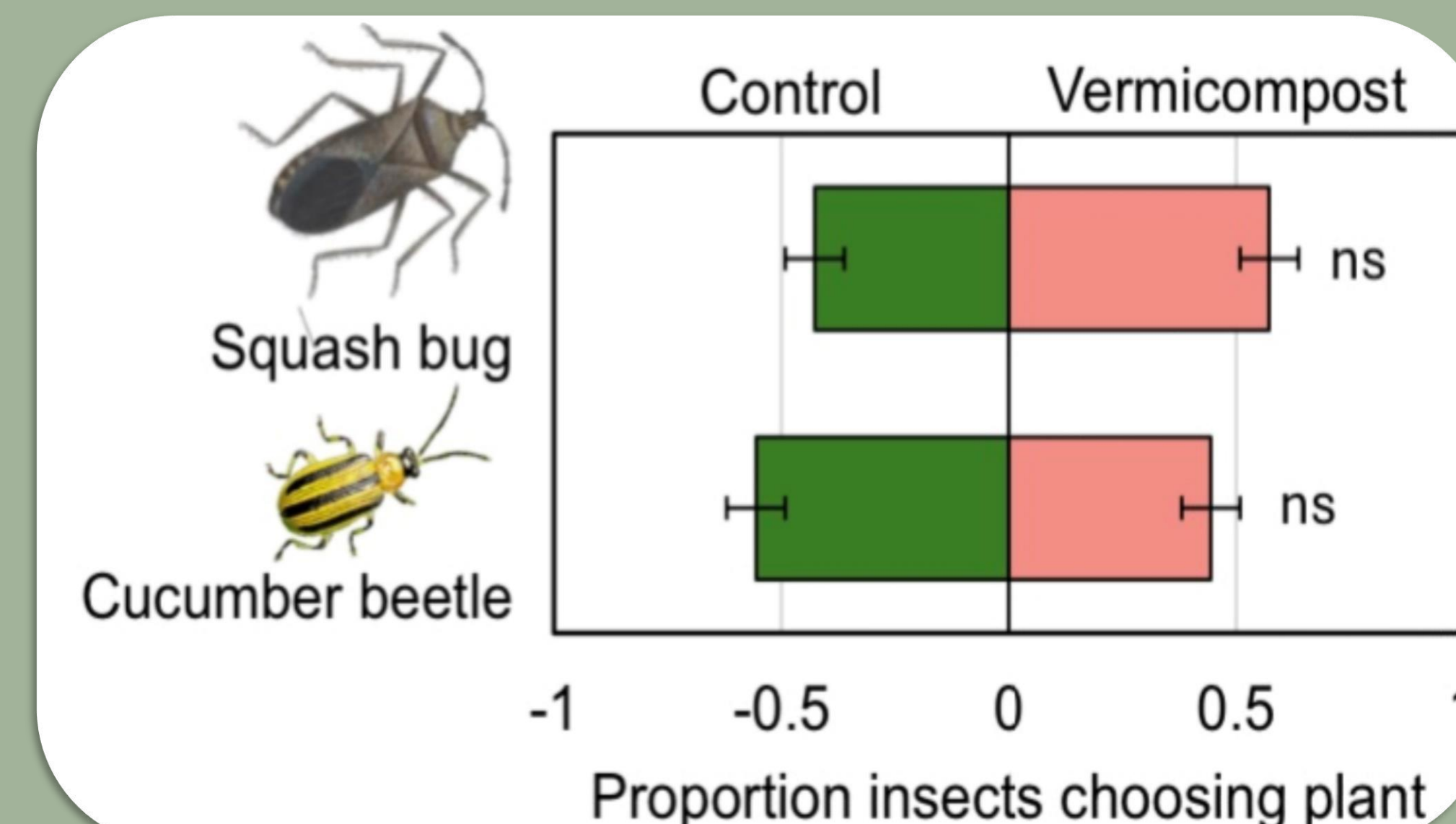
Vermicompost increased plant growth but had no effect under water stress conditions.



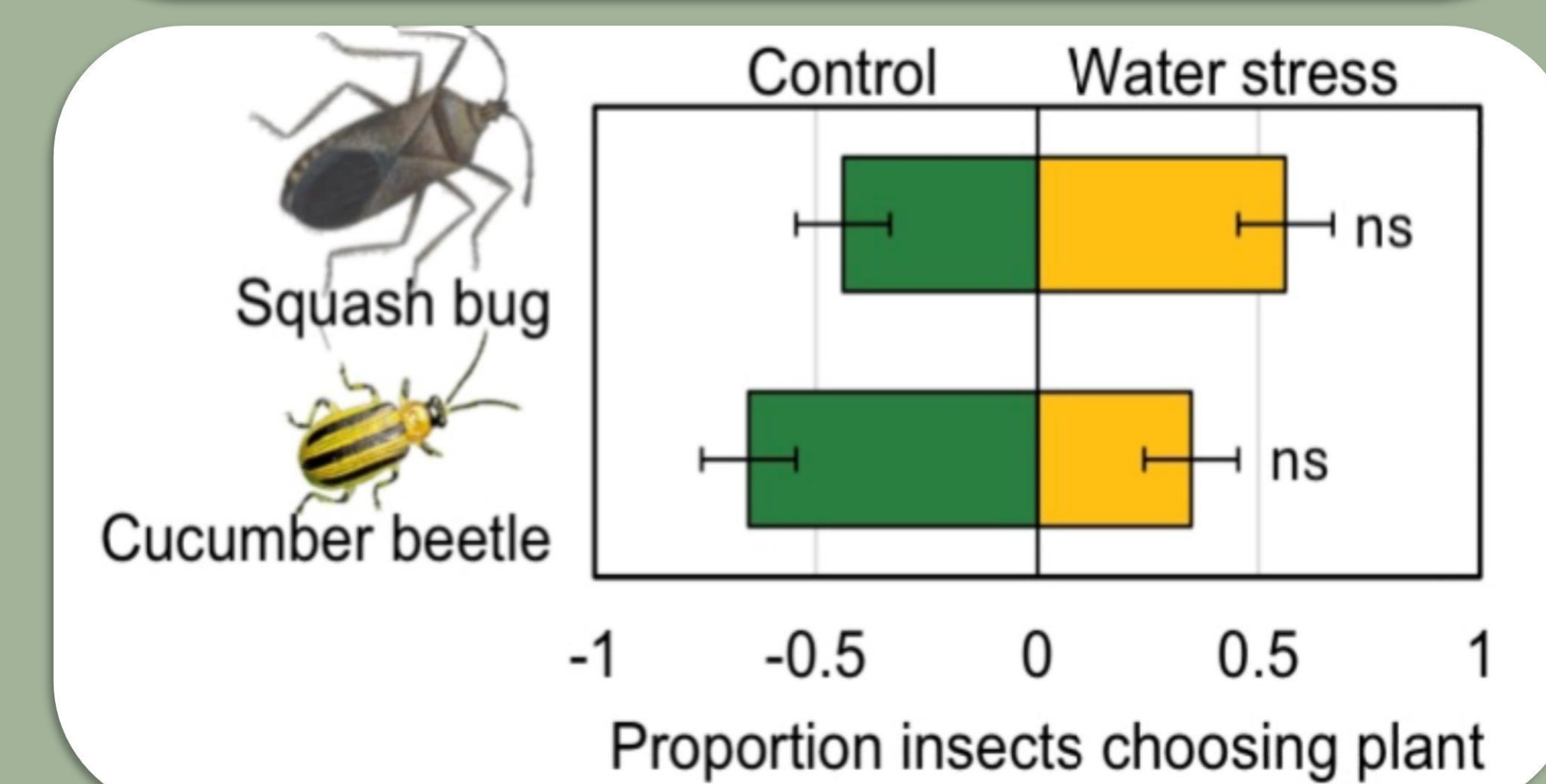
Both drought stress and vermicompost treatments reduced the whitefly colonization of zucchini plants.



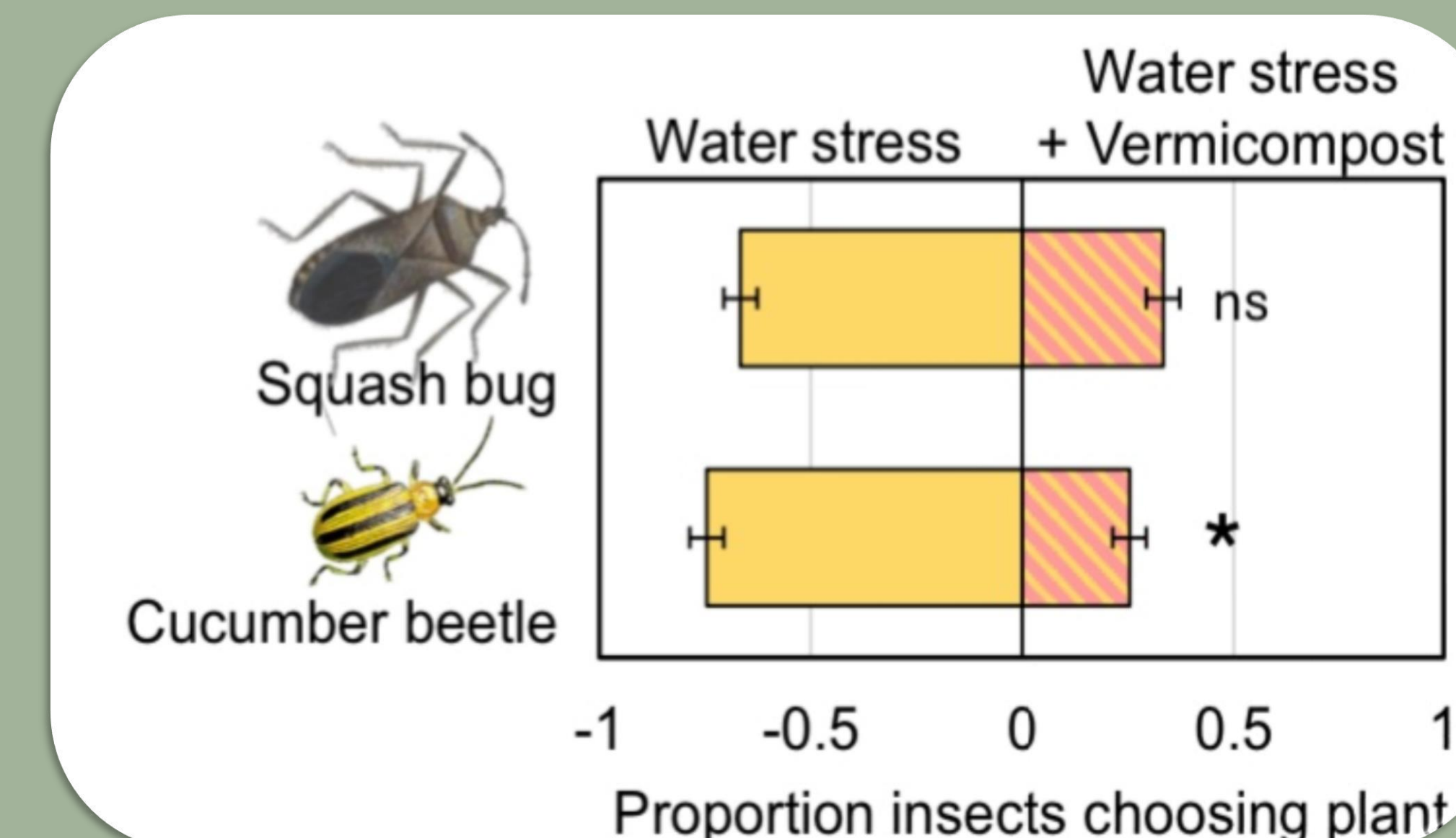
RESULTS



Vermicompost did not affect herbivore preferences, relative to the well-watered control.



Water stress did not affect herbivore preferences, relative to the well-watered control.



However, under water-stress conditions, vermicompost reduced the attraction of cucumber beetles!

DISCUSSION

- Vermicompost mitigated pest pressure under water stress conditions. But not under well-watered conditions.
- Conversely, vermicompost only improved plant growth under well-watered conditions.
- The plant growth and pest control benefits of vermicompost were not obtained under the same conditions.
- One cannot solve all problems with worm poop!

