

The Role of Local Adaptation in Agricultural Weeds

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Introduction

- Locally adapted plants are better suited for living in their environment than another plant of the same species living in a different environment.¹
- Agricultural weeds experience novel selective pressures that may drive local adaptation.

Research Objective

Our goal is to determine if there is genetic differentiation between agricultural and non-agricultural populations of the same species.

Methods

- Grew agricultural and non-agricultural populations of 2 common weed species, lambsquarters and ragweed, in a common garden experiment.
- Measured plant height, internode length, canopy area, and canopy perimeter during early development.



Ragweed shown in forefront



ImageJ analysis of canopy area

Results

Lambsquarters

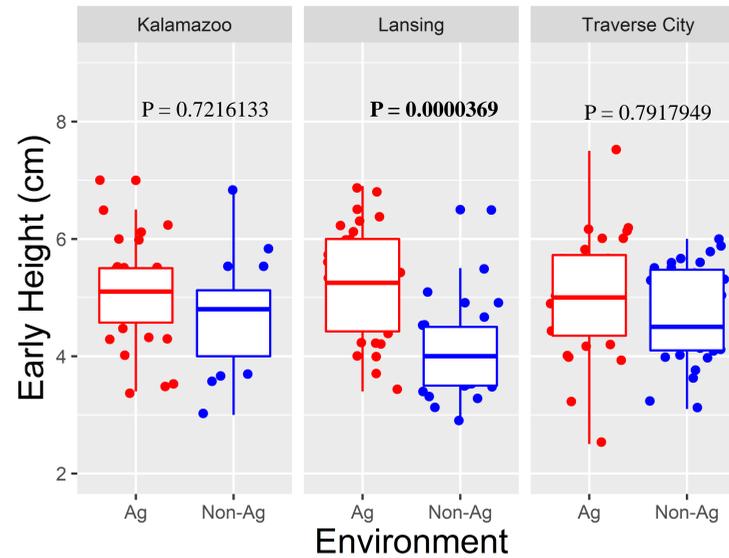


Fig 1: Early height for lambsquarters is significantly greater in agricultural populations from Lansing.

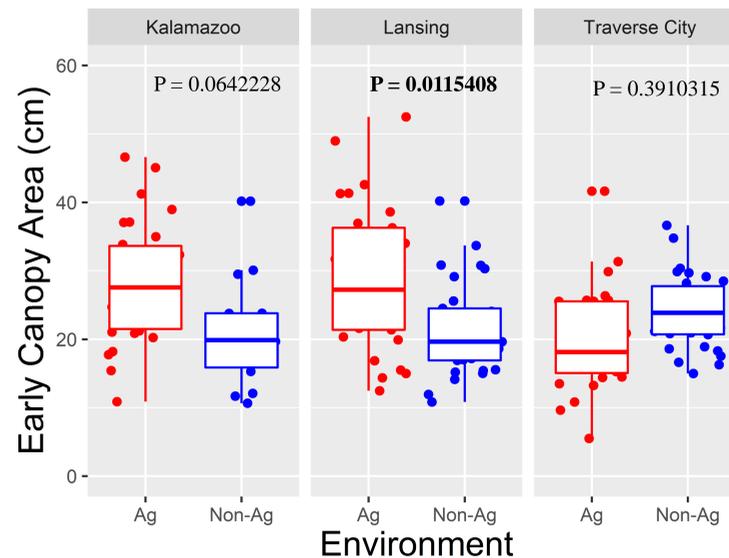


Fig 3: Early canopy area is significantly greater for agricultural populations from Lansing.

Ragweed

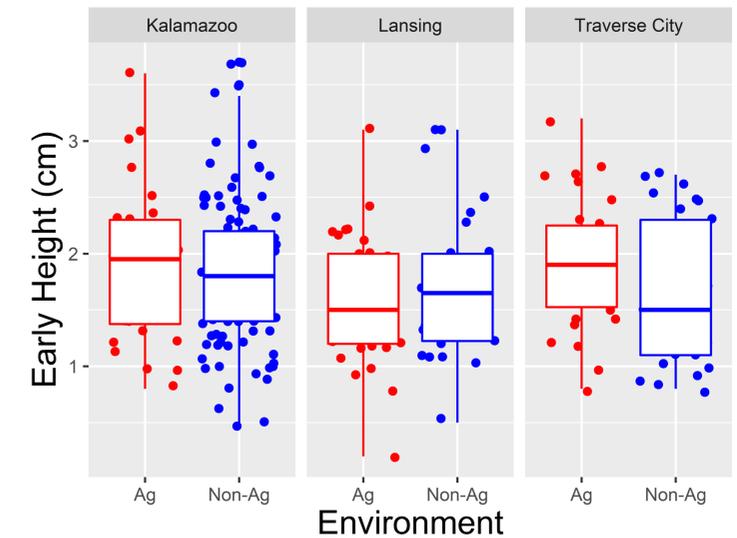


Fig 2: Differences between early height for ragweed are nonsignificant for environment and the interaction between region and environment.

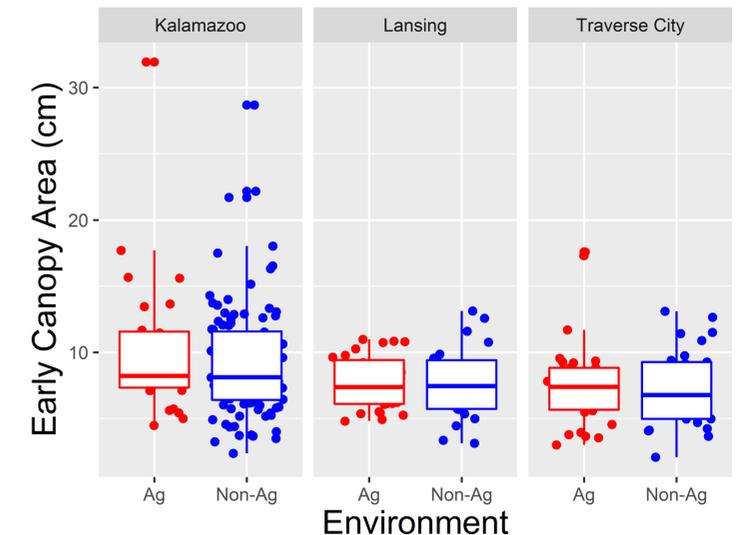


Fig 4: Differences between early canopy area for ragweed are nonsignificant for environment and interaction between region and environment.

Discussion

- There were significant genetic differences between lambsquarters from agricultural and non-agricultural populations in the Lansing region.
- The differences between ragweed from different environments were nonsignificant.

Future Directions

- Plants from this generation will self, and seeds will be reciprocally transplanted to determine the joint role of genetic differentiation and plasticity between plants from the different environments.

Acknowledgments

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References

Blanquart, F., Kaltz, O., Nuismer, S. L. & Gandon, S. 2013. A practical guide to measuring local adaptation. *Ecology Letters*, 16, 1195-1205.