

The Effect of Gibberellic Acid on Herbivory in Weedy and Native Radish

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Introduction

- The growth-defense trade-off hypothesis suggests that faster flowering plants allocate less to defense against herbivores compared to slower-flowering plants
- Wild radish (*Raphanus raphanistrum*) is native to the Mediterranean but is a serious weed in agricultural fields across the globe
- Prior research has shown that weedy radish flowers faster than native radish, and this rapid flowering may be caused by higher levels of gibberellic acid (GA), a plant growth hormone
 - The application of GA to native radish resulted in the natives flowering faster but not as fast as weedy radish; however, GA did not affect weedy radish

Hypothesis

Native radish receiving GA treatment should be more susceptible to herbivores due to their faster flowering



Figure 1: The 10m x 10m plot in Fort Schemske where the project was conducted.

Methods

- Conducted on a 100 m² plot located in Fort Schemske at the KBS Plant Ecology field lab
 - 50 plants each from four different populations (two native and two weedy) for a total of 200 were randomly distributed throughout the plot
 - Half the plants in each population were randomly assigned to either the GA or DI water (control) treatment and sprayed every other day
- Pictures of the rosette were taken using an iPhone camera and uploaded onto ImageJ where the percent of the leaf removed by herbivory was measured (Figure 1)

Preliminary Results

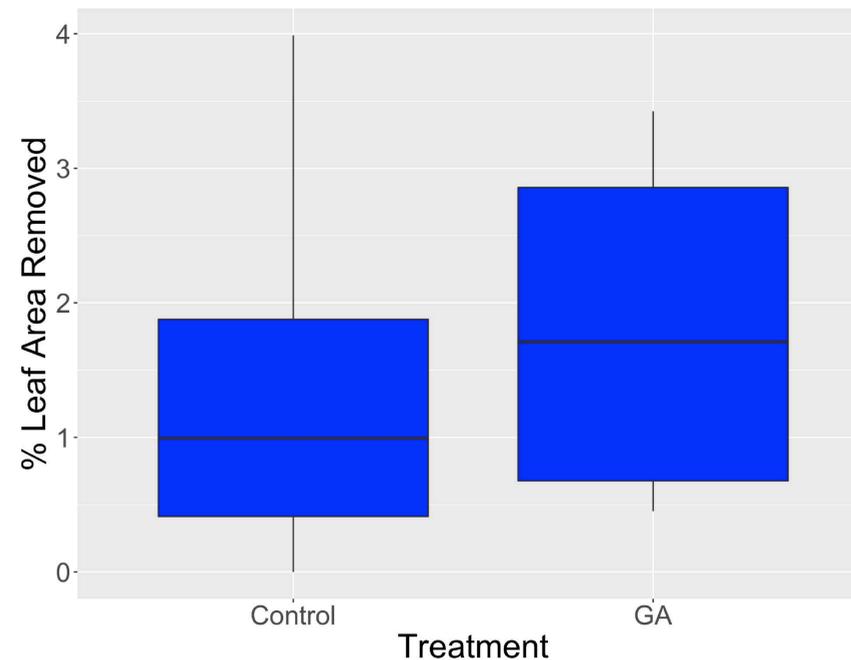


Figure 2: Percent leaf removed on native radish due to naturally occurring herbivory. Results showed a trend of greater herbivory in native radish treated with GA but it is not significant ($P = 0.33$). However, I only completed measurements on 10 of the 50 plants. This trend may be significant once we analyze the rest of the data.

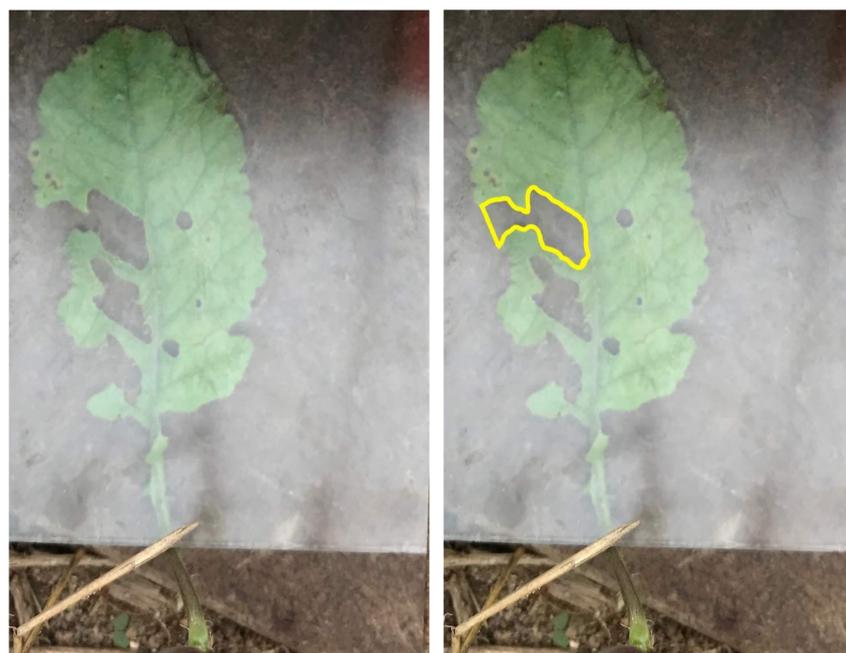


Figure 3: Before (left) and after (right) ImageJ analysis. To calculate the percent leaf removed we measured the amount of leaf area removed by herbivory and divided the value by the total leaf area.

Discussion

- Native radish when treated with GA suffered greater herbivory, perhaps due to reduced allocation to defense
- The percent herbivory removed in weedy and the rest of the native radish under both treatments will be analyzed
- We predict the rest of the native plants treated with GA will suffer more herbivory than the native control
- We expect GA to have no effect on the weedy radish, with weeds having the highest herbivory under both treatments



Figure 4: Examples of herbivory observed

Literature Cited

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