Increasing Grub Density of Asiatic Garden Beetle, *Maladera castanea,* Negatively Impacts Plant Growth

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Background

- The Asiatic garden beetle (AGB) is an invasive annual white grub that has spread to at least 25 states and 2 Canadian provinces[1]
- AGB has recently emerged as a pest of field crops, especially corn grown in sandy soil of northern Ohio, northern Indiana, and southern Michigan[2, 3, 4]
- Damage from grub root feeding includes:

Discoloration

Stunting

Stand Loss >40%

Objective Determine the effect of grub density on corn growth under greenhouse and field microplot conditions

Hypothesis: Increasing grub density will negatively impact plant growth

Methods

- Third instar grubs collected from fields in Fulton Co., OH in May, 2021
- Individual untreated corn seeds planted in 1 gallon nursery pots in a greenhouse and 12”x12” PVC microplots in the field on May 30th
- Treatments: 0, 1, 2, or 3 active grubs placed on soil
- 40 replicates in the greenhouse, 30 in the field microplots
- Recorded plant height, growth stage, and discoloration every 3-4 days for 37 days
- Plant height measured from the soil line to the arch of the tallest leaf with tip pointing downward
- Only plant height data once grubs had pupated (29 days after plant) is shown

Greenhouse nursery pot

Field microplot

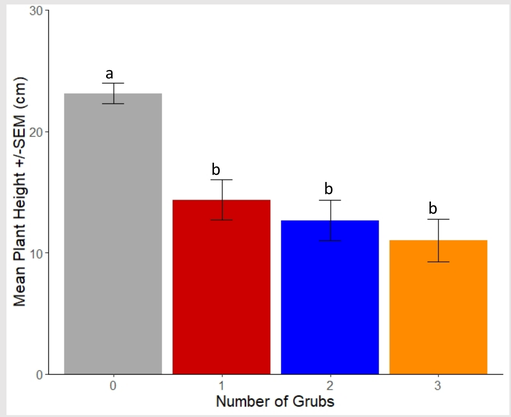
Plant height measurement

Results

- Kruskal-Wallis one way analysis of variance
- Pairwise Wilcoxon rank sum test to determine difference between treatments
- Across both experiments, 30% of plants died in the presence of 3 grubs, vs. only 4.3% plant death when grubs were absent

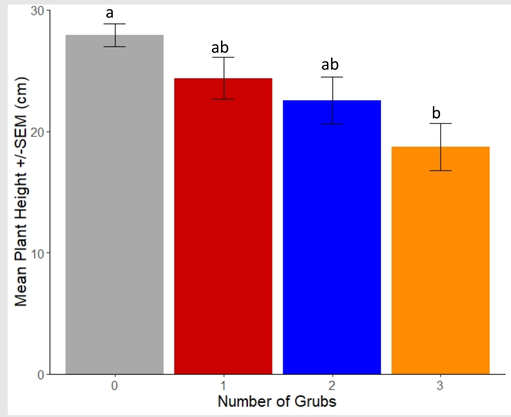
29 Days After plant

Greenhouse



1 grub significantly reduced plant height in the greenhouse (p=<.0001)

Microplots



3 grubs significantly reduced plant height in field microplots (p=.004)

Conclusions

- Plant growth was negatively impacted by increasing grub density in both the greenhouse and field microplot trials
- Corn plants showed low tolerance for grubs: even 1 grub significantly reduced plant height in greenhouse-grown plants
- This work suggest that action thresholds, when determined, may be relatively low

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