Patience, Young Grasshopper:
Analyzing the fungal composition of the grasshopper gut microbiome

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Introduction

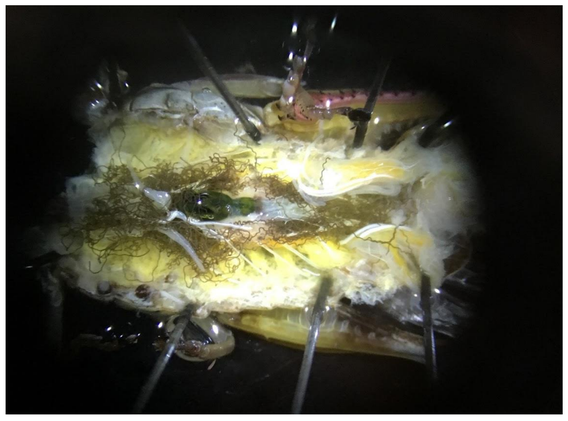
- Microbes are found all around us.
- Intestinal microbes, or gut microbiome, play an important role in overall animal health.
- The fungal communities within the gut microbiome of insects are important in insect physiology and thus, insect control.

Main Questions

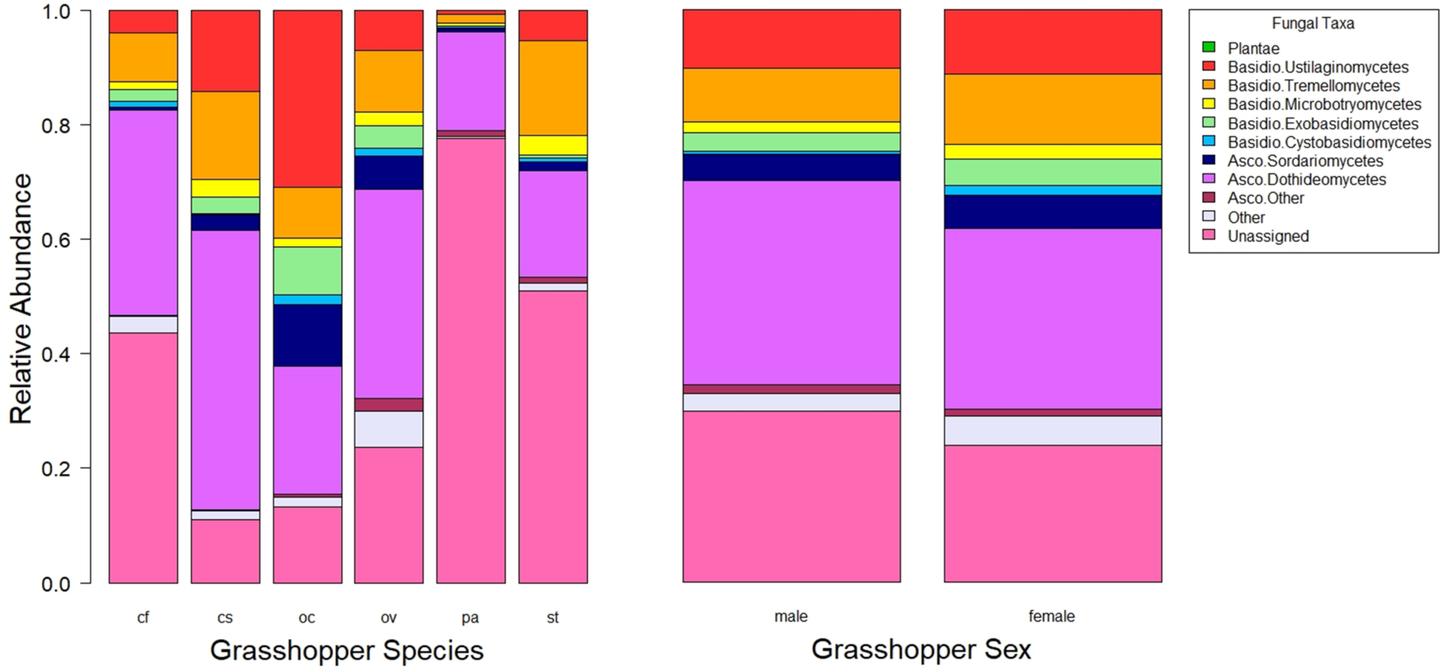
- What is the composition of the fungal communities in the microbiome of grasshoppers?
- What drives the composition of fungal communities within the microbiome of grasshoppers?
    - Species? Sex?
- Is there a “core” fungal microbiome in grasshoppers?

Methods

- The grasshoppers were collected in the summer of 2017 from a Texas prairie (multifactorial micronutrient experiment in which plots of the prairie were treated with various micronutrients)
- After collection and dissection, DNA was extracted from the grasshopper gut and submitted for sequencing by Zymo Research.
- Subsequently, the fungal and bacterial groups present in the sample were identified and analyzed using R programming.



Results



Summary

- No significant difference between males and females; The grasshopper species, *P. atlantica,* varied from the other grasshopper species
- The fungal phyla Ascomycota and Basidiomycota were most prevalent, while other phyla were scarcely found within the samples.
- Within Ascomycota → class Dothideomycetes most prevalent
- Within Basidiomycota → classes Tremellomycetes and Ustilaginomycetes most prevalent
    - Classes are directly associated with plant matter → food sources, presence in soil

Conclusions

- There exists a “core” fungal microbiome in grasshoppers.
- Diet and phylogeny are potential drivers of the fungal composition within the grasshopper gut microbiome.

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