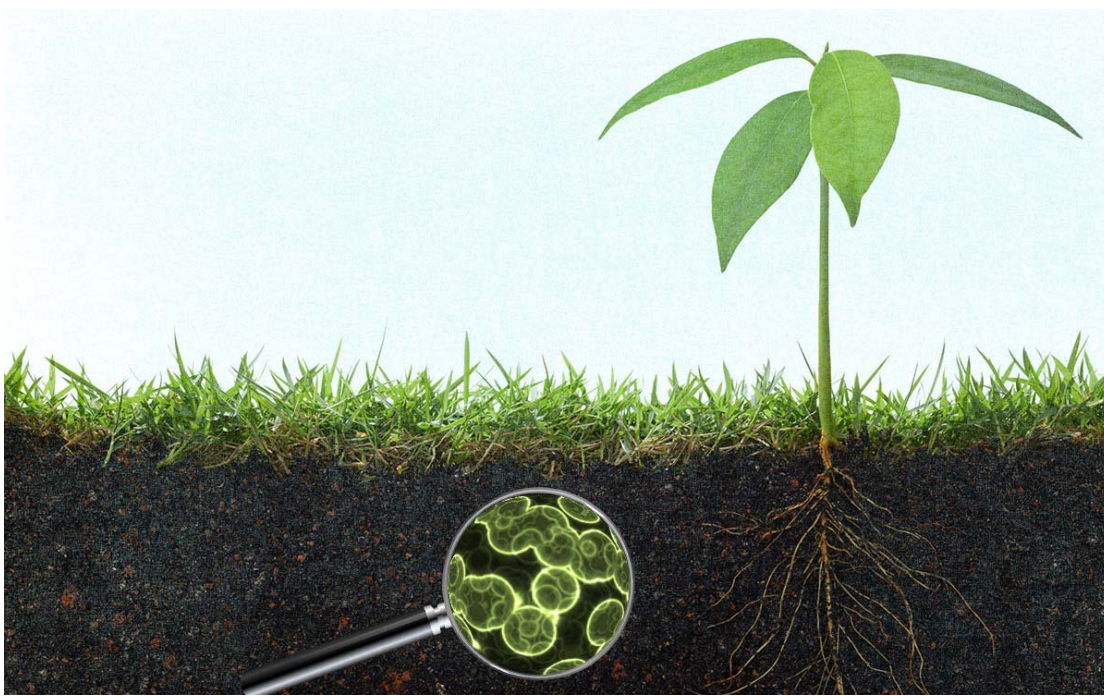


Associations between an invasive plant (*Taeniatherum caput-medusae*, Medusahead) and soil microbial communities

Elise S. Gornish¹, Noah Fierer², Albert Barberán¹

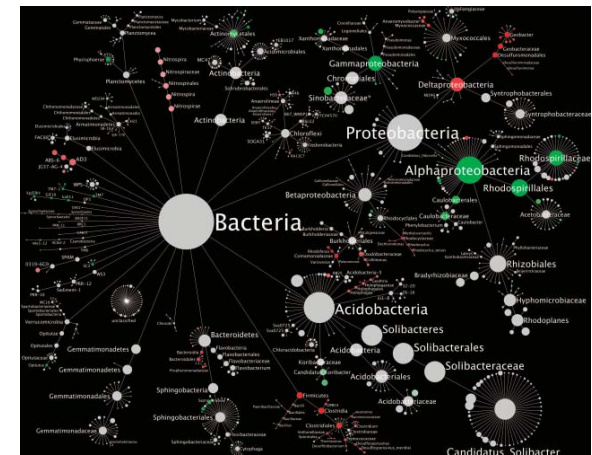
¹University of California, Davis; ²University of Colorado, Boulder

The soil microbiome



The fungal and bacterial communities that exist in the soil

Its BIG – near the root zone, 1 gram of soil has up to 10 billion microbes and 30k different microbe species



Hartmann et al. 2013 ISME

The soil microbiome affects *just about everything*

Stress tolerance in plants



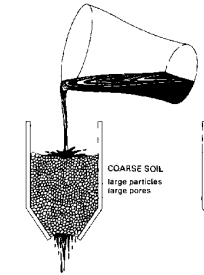
Foraging behavior



Restoration success



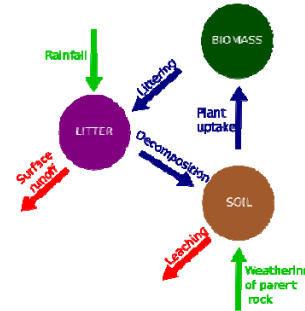
Water infiltration



Root growth



Nutrient cycling



Crop production



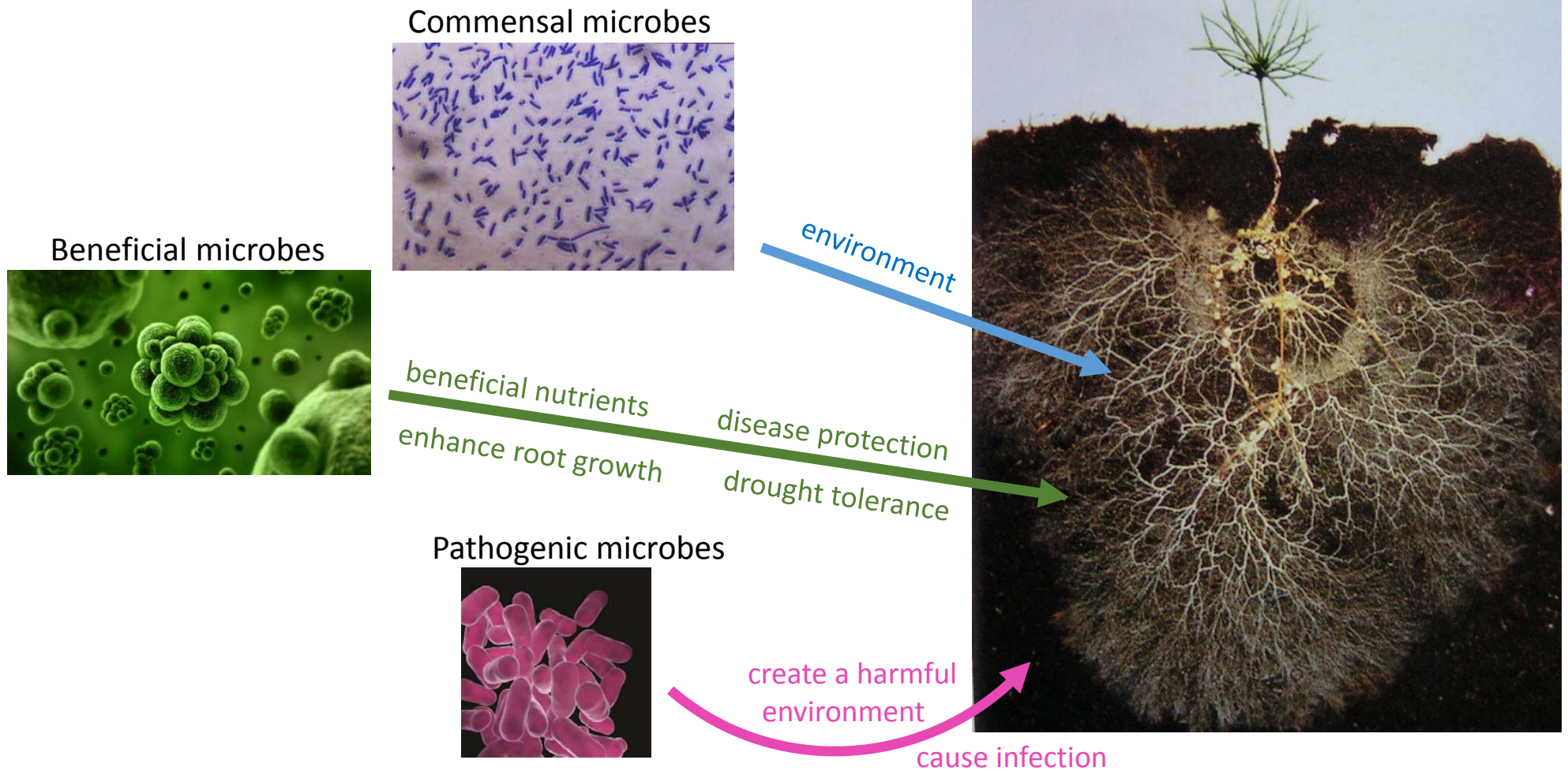
Litter decomposition



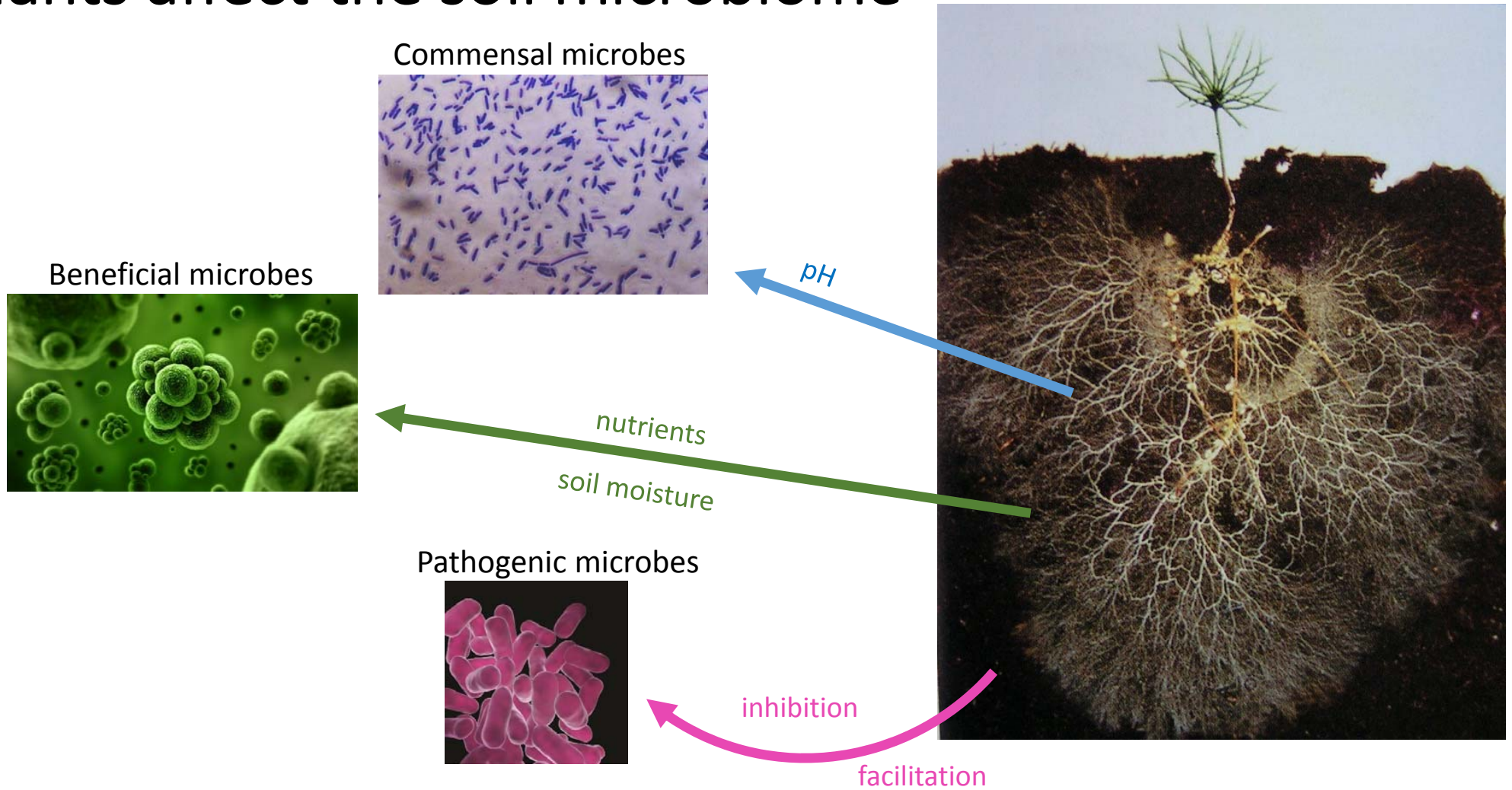
Insect invasion



The soil microbiome affects plants

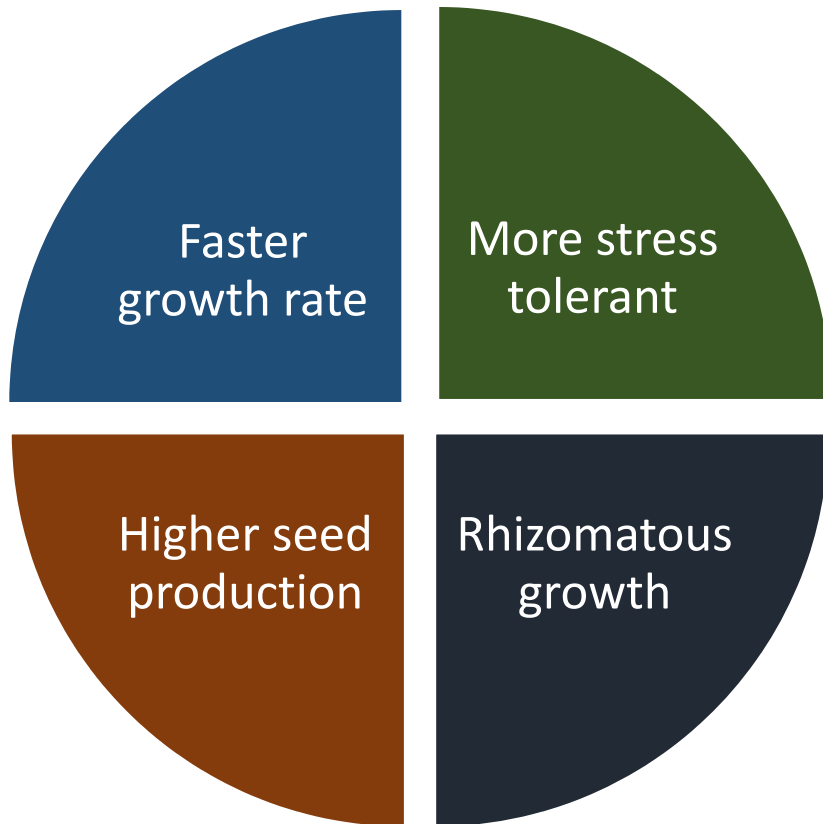


Plants affect the soil microbiome



Why do plants become invasive?

Plant-based factors



Environmental-based factors



Why do plants become invasive?

Plant-based factors

Faster growth rate

More stress tolerance

Higher seed production

Rhizome growth

Environmental-based factors

Less stress

Change in resources

Disturbance

Lack of predators

Soil microbiome



Invasive plants and the soil microbiome



Parepa et al. 2013 *Ecosphere*

Invasive plants and the soil microbiome



The soil microbiome and medusahead



Important for

Predicting invasion

Identifying management priorities

Develop management strategies

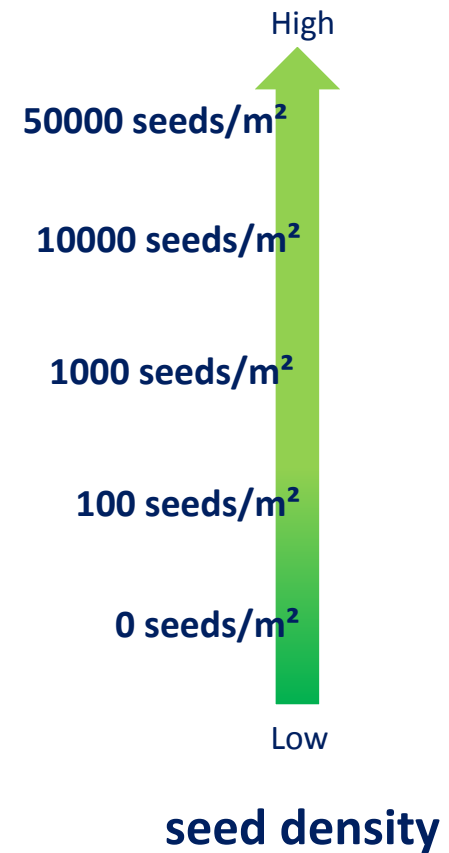
Our experiment

1. Does medusahead modify the soil microbiome?



Our experiment

1. Does medusahead modify the soil microbiome?
2. Does invasion intensity affect the relationship between medusahead and the soil microbiome?

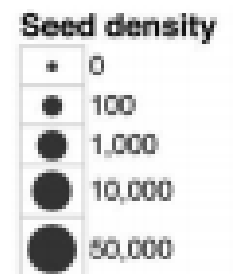


Our experiment

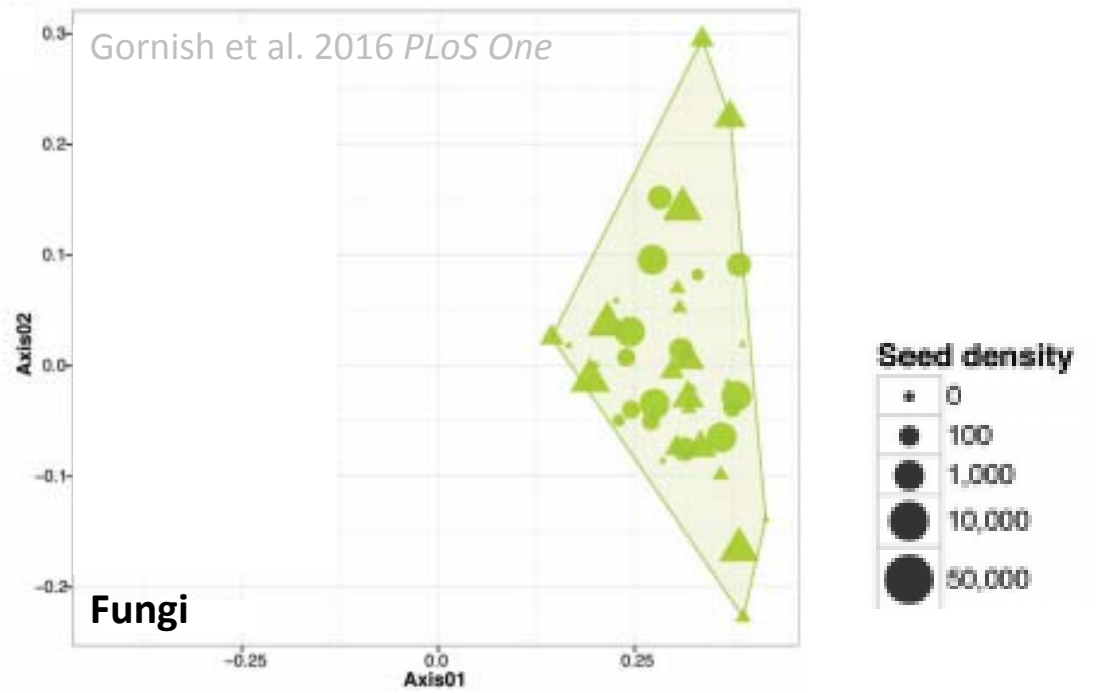
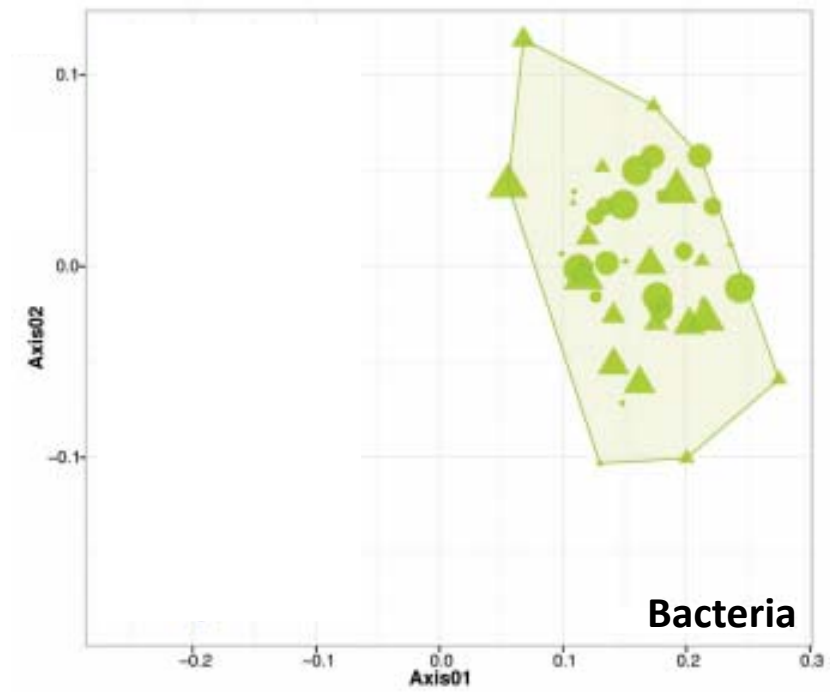
1. Does medusahead modify the soil microbiome?
2. Does invasion intensity affect the relationship between medusahead and the soil microbiome?
3. How do soil microbial communities differ in areas where medusahead is successful vs. areas where medusahead is unsuccessful?



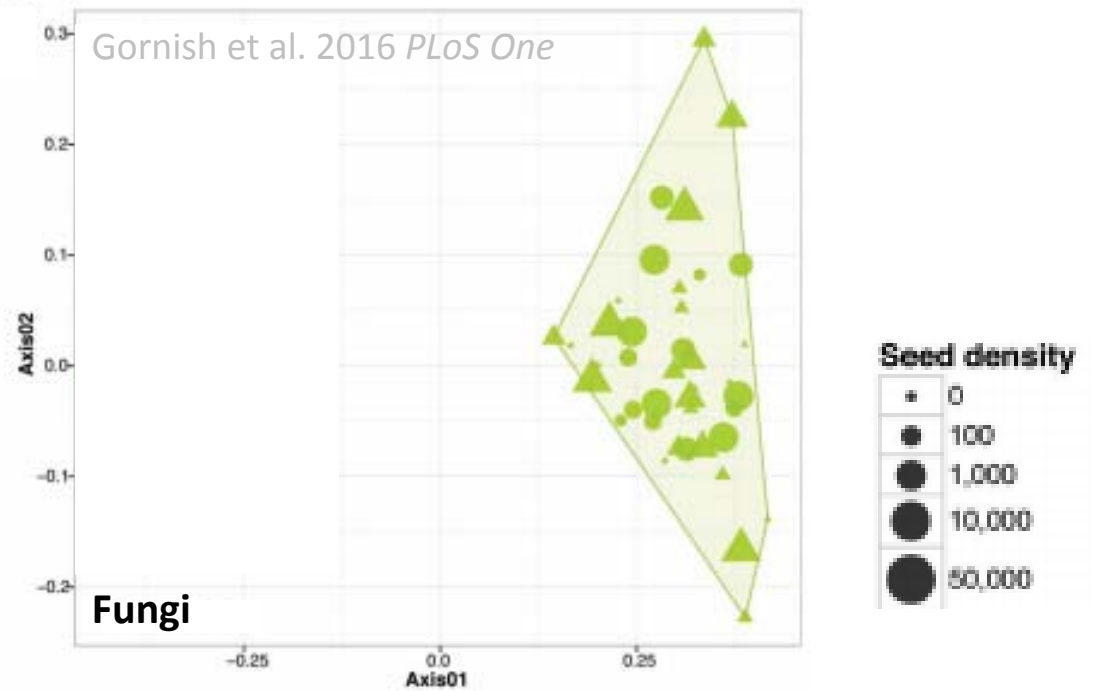
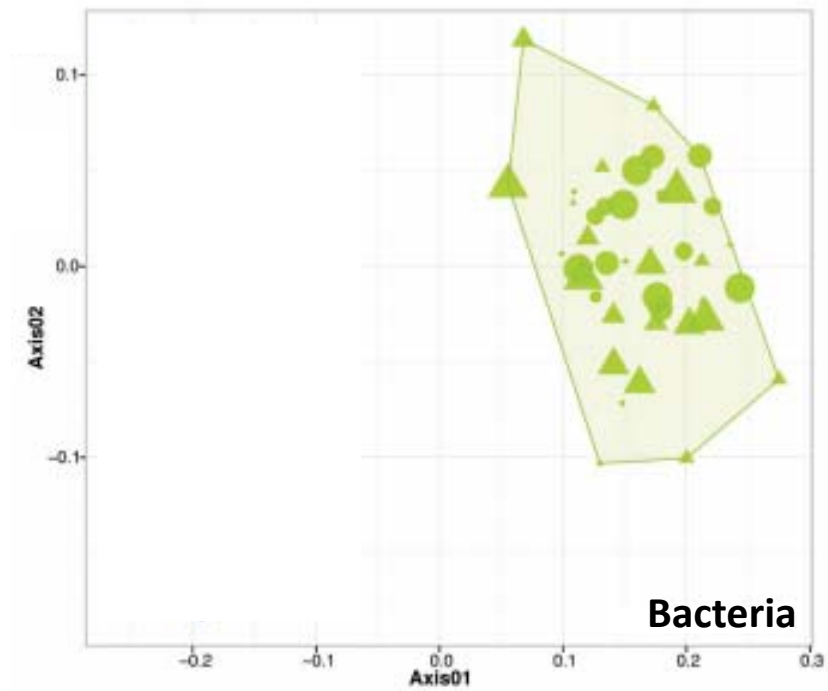
Results



Results

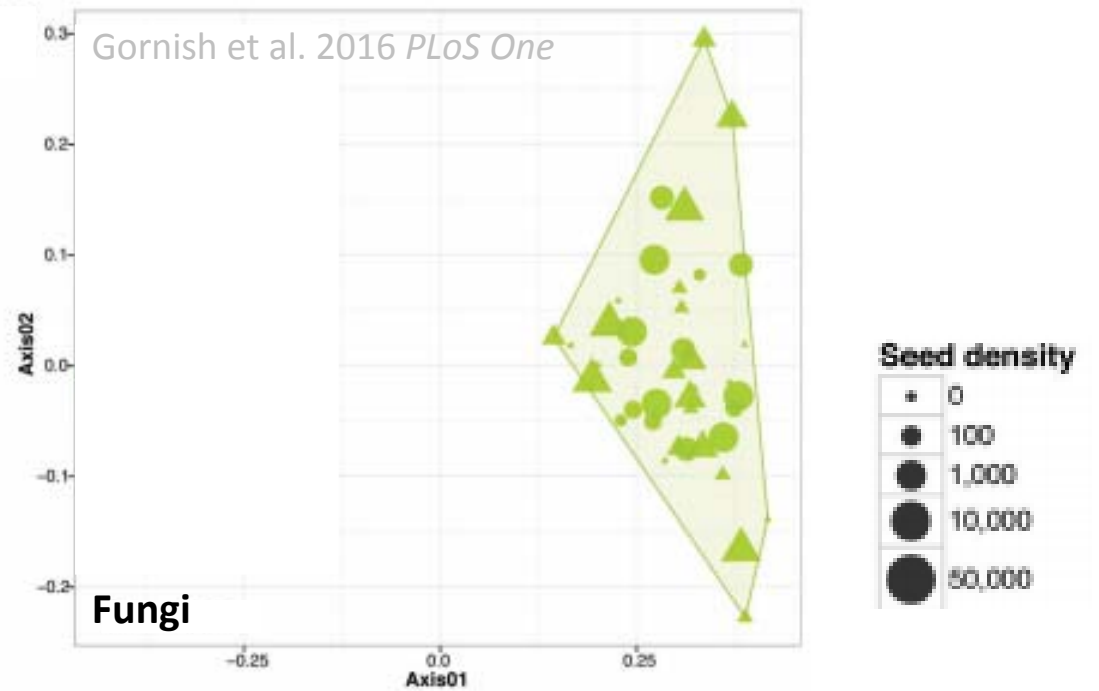
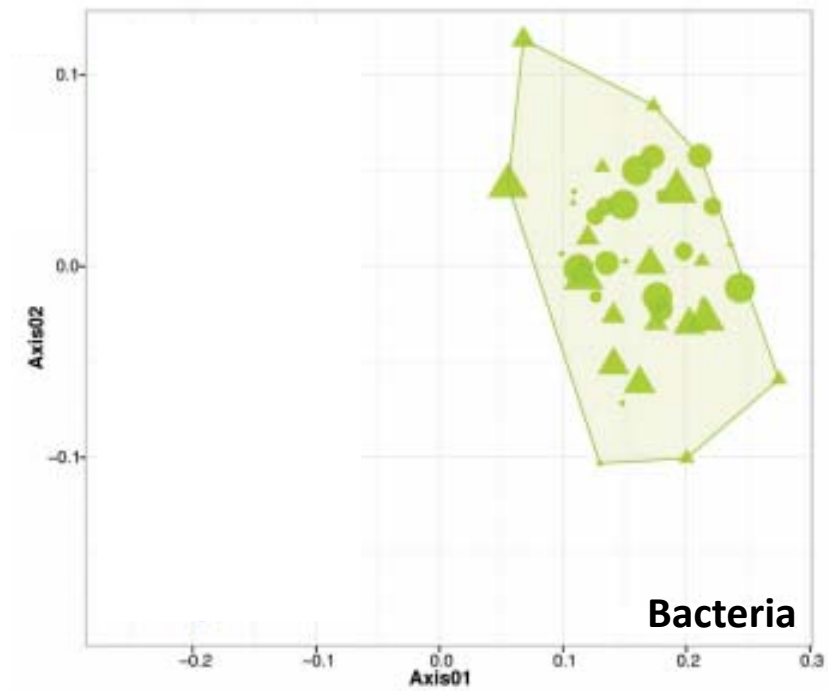


Results



Does medusahead modify the soil microbiome?

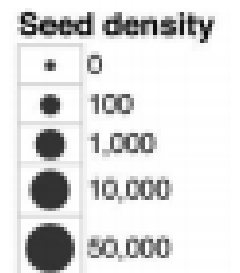
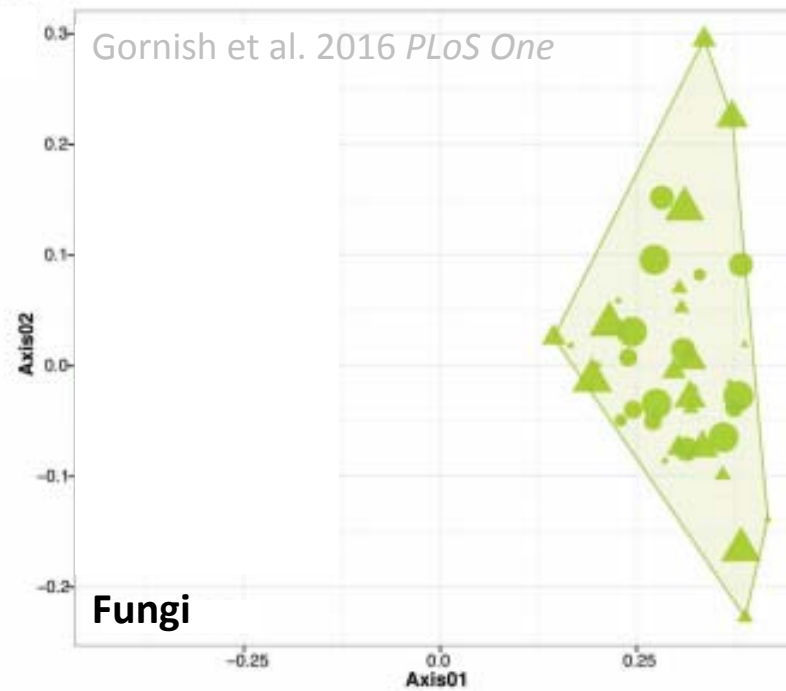
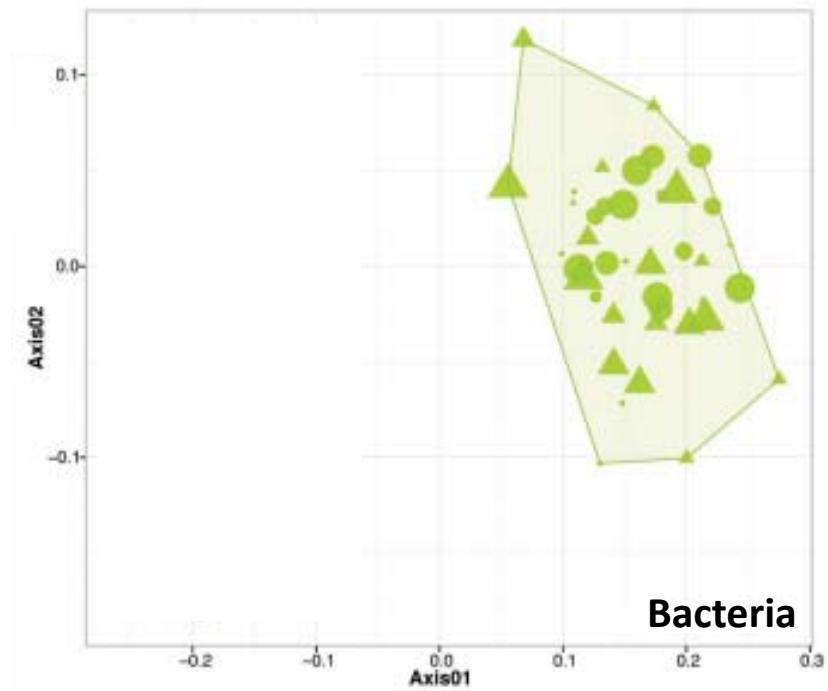
Results



Does medusahead modify the soil microbiome?

NO

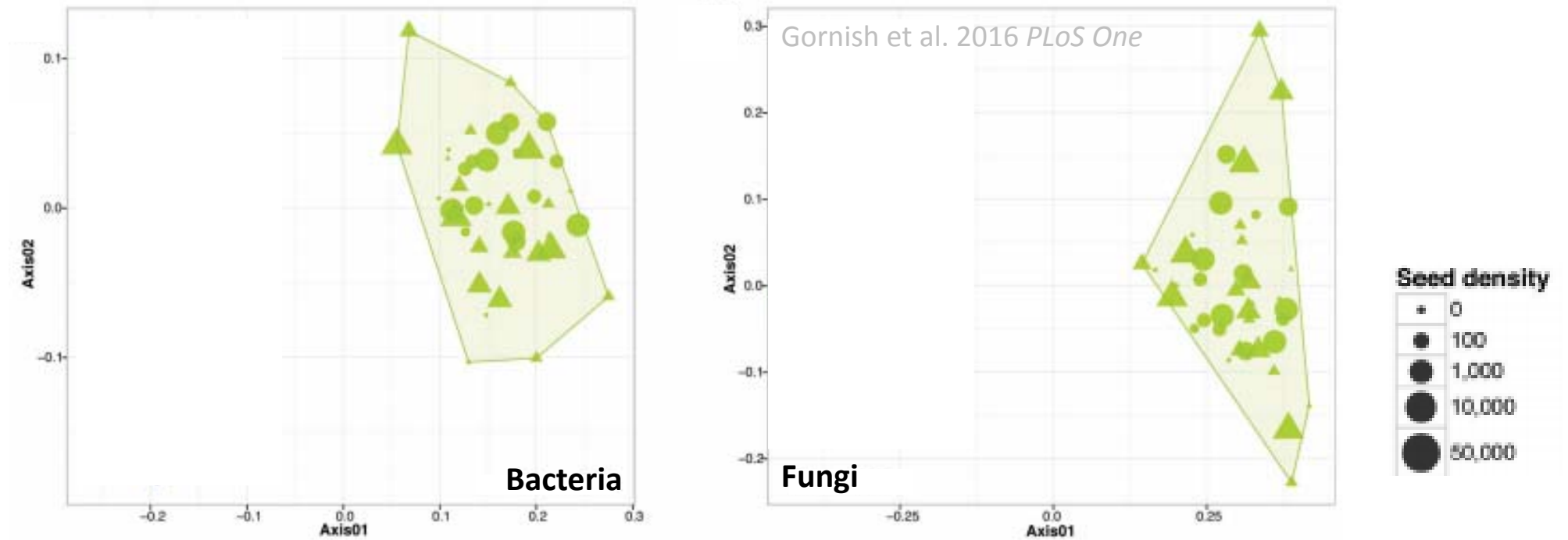
Results



Does medusahead modify the soil microbiome?

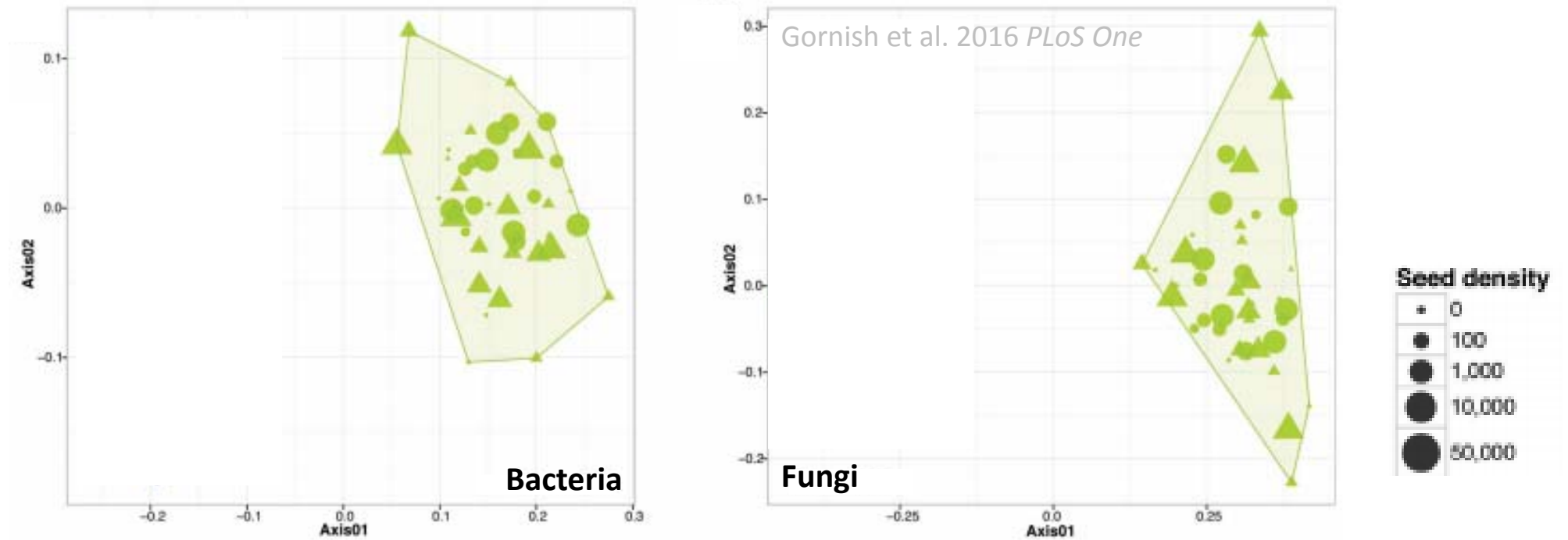
NOT COMMUNITIES

Results



Does invasion intensity affect the relationship between medusahead and the soil microbiome?

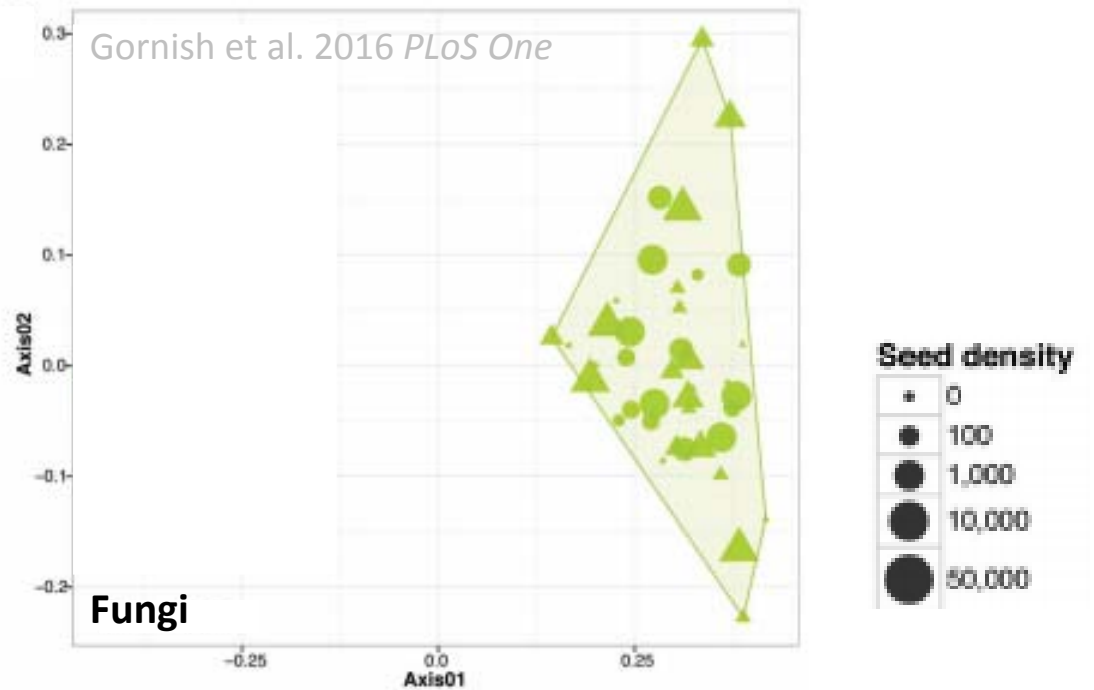
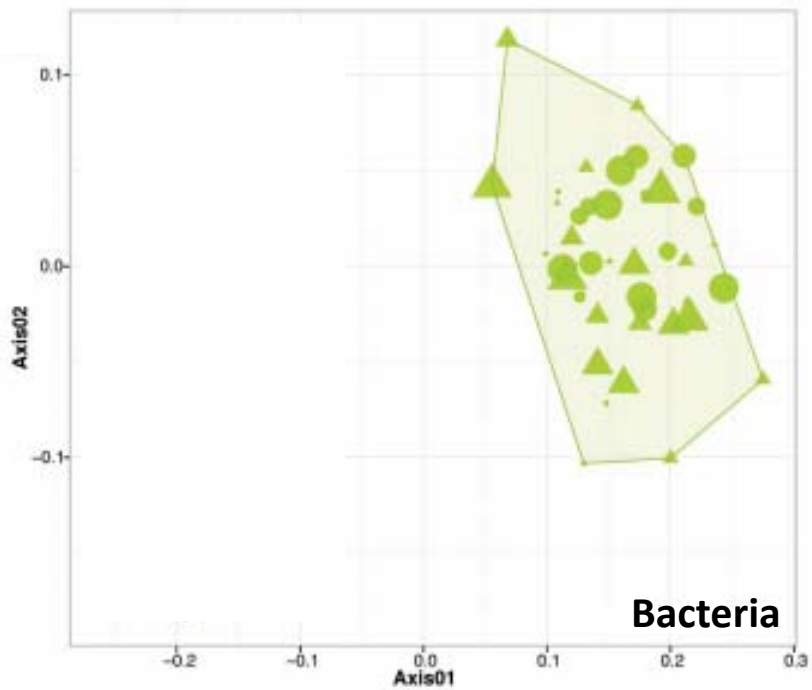
Results



Does invasion intensity affect the relationship between medusahead and the soil microbiome?

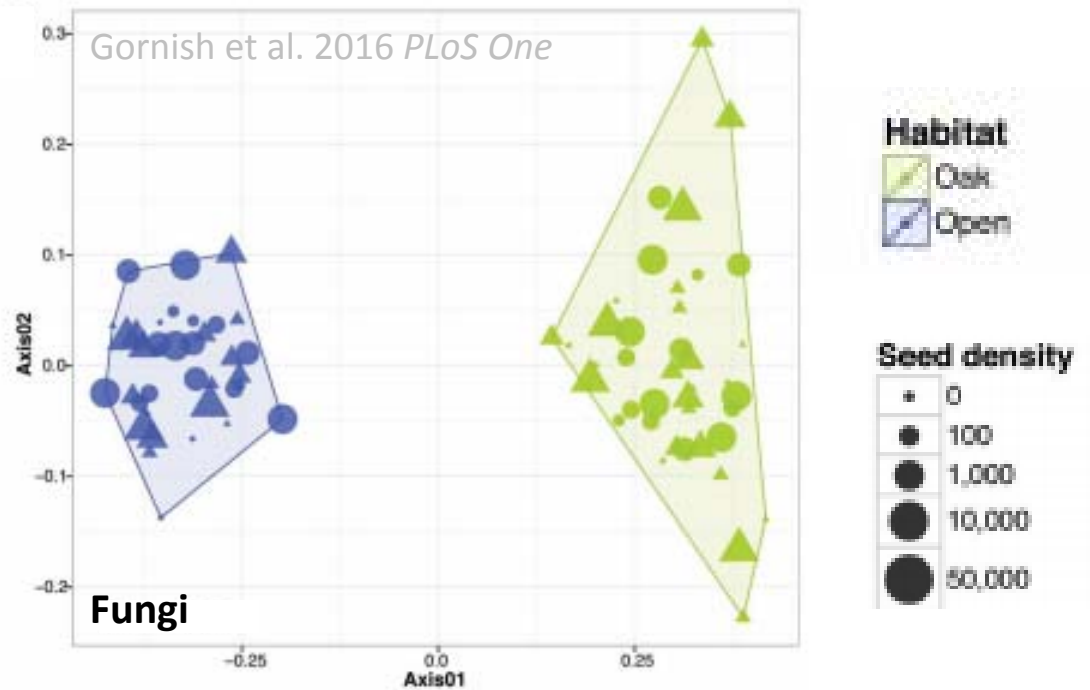
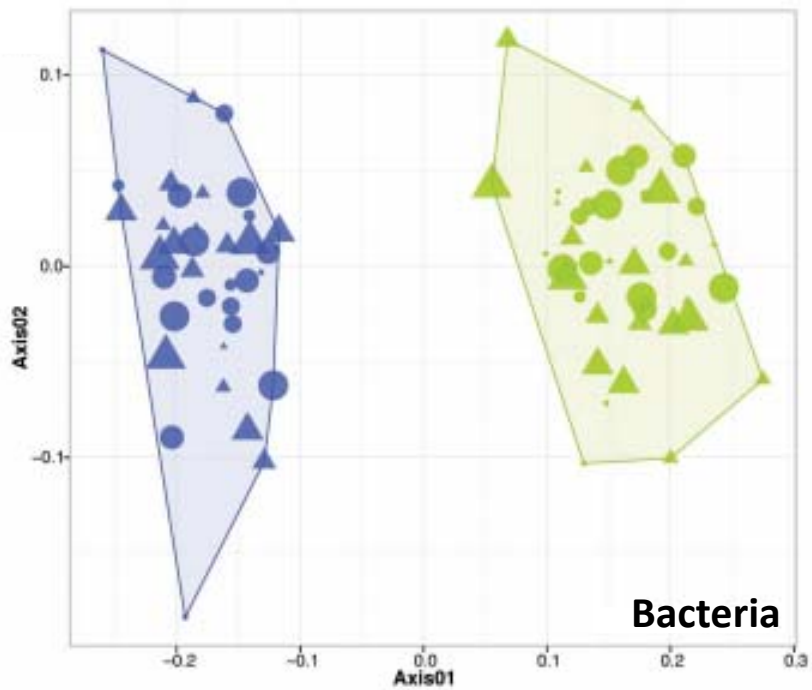
NO

Results



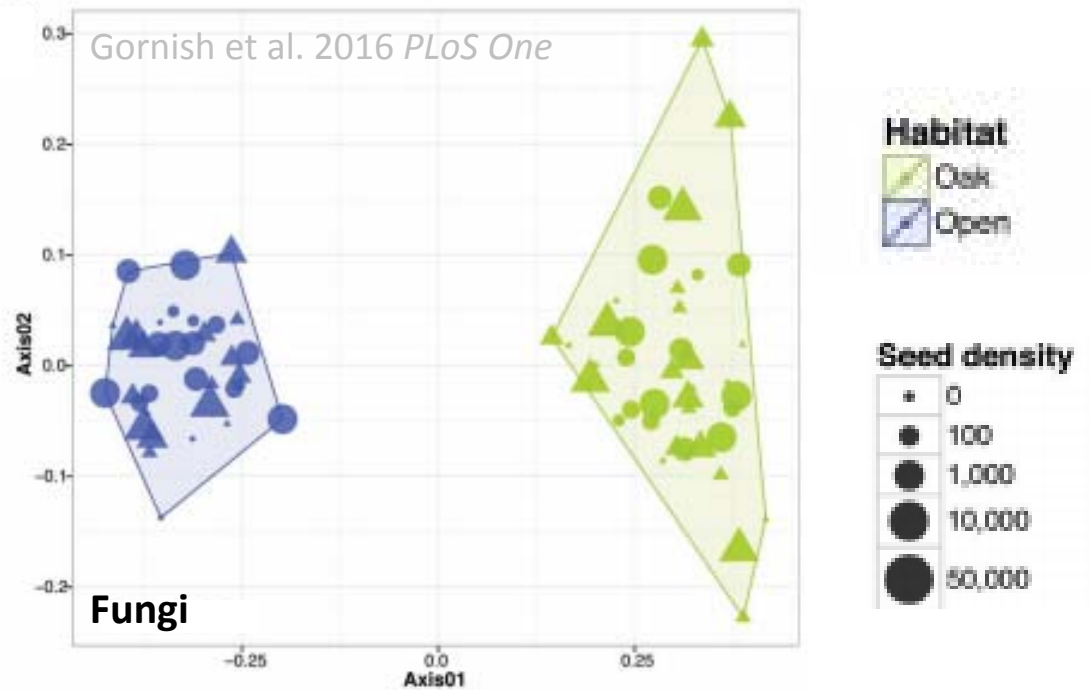
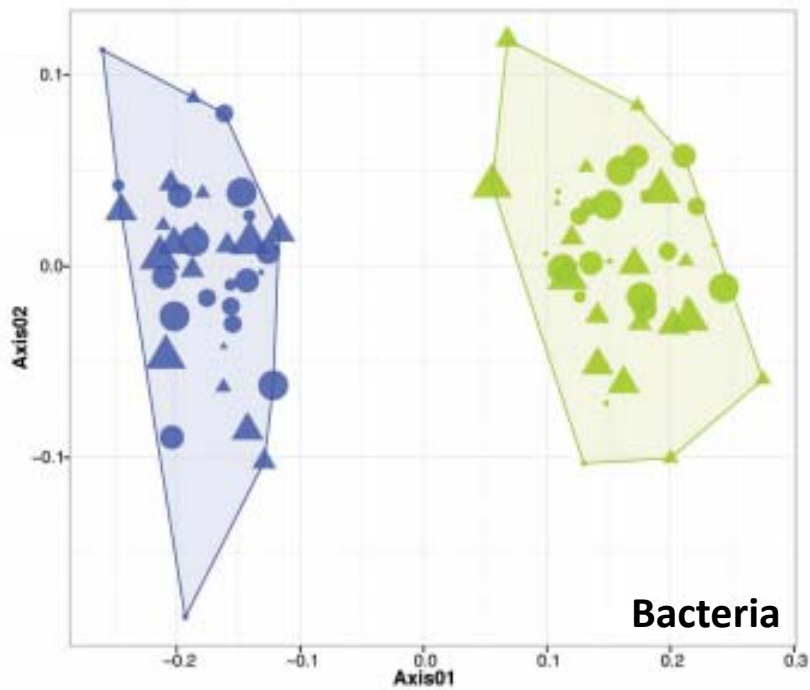
How do soil microbial communities differ in areas where medusahead is successful vs. areas where medusahead is unsuccessful?

Results



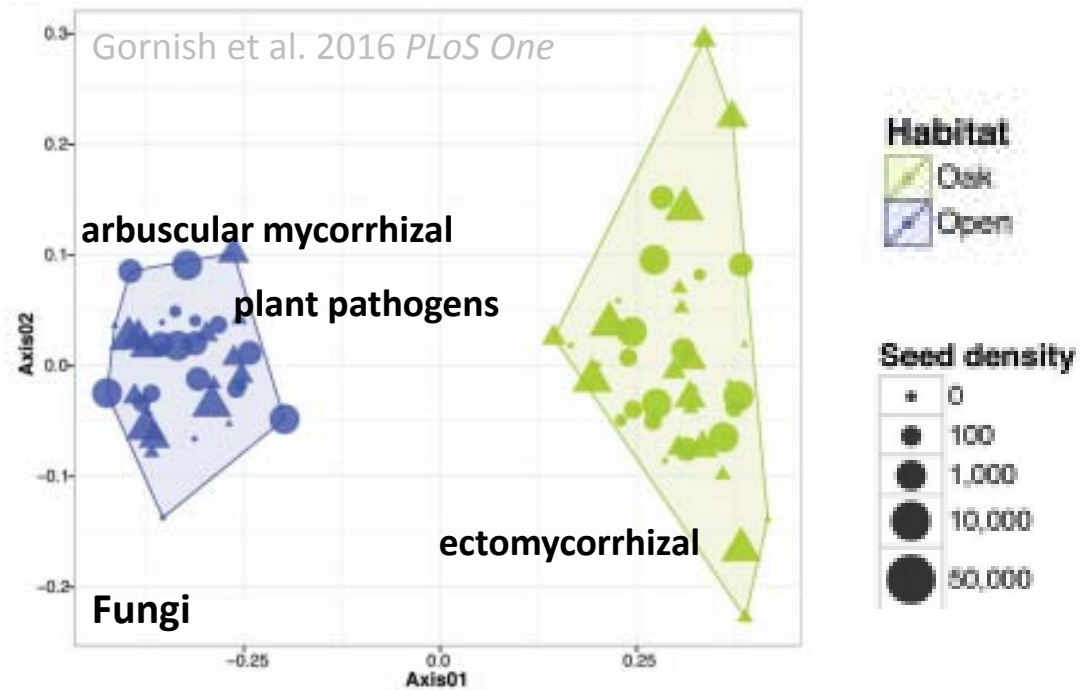
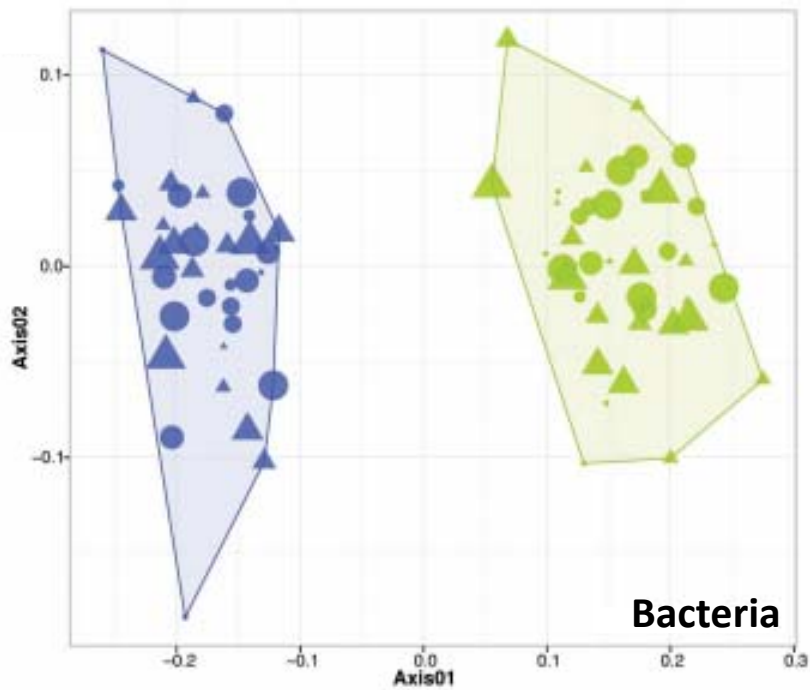
How do soil microbial communities differ in areas where medusahead is successful vs. areas where medusahead is unsuccessful?

Results



How do soil microbial communities differ in areas where medusahead is successful vs. areas where medusahead is unsuccessful?
THEY ARE COMPLETELY DIFFERENT

Results



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What does it all mean?

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In terms of soil-plant relationships, medusahead infestations of different intensities do not require different control approaches

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In terms of soil-plant relationships, medusahead infestations of different intensities do not require different control approaches

Medusahead might be excluded from oak habitat because of soil characteristics



THANK YOU!

Funding

University of California, Davis

University of California Division of Agriculture and Natural Resources

Acknowledgments

Xavier Rojas for lab help

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