

Understanding the impact of pea (*Pisum aestivum*) and canola (*Brassica napus*) intercropping on bacterial diversity



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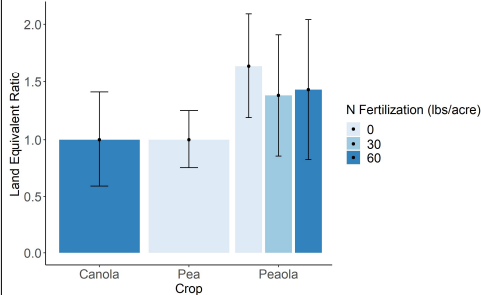
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PLANT-PLANT INTERACTIONS AND THE MICROBIOME

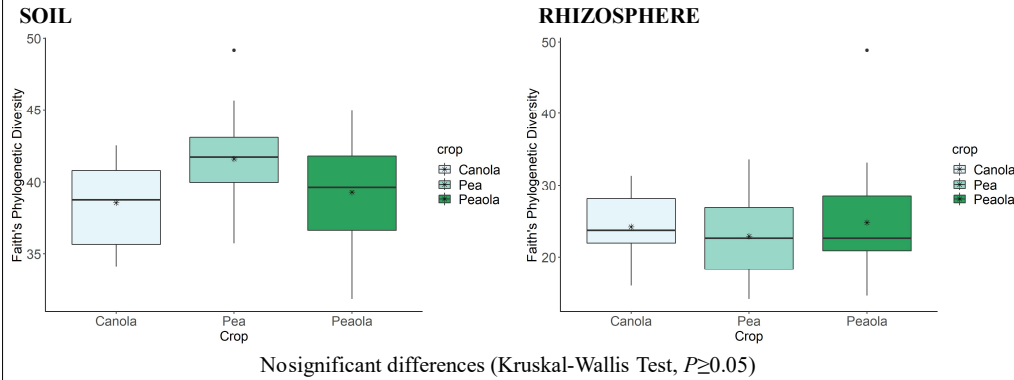
Runoff from N fertilizers have harmful environmental impacts¹

- Groundwater pollution
- Acidification of aquatic ecosystems
- Eutrophication of aquatic ecosystems

Pea-canola intercropping (peaola) causes a 65% increase in land productivity without N fertilizer inputs²



INTERCROPPING DOES NOT IMPACT ALPHA DIVERSITY



CONCLUSIONS

Only weak changes to the diversity of the microbiome were observed

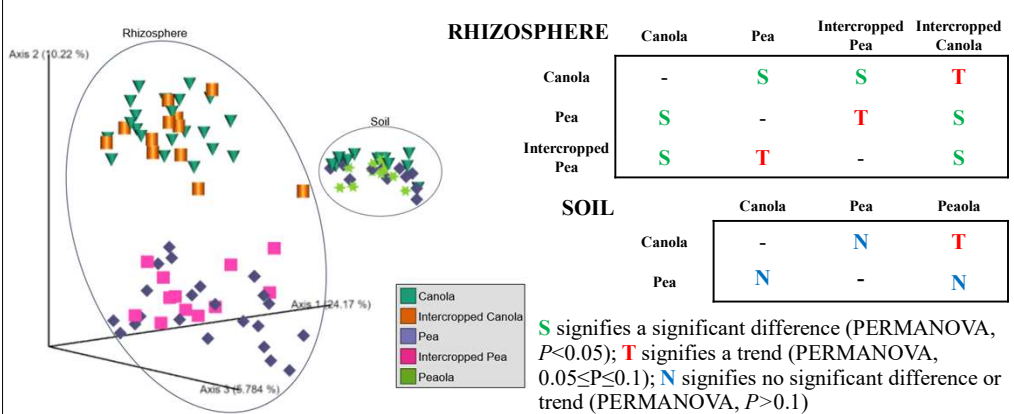
Peaola has a unique core microbiome from pea and canola, while also showing a combining of the two

- Indicates that a different below-ground environment is created having the potential to improve nutrient availability and yield potential

Can be applied to the re-establishment of sensitive plants in degraded ecosystems

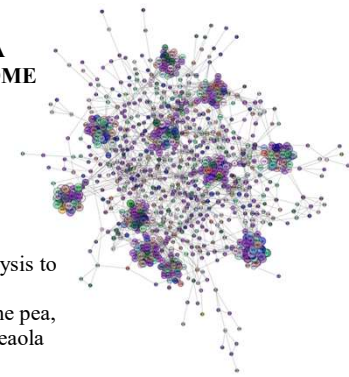
Decreased N inputs in agriculture due to improved microbiome functional diversity

INTERCROPPING HAS WEAK IMPACTS ON BETA DIVERSITY



ONGOING WORK

PEAOLA MICROBIOME



Network analysis to compare the structure of the pea, canola, and peaola microbiomes

QUESTIONS/HYPOTHESES

Does the peaola microbiome change from monoculture?

- The peaola microbiome will be more diverse than the monoculture microbiomes

Is there a difference in the makeup of the core microbiome between cropping systems?

- The peaola core microbiome will be unique from the monoculture microbiomes

METHODS

SOIL RHIZOSPHERE

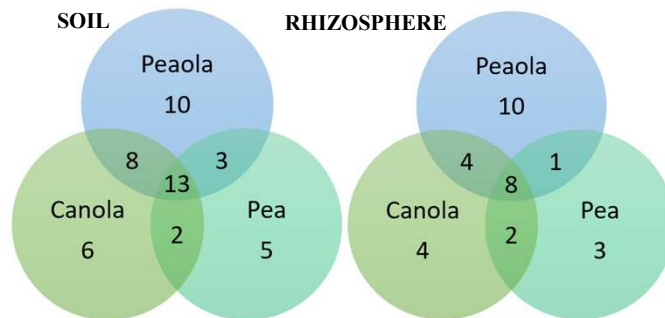


DNA extracted (QIAGEN® MagAttract® PowerSoil® DNA KF Kit)

Illumina amplicon sequencing 16S rDNA

Analysis of ASV's with QIIME2

INTERCROPPING PRODUCES A UNIQUE CORE MICROBIOME



Bacteria shared across all 3 microbiomes, but peaola has unique members

- Some unique members have N fixing potential in both the soil and rhizosphere

Suggests peaola is creating a unique soil environment

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- ²Madsen I., Ford J. Peaola yield and land equivalent ratio experiments. *2021 Dryland Field Day Abstracts*. 2021:66-67