



Exploring soil microbiota diversity to increase the sustainability of seed production in corn (*Zea mais* L.)

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Ph.D Workshop – 2021, December 17th

Objectives and roadmap



Test and define innovative agronomic techniques for seed crops production

Enhance seed production sustainability



Introduction

AMF experiments

Study of soil microbiota

Conclusions

Improve seed yield and quality



Focus on seed corn

Explore the interactions between plants and soil microbiota

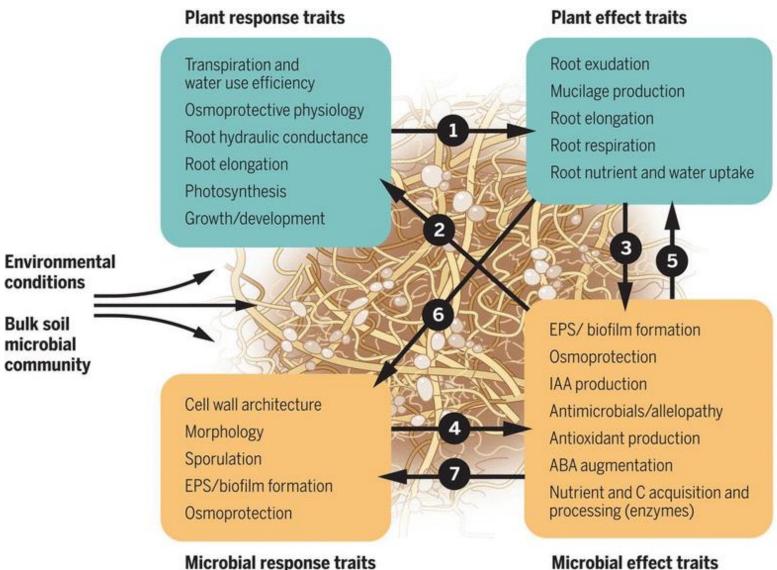
Test the efficacy of arbuscular mycorrhizal fungi (AMF) as root inoculants

Study soil and rhizosphere microbial biodiversity



The soil-plant-microbiota interactions





Introduction

AMF experiments

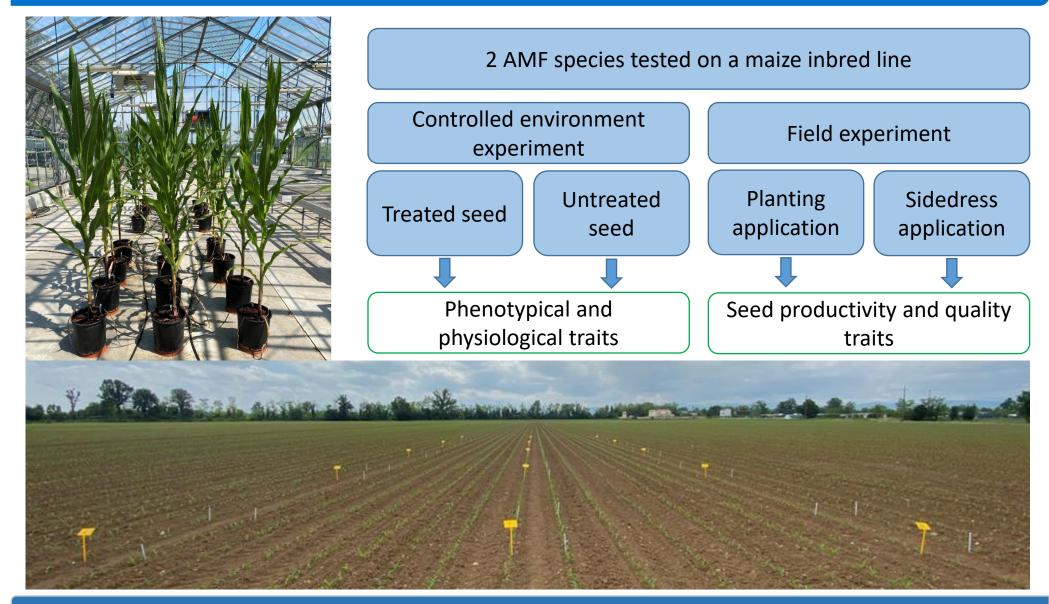
Study of soil microbiota

Conclusions

de Vries, Franciska T., et al. Science 368.6488 (2020): 270-274.

AMF experiments - Materials and methods





Introduction

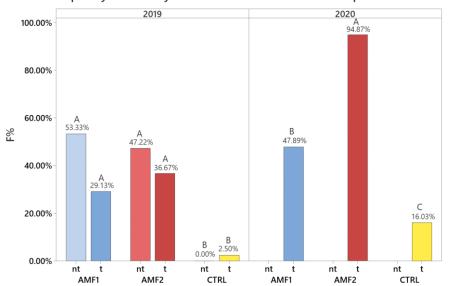
AMF experiments

Study of soil microbiota

AMF experiments – Controlled env. results

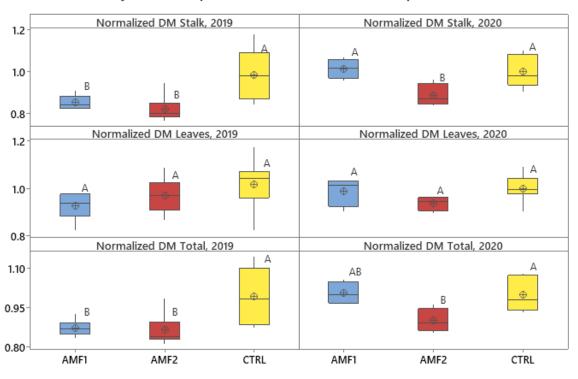








Dry matter repartition - Controlled env. experiment



Introduction

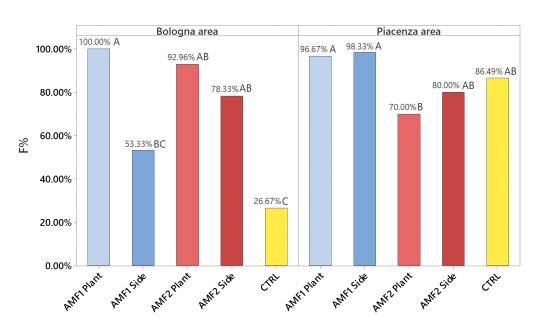
AMF experiments

Study of soil microbiota

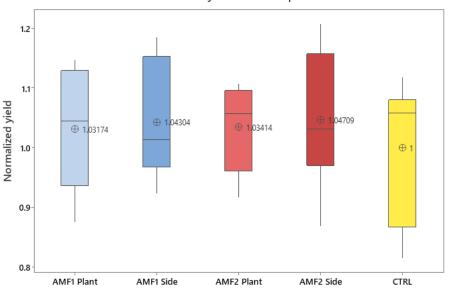
AMF experiments – Field results







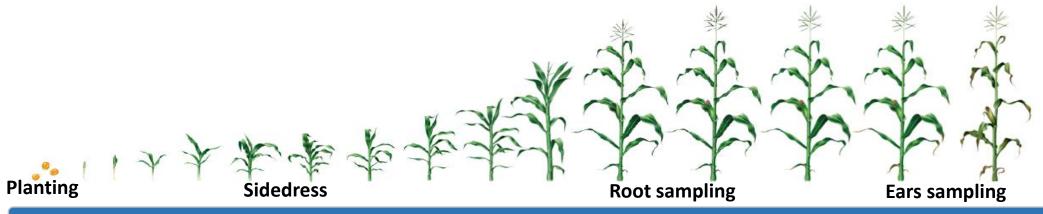
Normalized seed yield - Field experiment



Introduction

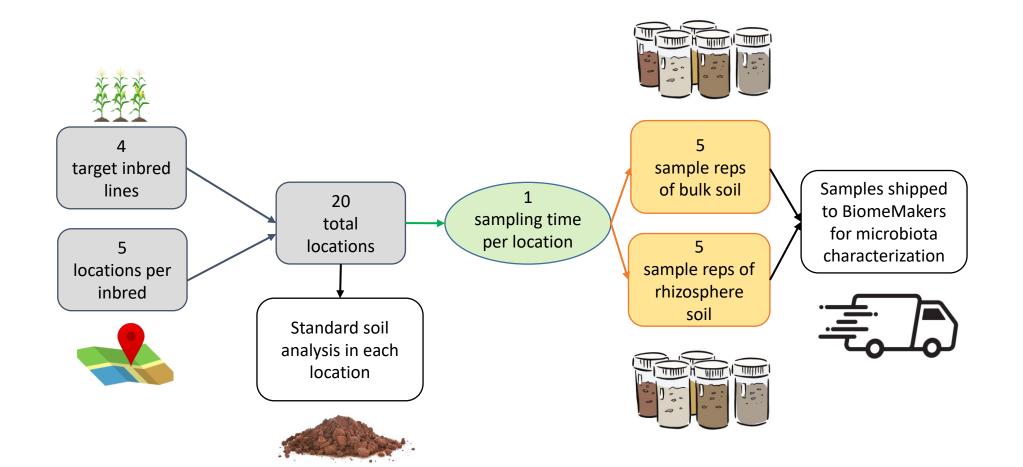
AMF experiments

Study of soil microbiota



Study of soil microbiota – Materials and methods





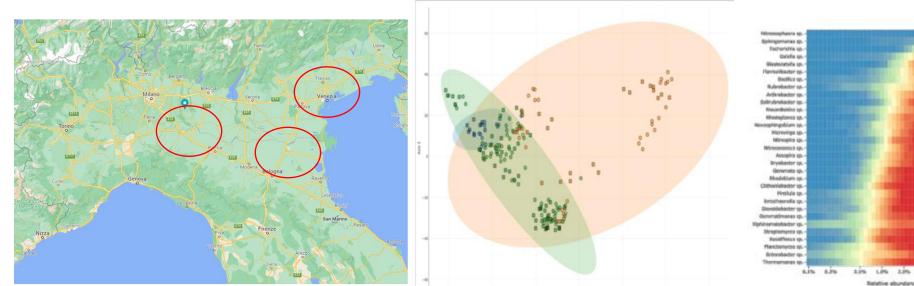
Introduction

AMF experiments

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Study of soil microbiota – Results





4.0	No.	0.3%	2,0%	1.0%	2.0%	5.8%	10.0%	20.0%	
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Directionwood sp									
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Storolivhacter sp									
Extetheurofia sp									
Prefute sp									
Chibonistocay sp.									
Bheloblari sp									
Generata sp									
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Aceopira sp									100
Milyeopouceus sp									
Nitrespira sp									
Hignwings sp									
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AMF

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experiments

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Model	Microbiome pcas	Other Var (PQ)	Seed	Accuracy
Model 1		Χ	X	0.739
Model 2	Χ			0.914
Model 2	Χ	Χ		0.903
Model 3	X	Х	X	0.980

The microbiome can capture yield variability

Conclusions



The tested AMF species demonstrated to be effective on creating endophytic symbiosis on corn roots

Seed fungicides aren't stopping the symbiosis



AMF activity in field conditions likely depends on local conditions

Promising yield improvements in field conditions: to be better investigated

Rhizosphere microbiota and its biodiversity are affected by production environment, management and crop

Rhizosphere microbiota can be an excellent predictor of yield potential



Introduction

AMF experiments

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Thank you for your attention!

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Conclusions

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