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

Improve seed yield and quality

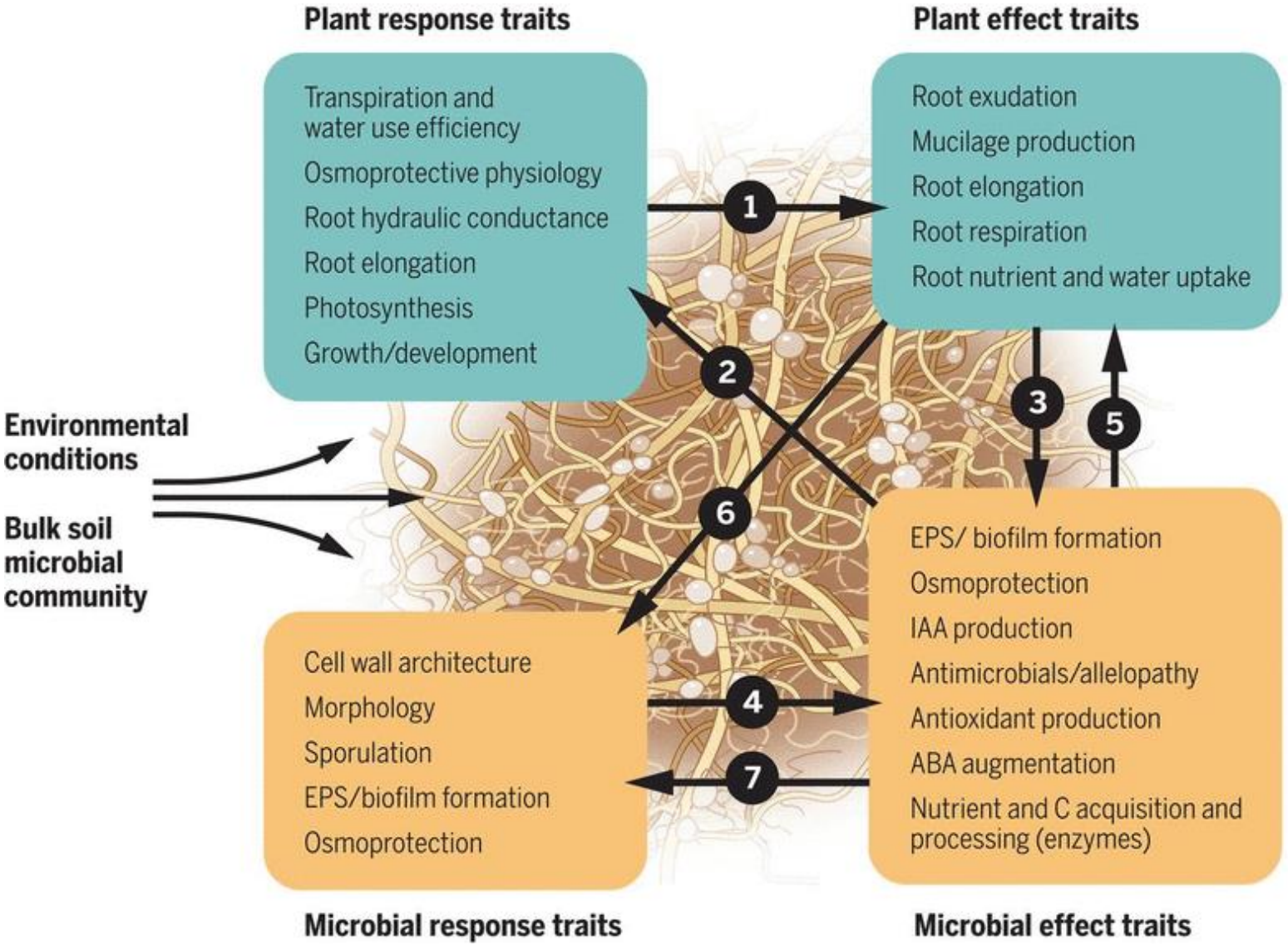
Focus on seed corn

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



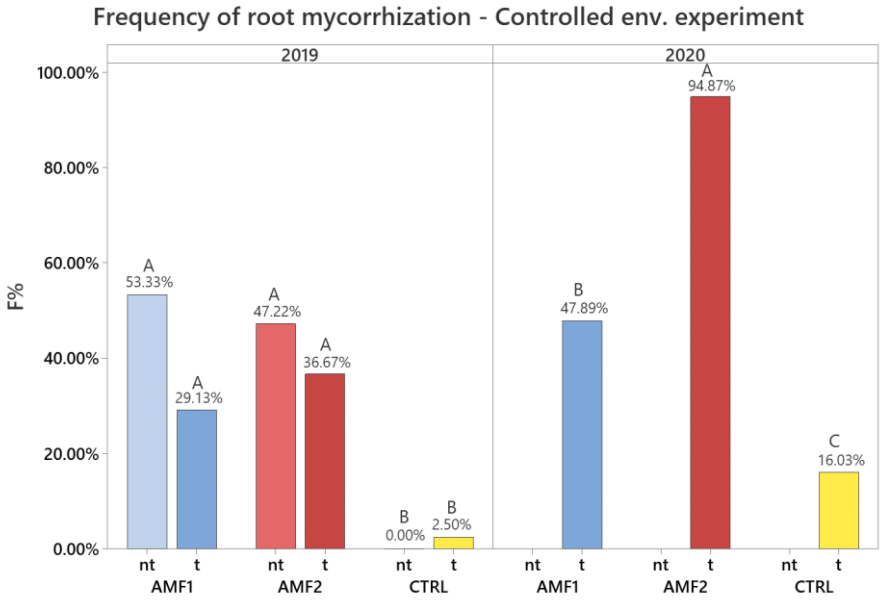
de Vries, Franciska T., et al. *Science* 368.6488 (2020): 270-274.

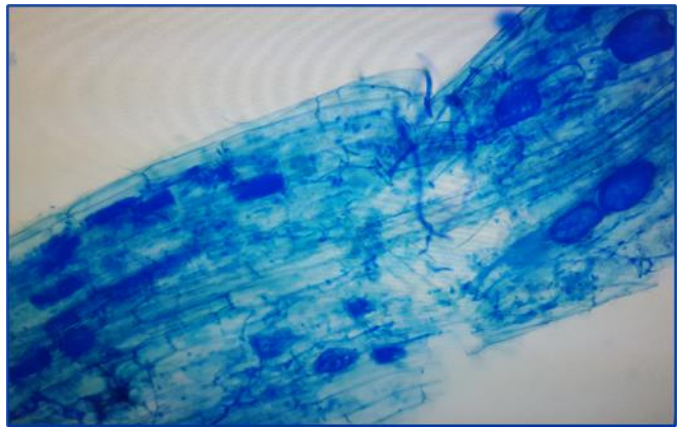
AMF experiments - Materials and methods

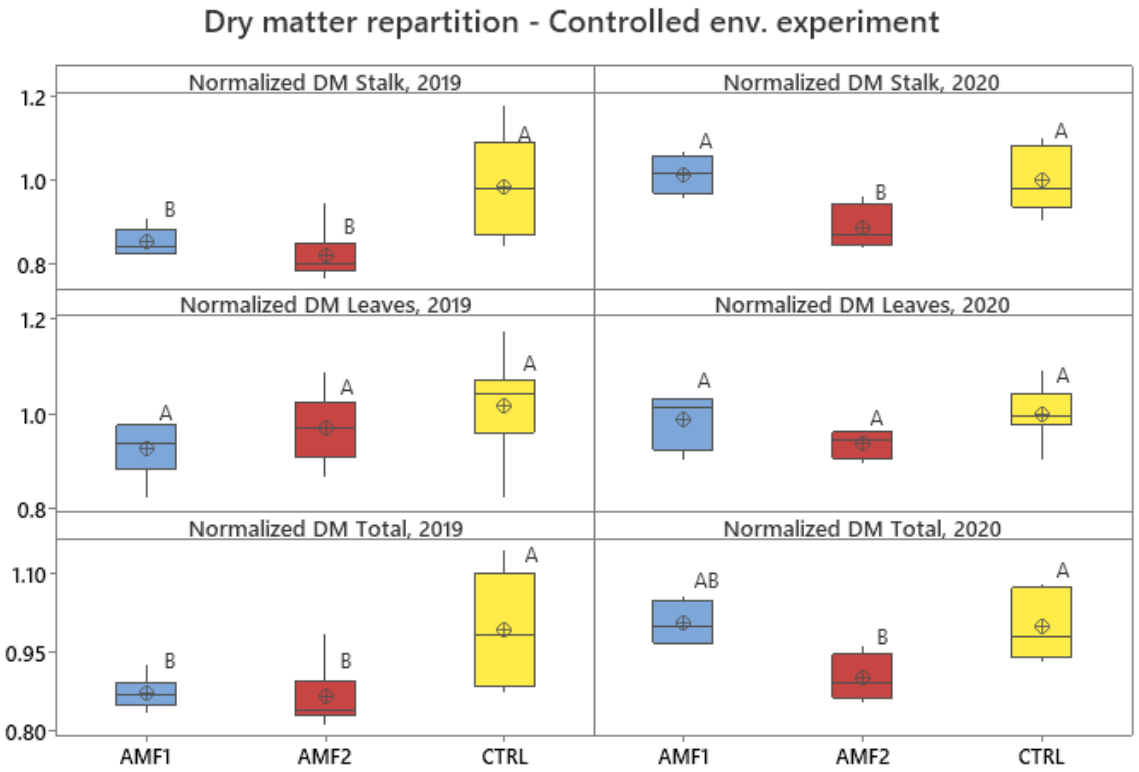
2 AMF species tested on a maize inbred line

Controlled environment experiment		Field experiment	
Treated seed	Untreated seed	Planting application	Sidedress application
Phenotypical and physiological traits		Seed productivity and quality traits	

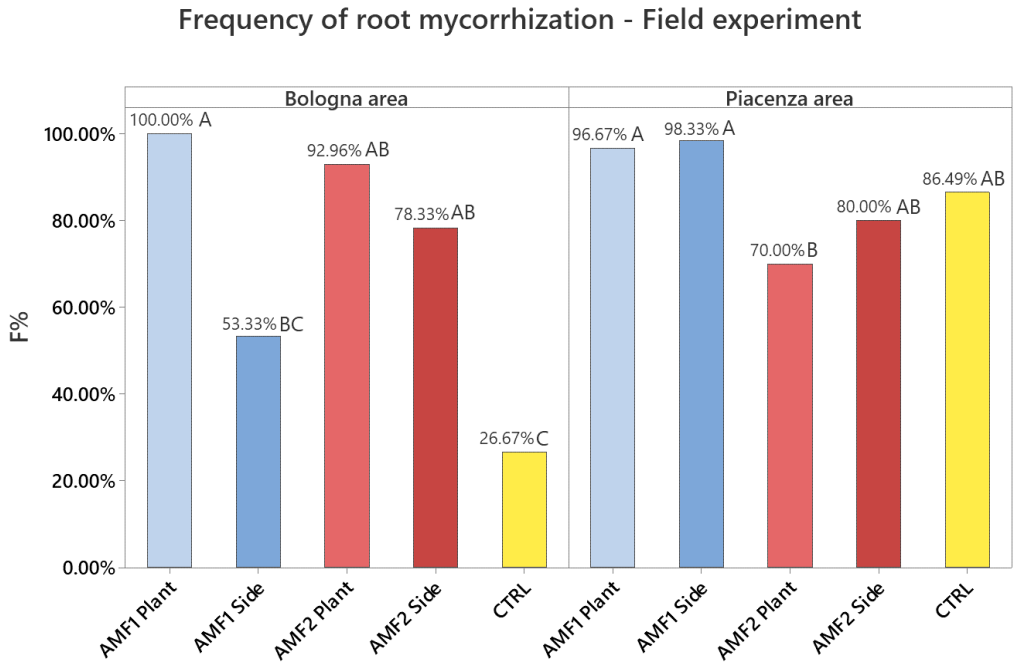
AMF experiments – Controlled env. results

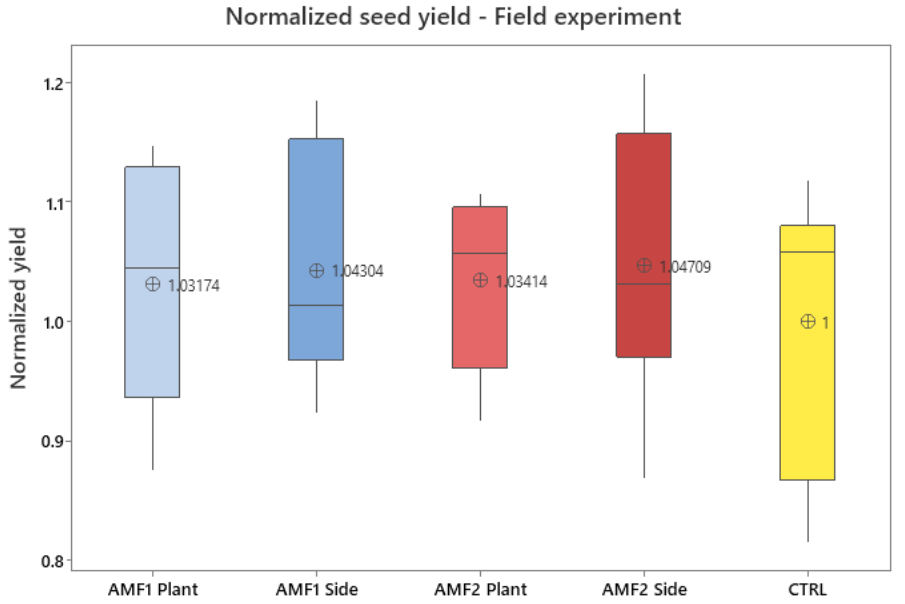


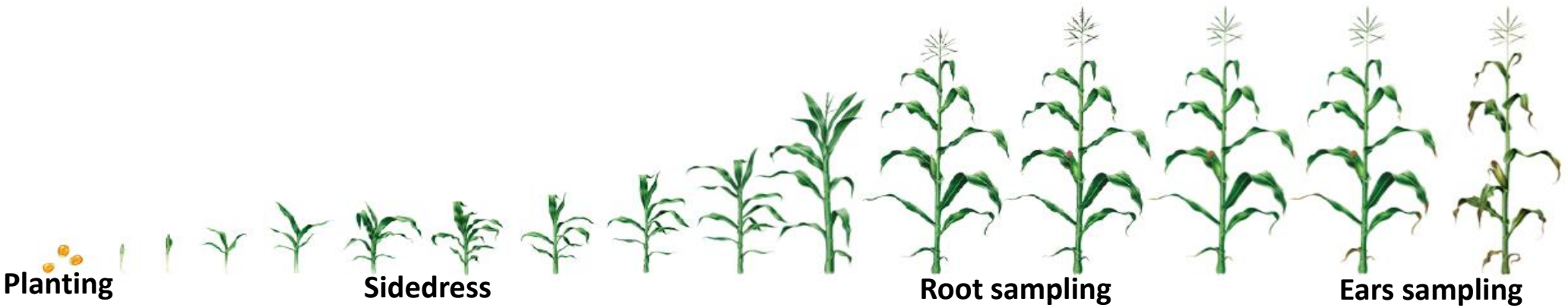




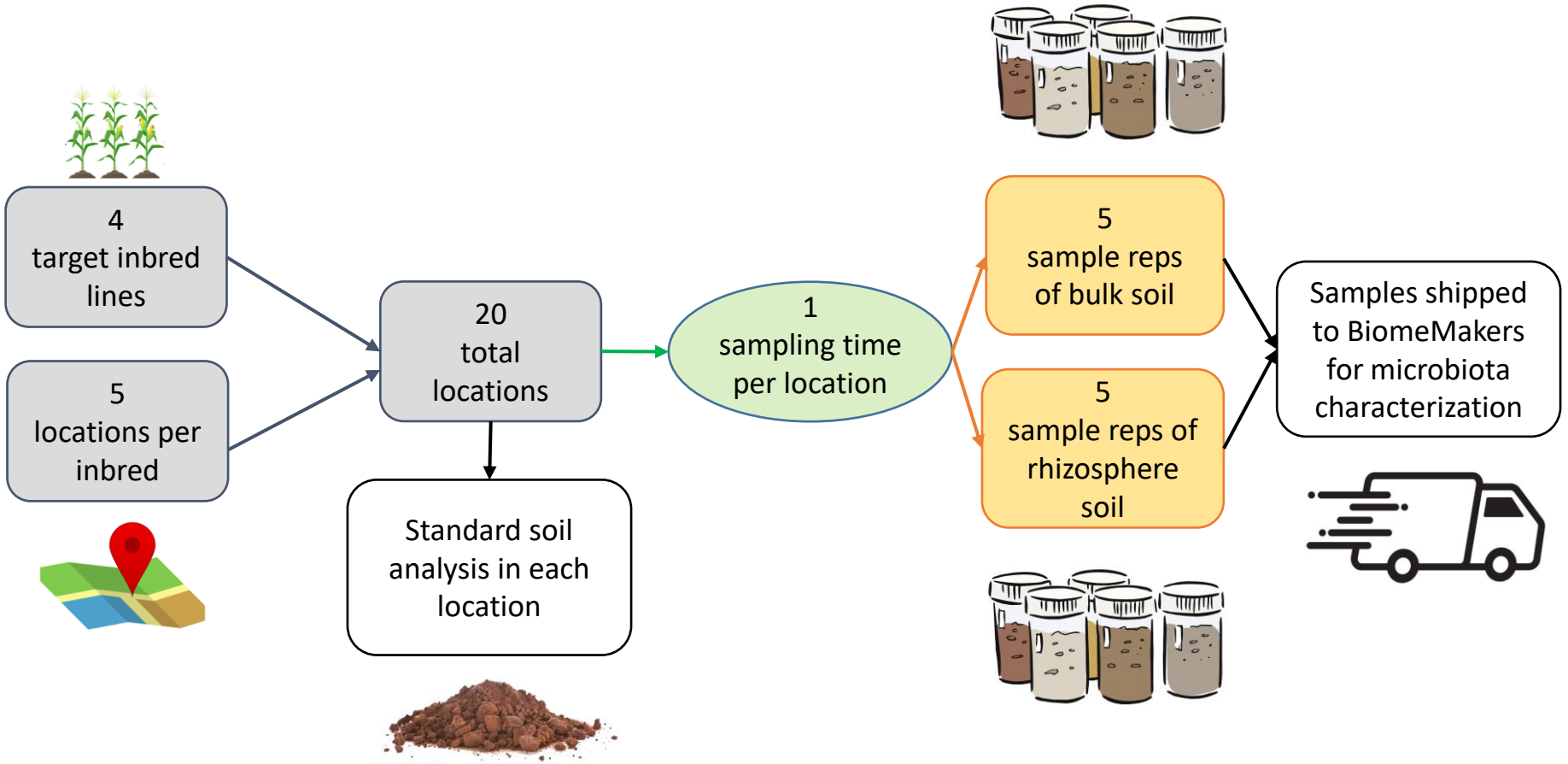
AMF experiments – Field results



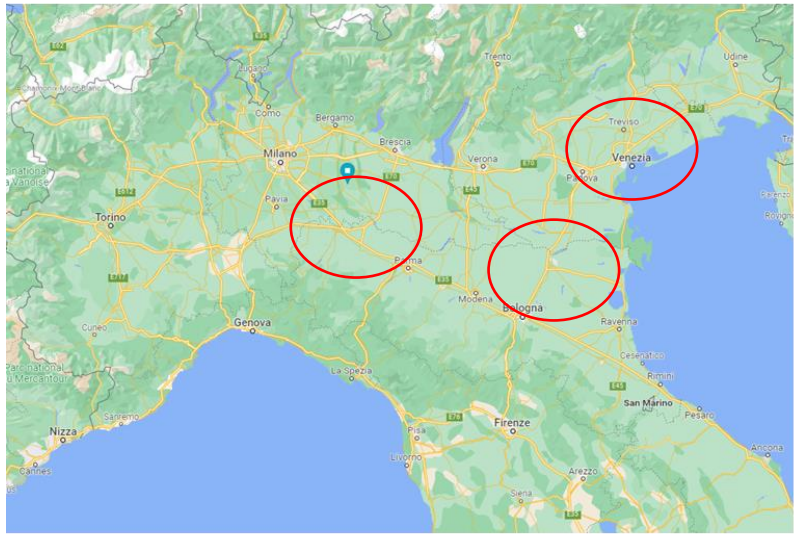


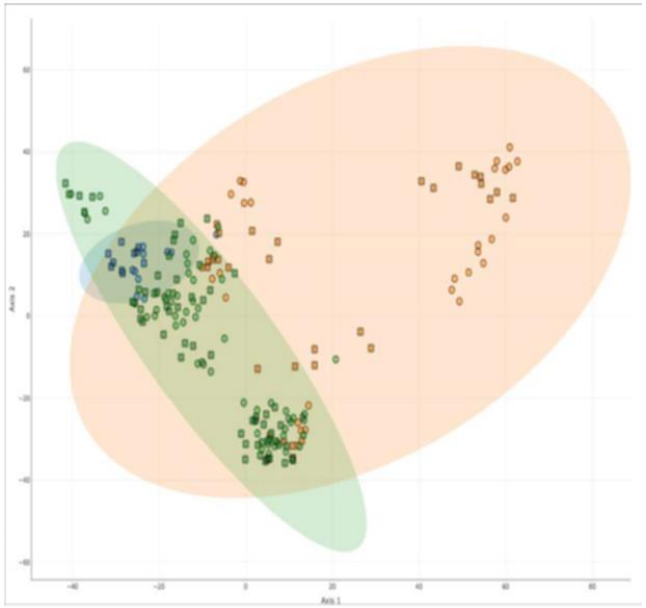


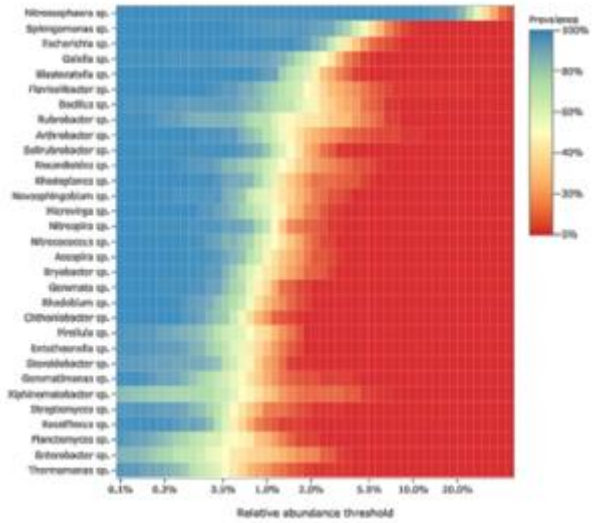
Study of soil microbiota – Materials and methods



Study of soil microbiota – Results







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

Thank you for your attention!

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