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IMPROVING FIELD INOCULATIONS WITH ARBUSCULAR MYCORRHIZAL FUNGI

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Content: Arbuscular mycorrhizal fungi (AMF) form a symbiosis with 80% of plant species, where they exchange carbohydrates for nutrients, in particular phosphate and nitrogen. Not only do AMF improve plant yield by they also improve environmental health by reducing nutrient leaching and nitrous oxide emissions. Although it is widely known that AMF inoculation can promote plant yield under controlled conditions, experiments performed under conventional field conditions in Europe are rare and it is unclear if, and under which conditions, AMF inoculation is beneficial. In this project, we performed on-farm inoculation experiments in 18 maize fields (2018), 25 fields (2019), and 11 fields (2020) throughout northern Switzerland. All fields were managed conventionally and received mineral fertilizers. The investigated fields varied widely in chemical, physical and biological properties. Upon maize seeding, the AMF *Rhizoglyphus irregulare* or a control inoculum (carrier substrate) was inoculated. First, we measured AMF colonization rate of maize roots by microscopy. In 69% the fields, inoculation enhanced the abundance of AMF in maize roots. In a quarter of all investigated fields, AMF inoculation led to an increase in maize yield, ranging from 12 to 40%. However, there is no relationship between mycorrhizal growth response and changes in colonization as measured by microscopy, indicating that molecular tools are necessary to assess establishment of the inoculated AMF in the roots. We are currently modeling the relationships between soil properties and root colonization as well as growth promotion for a better understanding of the context dependency of AMF inoculations.

Disclosure of Interest: None declared

