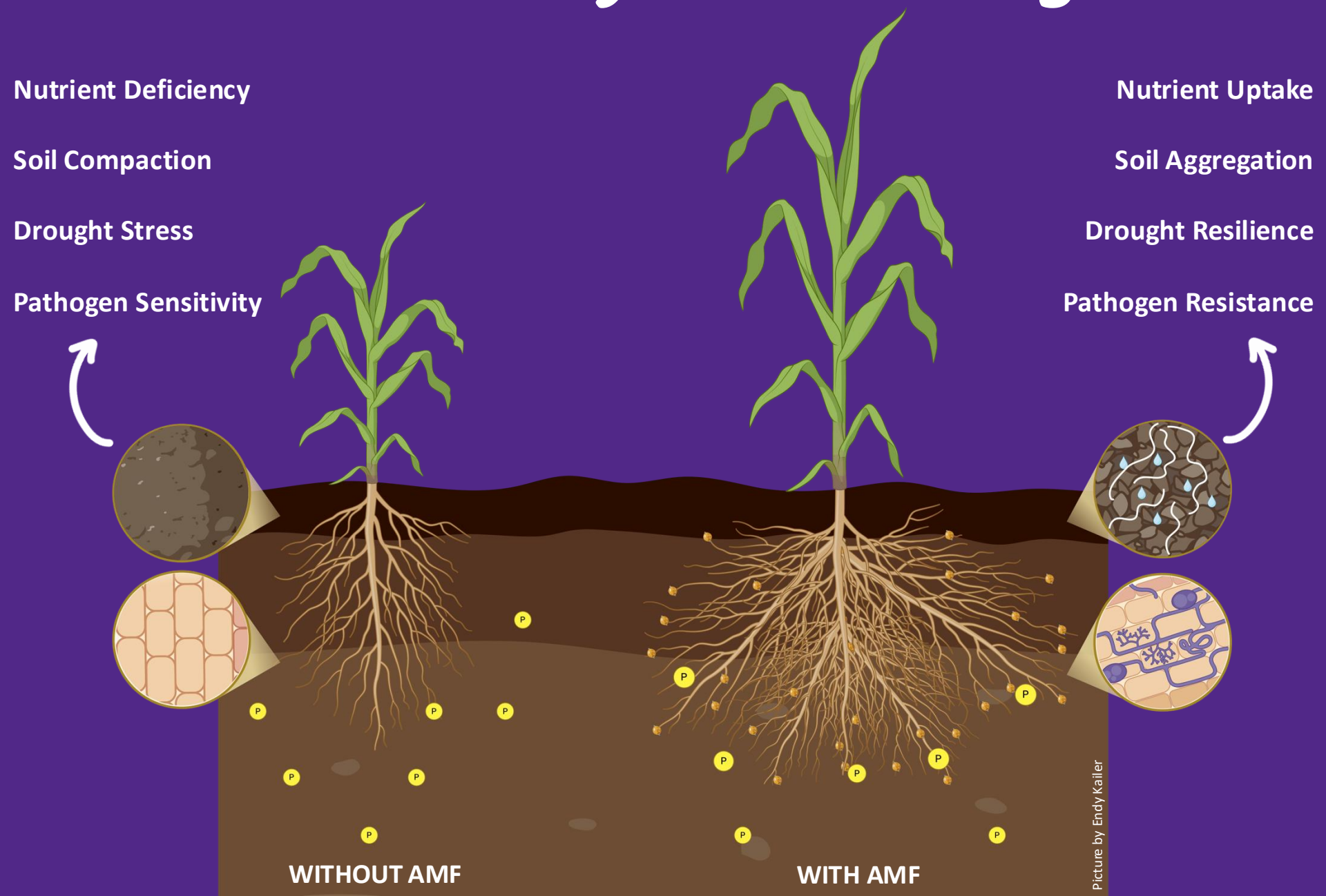
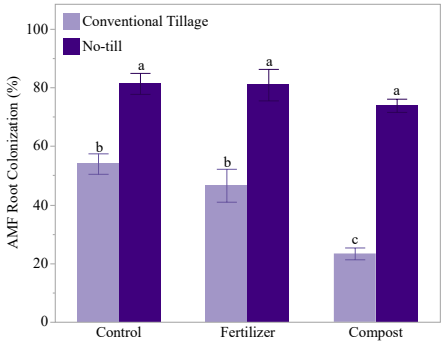
Arbuscular Mycorrhizal Fungi



Soil Microbial Agroecology Lab

Kansas State University



Data from a long-term study (34 years) in Manhattan-KS indicated that tillage and compost application decreased AMF colonization in corn roots. No-till maintained higher levels of AMF root colonization across fertilization treatments.

Interested in exploring our AMF research projects? Scan the QR code to learn more and connect with our team:

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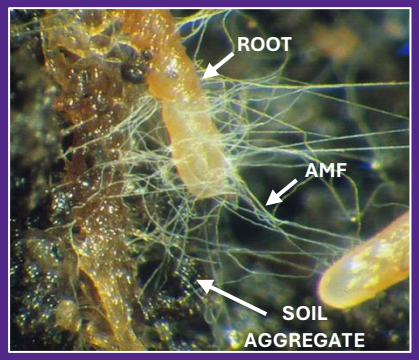
K-STATE Research and Extension

NORTH CENTRAL SARE Sustainable Agriculture Research & Education

Arbuscular Mycorrhizal Fungi

Invisible Engineers of Soil Health



Arbuscular mycorrhizal fungi (AMF) are natural specialized soil fungi that associate with the root systems of around 80–90% of all land plants.

The fungi connect to plant roots and extend into the soil, creating a vast underground network that promotes:

↑ Nutrient and Water Uptake

↑ Soil Aggregation

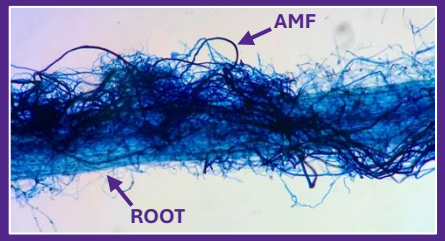
↑ Pathogen Resistance

↑ Drought Resilience

↑ Plant Growth and Yield

↑ Soil Health

Why should we care about AMF?



Nutrient and Water Uptake

AMF enhance plant uptake of immobile nutrients such as phosphorus (P) and zinc (Zn) by extending hyphae beyond the root zone and releasing organic acids that release bound nutrients while also improving water access.

Soil Aggregation and Moisture Retention

AMF hyphae physically bind soil particles into stable aggregates and release compounds that “glue” soil together. This improves soil structure, reduces erosion, and enhances the soil’s ability to retain moisture between rainfall events.

Plant Resilience and Yield Stability

AMF primes plants to activate defense responses faster and more effectively to pathogen attack and environmental stressors, which leads to healthier crops, increased productivity, and more consistent yields across growing seasons.

How soil management impact AMF?

Soil Tillage

Tillage disrupts AMF hyphal networks and reduces their abundance in the soil. In contrast, no-till systems protect and promote AMF growth by preserving soil structure and fungal networks.

Heavy Use of Fertilizers

Excessive application of synthetic fertilizers, especially P can suppress AMF colonization, as plants become less reliant on fungal partners for nutrient uptake.

Cover Crops

Maintaining living roots year-round supports AMF populations. Mycorrhizal-host cover crops help sustain fungal communities between main crops.

Certain plants, particularly Brassicas (e.g., radish, canola, and turnip), do not form associations with AMF and can temporarily reduce AMF presence in the field.

Crop Rotation

Rotating crops with a variety of root types encourages diverse AMF populations, improving their abundance and overall soil health.