Enhancing Nutrient Uptake in Wheat: Evaluating the Effects of Mycorrhizal Fungi Inoculation

Bohl, Madalyn (School: Flasher High School)

This project explores a cost-effective method to improve nutrient uptake in wheat using mycorrhizal fungi. These fungi form a symbiotic relationship with plant roots, aiding nutrient absorption capacity. My research question was: Does mycorrhizal fungi enhance or diminish wheat's ability to absorb macronutrients and micronutrients from the soil? I set up two groups of wheat plants to simulate field conditions. Equal amounts of topsoil were placed in two trays-one inoculated with mycorrhizal fungi and the other as a control. Both trays were planted with hard red spring wheat and received a starter fertilizer. The plants were placed under a grow lamp and watered equally as needed throughout the experiment. I recorded growth and health weekly and analyzed soil samples at the end of the growing season to assess nutrient availability. Wheat inoculated with mycorrhizal fungi showed reduced growth compared to the control. However, this difference was not significant and very slight. The fungi did increase the availability of key nutrients such as nitrate-nitrogen, potassium, magnesium, sodium, zinc, and calcium. The control group had higher levels of soluble salts, phosphorus, boron, and sulfur, Soil pH was slightly lower in the control (7.60) compared to the fungi-treated soil (7.66), with black soil having the highest pH (7.84). Mycorrhizal fungi increased nutrient availability but unexpectedly slightly reduced plant growth. Further research is needed to understand the relationship between fungi and wheat growth efficiency.

Awards Won: