

# Whole Cycle Tuesday

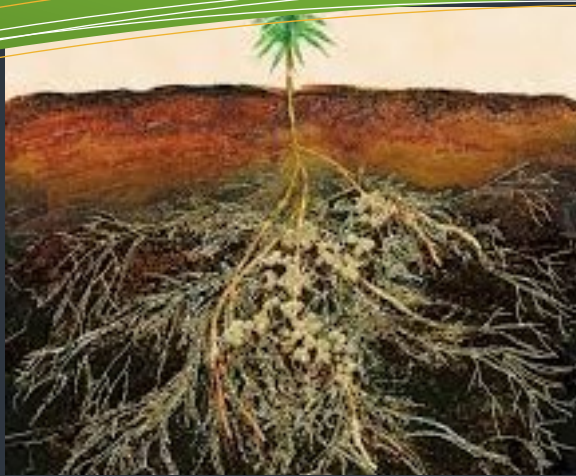
## Key Takeaway

Mycorrhizal fungi are among the most important biological partners plants have.

These fungi form symbiotic relationships with plant roots, creating vast underground networks that break chemical bonds, mobilize nutrients, and deliver them directly to plants. In healthy soils, mycorrhizae are a primary driver of nutrient efficiency and long-term fertility.

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*"The environment is where we all meet; where we all have a mutual interest; it is the one thing all of us share."* — Lady Bird Johnson

## Mycorrhizal Fungi: Unlocking Plant Nutrition

### A Biological Extension of the Root System

Mycorrhizal fungi colonize plant roots and grow outward into the surrounding soil as fine hyphae. These hyphae are far smaller than root hairs, allowing them to penetrate micro-pores and soil aggregates that roots cannot access.

This expanded reach:

- Increases the effective root surface area many times over
- Allows plants to explore more soil volume for nutrients and water
- Improves nutrient uptake efficiency without increasing root biomass

### Breaking Bonds and Mobilizing Nutrients

Mycorrhizal fungi actively release enzymes and organic acids that loosen chemical bonds holding nutrients in unavailable forms. Through these mechanisms, they:

- Solubilize phosphorus bound to calcium, iron, or aluminum

- Mobilize micronutrients such as zinc, copper, and iron
- Improve access to nitrogen tied up in organic matter

Rather than flooding the soil with nutrients, mycorrhizae make existing reserves accessible.

### Direct Nutrient Transfer to Plants

One of the defining features of mycorrhizal fungi is their ability to move nutrients directly from soil to plant roots.

- Nutrients absorbed by hyphae are transported internally
- Phosphorus and micronutrients are delivered straight into root cells
- Losses from fixation, leaching, or runoff are reduced

This targeted delivery allows plants to meet nutritional needs with less total nutrient input.

### Bottom Line

Mycorrhizal fungi don't just help plants absorb nutrients; they actively break chemical bonds, unlock mineral reserves, and deliver nutrients directly to roots. In doing so, they form biologically driven plant nutrition systems.

