



Morphology

Mycorrhizas are literally ‘fungus-roots’ created by symbiotic associations between plant roots and fungi. Mycorrhizal fungi help their host plants acquire mineral nutrients from the soil in return for plant sugars. Mycorrhizal fungi form structures outside and inside plant roots. All types form extensive networks of microscopic hyphae that extend outwards from plant roots into the surrounding soil or leaf litter. Arbuscular mycorrhizas (AM), ericaceous mycorrhizas and orchid mycorrhizas are sometimes called ‘endomycorrhizas’ because the fungi form distinctive structures between and inside the cortical cells of plant roots, but do not generally cause obvious changes in root morphology. By contrast, ectomycorrhizas (EcM) often cause distinct changes to roots that can be observed without a microscope. Reproductive structures also differ among mycorrhizal types. AM fungi reproduce with microscopic spores produced in the soil or within plant roots, whereas many EcM fungi reproduce with mushrooms or underground truffles. Mycorrhizas are among the most widespread symbionts in the world. They are found in more than 80 % of all plant species and 92 % of all plant families.

- Mycorrhizas can be managed as biofertilisers as they increase plant nutrient uptake
- Many species of EcM fungi are important culinary mushrooms and truffles.

The significant mutual benefit of mycorrhizal symbioses is evident from their tremendous abundance and diversity. Mycorrhizal fungi are found in all terrestrial biomes and in association with most plant families. They are found with trees, shrubs, forbs, grasses and agricultural crops. AM are abundant in tropical forests, grasslands, savannahs, deserts and arable lands, and EcM dominate temperate and boreal forests. Ericaceous mycorrhizas are common in boreal forests and heathlands. Orchid mycorrhizas are essential to the survival of orchids throughout the world.

Glomeromycota

Fungi in the phylum Glomeromycota form AM symbioses with the majority of plant species, by colonising the root cortex and forming an extensive mycelium, vesicles and arbuscules.

Glomeromycota produce abundant hyphae and spores in soils. In grasslands and agricultural lands, these fungi comprise an estimated 20 - 30 % of soil microbial biomass, making AM fungi among the most abundant organisms in many soils.

Ectomycorrhizas

Approximately 6 000 fungal species establish EcM associations with many species of trees and woody plants. At least 20 families of Basidiomycota are known to establish EcMs. The biomass of EcM fungi mycelia has been estimated to range from 700 to 900 kg per hectare, and 20 - 40 % of an EcM root weight is due to the fungus.

Ericaceous and orchid mycorrhizas

Most plant species belonging to Ericaceae, including the genera *Rhododendron*, *Calluna* and *Vaccinium*, form ericoid mycorrhizas. These plants form delicate roots lacking root hairs and their outermost radical cells become heavily colonised by Ascomycota from the genera *Rhizoscyphus* and *Hymenoschyphus*. Orchid mycorrhizas are established between plant species of the family Orchidaceae (20 000 to 35 000 species) and several groups of fungi in the phylum Basidiomycota, as well as some rare Ascomycota.

Farming Secrets says: The Role of Fungi In Agricultural Soils Cannot Be Overestimated