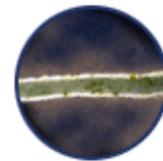


Mycorrhizae

Mycorrhizal fungi have occurred naturally in the soil for 400 million years. They form a close symbiotic relationship with plant roots. They are called mycorrhizae (from the Greek "mukés", meaning fungus, and "rhiza," meaning roots). However, in most soils that have been disturbed by residential construction, or intensive cropping practices with applications of fertilizers containing pesticides and other chemical products, the mycorrhizae content has considerably diminished, and has become insufficient to significantly enhance plant growth. When mycorrhizal fungi colonize the plant's root system, they create a network that increases the plant's capacity to absorb more water and nutrients such as phosphorus, copper and zinc. This process in turn enhances growth and favors rapid development of roots and plants.

What are Mycorrhizal Fungi?

"Mycor" - "rhiza" literally means "fungus" - "root" and defines the mutually beneficial relationship between the plant root and fungus. These specialized fungi colonize plant roots and extend far into the soil resource. Mycorrhizal fungal filaments in the soil are truly extensions of root systems and more effective in nutrient and water absorption than the roots themselves.



Uncolonized root



Colonized root by mycorrhizal fungi

What plants form specialized roots with mycorrhizal fungi?

Over 90% of the world's plant species form mycorrhizae and require the association for maximum performance in non-artificial conditions.

How do mycorrhizal fungi increase nutrient uptake?

These fungi increase the surface absorbing area of roots 10 to 100x thereby greatly improving the ability of the plants to utilize the soil resource. Estimates of amounts of mycorrhizal filaments present in soil associated with plants are astonishing. Several miles of fungal filaments can be present in less than a thimbleful of soil! But mycorrhizal fungi increase nutrient uptake not only by increase the surface absorbing area of roots, they also release powerful chemicals into the soil that dissolve hard to capture nutrients such as phosphorous, iron and other "tightly bound" soil nutrients. This extraction process is particularly important in plant nutrition and explains why non-mycorrhizal plants require high levels of fertility to maintain their health. Mycorrhizal fungi form an intricate web that captures and assimilates nutrients, thus conserving the nutrient capital in soils. In non mycorrhizal conditions much of this fertility is wasted or lost from the system.

What other activities do mycorrhizal fungi do?

Mycorrhizal fungi are involved with a wide variety of other activities that benefit plant establishment and growth. The same extensive network of fungal filaments important to nutrient uptake is also important in water uptake and storage. In non-irrigated conditions, mycorrhizal plants are under far less drought stress compared to non-mycorrhizal plants.

Disease and pathogen suppression is another benefit for a mycorrhizal plant. Mycorrhizal fungi actually attack pathogens or disease organisms entering the root zone the fungi. For example, excretions of specific antibiotics produced by mycorrhizal fungi immobilize and kill disease organisms. Some mycorrhizal fungi

Mycorrhizae

protect pine trees from Phytophthora, Fusarium and Rhizoctonia diseases. In addition mycorrhizal roots contain a mantle (a tight, interwoven socklike covering of dense filaments) that acts as a physical barrier against the invasion of root diseases.

Mycorrhizal fungi also improve soil structure. Mycorrhizal filaments produce humic compounds and organic "glues" (extracellular polysaccharides) that bind soils into aggregates and improves soil porosity. Soil porosity and soil structure positively influence the growth of plants by promoting aeration, water movement into soil, root growth, and distribution. In sandy or compacted soils the ability of mycorrhizal fungi to promote soil structure may be more important than the seeking out of nutrients.

Don't soils already contain mycorrhizal fungi?

Undisturbed soils are full of beneficial soil organisms including mycorrhizal fungi. Research indicates, however, many common practices can degrade the mycorrhiza-forming potential of soil. Tillage, fertilization, removal of topsoil, erosion, site preparation, road and home construction, fumigation, invasion of non-native plants, and leaving soils bare are some of the activities that can reduce or eliminate these beneficial soil fungi. Reintroducing mycorrhizal fungi in areas where they have been depleted can dramatically improve plant establishment and growth.

What types of mycorrhizal products are available?

Certain mycorrhizal spores or "seeds" of the fungus have been selected for their growth enhancing abilities. These spores are combined with root biostimulants, humic acids and water absorbent gel to invigorate roots and promote plant survival and growth. When applied, the spores of mycorrhizal fungi spread through soil colonizing plant roots and work to produce vigorous root systems and plant growth. The yield enhancing attributes of mycorrhizal fungi have co-evolved over millennia and has been the focus of 20 years of intensive research. Now, growers, landscapers and homeowners can apply the miraculous relationship of plant and mycorrhizal fungi and improve plant growth the natural way. Anderson's carries MYKE, an all-natural mycorrhizal transplant to use when planting or seeding. There are different types of mycorrhizae, and they do form relationships with different plants. MYKE makes choosing the right mycorrhizae easy by offering it in these forms: Vegetable Garden, Annuals and Perennials, and Tree and Shrub.

How do you apply these mycorrhizal fungi?

Mycorrhizal application is easy and requires no special equipment. The goal is to create physical contact between the mycorrhizal inoculant and the plant root. Mycorrhizal inoculant can be sprinkled onto roots during transplanting, worked into seed beds, blended into potting soil, "watered in" via existing irrigation systems, applied as a root dip gel or probed into the root zone of existing plants. The type of application depends upon the conditions and needs of the applicator.

Is mycorrhizal inoculation expensive?

Mycorrhizal inoculation is inexpensive. Typically for small plants the cost ranges from less than a penny to a few cents per seedling. For larger plants, more inoculum is needed and costs are higher.