

# Discover Mycorrhizae

## *The Natural Partner*

By

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### What Is Mycorrhizae?

Mycorrhizal fungus are beneficial to plants, establishing a symbiotic relationship with roots. Nearly all plant life is dependent on the mycorrhizal association which it is believed began some 400 million years ago and is credited with enabling life to move from water to land. Mycorrhizal fungi grow through the soil by means of hyphae, which are the "roots" of the fungus. These "roots" are extremely filamentous and colonize every tiny crack and cranny in the soil to absorb water, and nutrients in solution, and give this solution to the roots of the plant. For this service about 15% of the foods converted by the plant from the energy of the sun is given to the mycorrhizal fungi as it only food source. This mutualistic relationship between plant roots and mycorrhizal fungi is an essential link between nearly all plants and their soil environment. Should this food flow from the roots to the fungi be interrupted in anyway the fungi responds accordingly. This is why plants in stressed conditions benefit from mycorrhizae. Regardless of the cause, i.e., drought, high salt, parasites, negative organisms, etc., mycorrhizae has evolved to protect their food source - the plant. Mycorrhizal fungi are a natural phenomenon - it is a natural part of a complete plant system.

The full story of what effect mycorrhizal roots have on plants are still evolving. To date we know that some plants cannot live without mycorrhizal roots. We also know there are a few obscure plants that do not need mycorrhizae.

### Why Inoculate?

The reason we need to inoculate is that standard agricultural, nursery and landscape practices have largely ignored what's going on below the ground - the focus has been upon the appearance of the plant above the ground. Formal horticulture classes have given limited attention to the topic of mycorrhizae - but this is changing rapidly - today it is estimated there are over 10,000 research studies on the subject. The real energy that is pushing the topic of mycorrhizae to front stage is the success that it is now showing in commercial applications.

Commercially speaking our focus in the nursery industry has been on top growth and quantity. Because of the pressure the typical nurseryman has to turn inventory, little, if any attention, has been given to the natural health of the plant. Today the nursery industry produces plants that look good, but are not *naturally complete*. To turn inventories and remain competitive the nurserymen uses a host of chemical and management techniques to manipulate plants to grow fast and look good. Plants are quite literally grown in a "bubble" (the greenhouse) and do not develop many of the

natural systems that they have evolved with and in many cases must have on the “outside” (the landscape) in order to thrive and prosper. As a consequent much of the nursery stock that is sold is relatively fragile and can quickly die if not maintained intensively. Thus, much of the reason for so called “transplant shock”.

Most will agree that we could use some help for better results with newly planted landscapes which often times go into severe transplant shock. Generally the reason is poor after care, but heat, time of the year, soil conditions, along with untold other factors also play important roles here. One of the biggest problems is most transplanted plants have little, if any, natural systems working with them and the soil in which they are planted is likely to offer little help from a microbial standpoint because it has often been moved around and disturbed (grading, fill, etc.) And generally has little, if any, beneficial microbial activity.

Inoculation can significantly aid transplanted trees, shrubs and flower bed results, especially under adverse conditions. Today we know that mycorrhizal roots take hold faster - there is little doubt on this fact. Furthermore, we know mycorrhizae and beneficial microbial activity in the soil make sound horticultural sense resulting in better plant health. Research has shown for several decades that mycorrhizal roots improve establishment, nutrient uptake, hardiness and drought resistance, reduced fertilizer and fungicide input, and increased plant disease tolerance. Recent research is showing that mycorrhizal roots can thrive in high salt environments which have in recent time become more and more prevalent because of the sever problems associated with salt water intrusion. Now we are beginning to take serious the natural systems that we have turned our back on. We have these perfect systems available to us, but have instead employed billions of dollars in chemicals to control growth and predators. Now is the time to look at the natural systems that lie below our feet - the soil flora, and especially, mycorrhizae.

### **It's A Natural Approach**

So, how can we treat plants with mycorrhizae? The rules haven't changed a bit - root dips, transplant amendments, root injection and vertimulching. What do we treat the plants with? And since we are going through the exercise, is there anything else that we can do? You bet there is. If the concept makes sense lets consider a “cocktail” for the transplant. Instead of a simplistic approach (chemical) lets use a systems approach (natural systems, that is). In fact, forget the “cocktail”, lets give the transplant a banquet:

**Endomycorrhizae** - 7 species

**Ectomycorrhizae** – 4 species

**Trichoderma** - 6 species - soil disease fighting fungi

**Stimulants** - over a hundred from Sea Kelp Extract,  
Humus, Yucca Plant Extract

**Amino Acids** - buffers heavy metals and high salts and  
improves microbial activity in the soil.

**Vitamins & Enzymes** - essential for chlorophyll production,  
cell division, transpiration and respiration.

**Beneficial Bacteria** - Nitrogen Fixing, Phosphate solubilizing, and Growth Promoting Bacteria

**Water Management Gels** - agricultural grade to slow release water and nutrients.

All are well proven, commercialized, and inexpensive - each loaded with benefit to the plant and its growing environment. Including a water management gel to hold water and slow release all the solubles can make a world of difference for the transplant and provides dramatic results.

### **If You Deal With Landscape - We've Got You Covered**

DIEHARD™ mycorrhizal inoculants are formulated as transplant soil amendments, injectables, and bare root preparations to inoculate landscape trees and shrubs, flower beds, established trees and shrubs and bare root seedlings with live beneficial mycorrhizal fungi. The inoculant contains highly selected strains of low host specificity endo- and ectomycorrhizal fungi that will quickly colonize the roots of new transplants to provide the best possible conditions for the roots to become mycorrhizal during the establishment period and beyond. The mycorrhizal inoculants are combined with humic acids, stimulants, beneficial bacteria, soluble sea kelp, yucca plant extracts and organic soil conditioners to promote rapid root development. To reduce transplant stress and watering maintenance, and to slow release all soluble components of the formulation Horta-Sorb® water management gels are added to complete the package.

### **Conclusion**

DIEHARD™ inoculants, with all the additional additives, are an investment that can return its cost several times over in a number of ways. Just think how you would feel about your projects when you have all the goodies Mother Nature has to offer working for you. Stressed plant materials are the norm when transplanting. Lets give them all we've got when we transplant - it's the right thing, the responsible thing to do for our clients, and our practice.