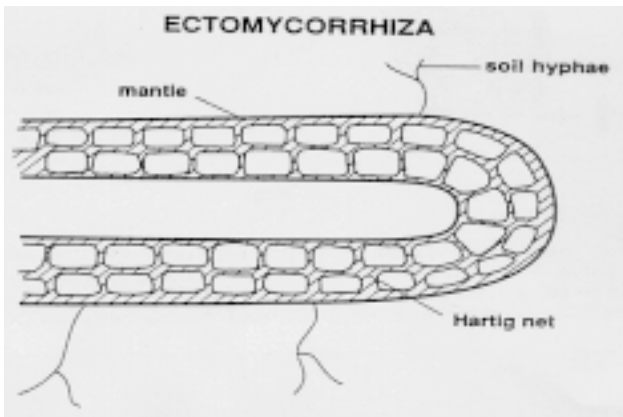


AscendTM EM

Ecto-Mycorrhizal Soil and Root Inoculant for
Nursery and Outplant applications

“For nurseries and foresters in Silviculture with deficient soil ecologies, BioScientific’s *Ascend EM* is a liquid culture of multiple Ecto-Mycorrhizal fungi that promotes growth over fertilizers alone. Unlike fertilizers alone the use of *Ascend* establishes the most elemental component of soil/plant fertility, while providing for a foundation of disease resistance and longevity.”



BACKGROUND

Biotechnology can be defined as the controlled use of living organisms or their components for the benefit of mankind. One aspect of biotechnology involves the special relationships formed between certain fungi and plants, called mycorrhizae, which have been shown to dramatically enhance the establishment, growth, development and survival of plants. The term mycorrhiza; means “fungus root” and can be defined as a beneficial symbiotic association between plant roots and specific soil fungi. In the mycorrhizal relationship, the fungus penetrates roots to form an new organ called the mycorrhizae.

The most horticulturally important mycorrhizal fungi found in North America are those

that colonize conifers, also referred to as Ecto-Mycorrhizae (EM). As a “biological fertilizer,” *Ascend* contains viable spores and infective propagules from the EM's: *Elaphomyces granulatus*, *Martellia brunnescens*, *Pisolithus tinctorius*, *Rhizopogon occidentalis*, *Rhizopogon vinicolor* and *Glomus intraradices*. Although, there is host specificity between different species, the fungi in the inoculant *Ascend EM*, will colonize plant roots in the absence of the preferred symbiont over a broad degree of circumstances. This is particularly valuable in a sterile soil media, and/or where a earlier or rapid colonization benefit is desired.

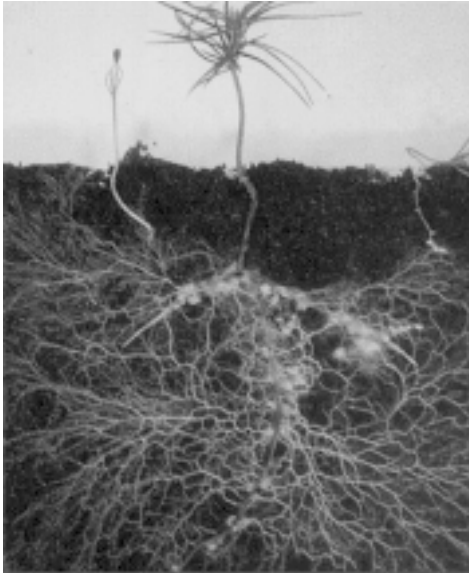
COMMONLY ASKED QUESTIONS:

How does *Ascend EM* help plants?

Once colonized, the ecto-cellular fungal hyphae extend the surface area of the host root system allowing for the increased uptake of the critical nutrients: Phosphorus, Nitrogen,

Ascend EM benefits plants by increasing:

- ▣ Nutrient and water uptake.
- ▣ Root health and disease resistance.
- ▣ Tolerance to environmental stresses.



Zinc, Copper, etc., and Water. While increasing tolerance to drought, salts and pesticides. Also this “fungal net” creates a physical and biochemical barrier to root pathogens.

Which soils most need Ascend EM?

Sterile soil ecologies, whether induced by cultural practices (e.g. fumigation, fallowing, pastureization) or by nature, lack the benefits of mycorrhizae. Also, soils with “immobilized phosphorus” can benefit. Mycorrhizae are of most benefit in poor, light textured, and low organic soils.

Aren't mycorrhizae already in the soil?

All natural soils contain some level of mycorrhizae, but they are easily destroyed. Many practices can degrade mycorrhizae, such as: Long Fallowing, frequent tillage, “cut and fill” land leveling, sterilization, pesticides, and acid or ammonia fertilizers. Once lacking re-introduction is prudent.

How does one know they have a deficient soil ecology?

Sub-optimum productivity, slow, uneven growth, mortality or Phosphate/Zinc deficiencies are the most common, however in some cases the plant will stop growth after the cotyledon stage, which is common to fumigated, sand base and cool/wet soils.

How can mycorrhizae be introduced into the soil?

Cultural systems that use minimum tillage, and “pro-biotic” inputs can encourage the development of natural mycorrhizae. However, accurately timed/placed applications of *Ascend EM* will ensure that the plant has the greatest opportunity for optimum development.

What plants need Ascend EM?

The most common are the Pinacea Plant family that includes Pine, Fir and Spruce. Also are the Fagaceae (Oak), and Myrtaceae (Eucalyptus).

What plants will not benefit from Ascend?

VA-Mycorrhizal plants do not respond to EM.

Does Ascend require special handling?

The viable microorganisms in *Ascend EM* are living and as such require special treatment. As with all living organisms there is a limited life span during which the product must be used.

RATES AND TIMINGS:

RATES:

Refer to label for plant/use specific recommendations. Label rates are generally around 15 gallons per acre per growing season. High placement accuracy will allow lower rates while low placement accuracy will necessitate higher rates.

TIMINGS:

As *Ascend EM* is only of benefit to plant roots; placement accuracy will increase the effectiveness of any application. Place *Ascend EM* in close proximity to newly developing roots and early in the plants development.



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