

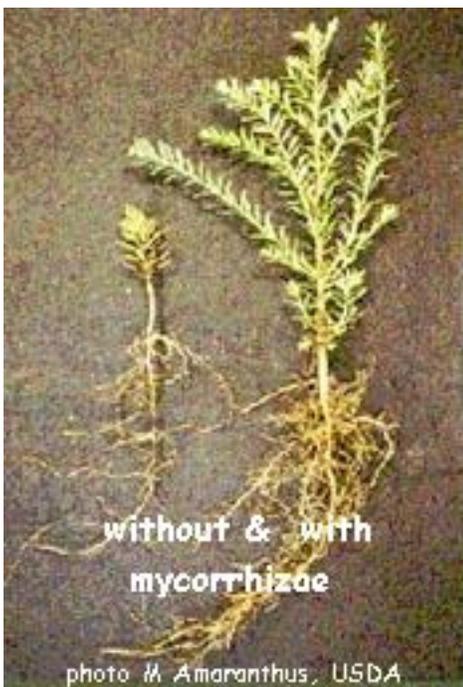
Why a Tree Needs Its Fungus

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Tree roots and fungusThe roots of most tropical trees enjoy a symbiotic relationship with specialized soil fungi. Together they form root-fungus structures called mycorrhizae. Mycorrhiza literally means "fungus root." The mycorrhizal association is beneficial to both the tree and the fungus. The tree supplies carbohydrates and other growth requirements to the fungus, and the fungus increases water and mineral uptake (particularly phosphorus and potassium) of the host tree by increasing the total absorptive area of the root system.

A little field work can reveal this web of growth. Removing the first layer of litter from the forest floor, one can sometimes discern an intricate interwoven mass of white threads. This pale tangle consists of the rootlets of forest trees and strands of fungal mycelia. If you find a fungal thread emanating from a rotting log or decomposing leaf, you may be able to trace it back to a tree's rootlets.

There are more than 2500 different fungi which form mycorrhizal relationships with trees; often there are several different fungi associated with an individual tree. The presence of this association is necessary for establishment and growth of many trees; its absence has often reduced the success of new tree plantings, especially on old field sites. Effect of mycorrhizae deprivation Mycorrhizae are particularly abundant in forest soils but are found in almost all soils, with the possible exception of grasslands where no trees have previously grown. Growth enhancement is especially significant for plants growing on infertile soils and dry soils.



Interestingly, mycorrhizae development decreases following heavy fertilization of soil. The reduced growth of the pine seedlings in the middle of the photo on the left photo was because of the lack of mycorrhizae on the roots. The stunted seedlings were those planted in an old limestone rock roadbed. The soil has a pH greater than 8, which the fungus could not tolerate.

At Cloudbridge, we use fungus-rich native soil in our nursery beds, although we cannot be sure that we're associating the right fungi with the right trees, especially when we are bringing seedlings and seeds from the forest into the nursery. In cases where we've transplanted bare-root saplings from the forest into the plantation area, which is former pasture, we lose quite a few trees -- this may be attributed to the absence of the symbiotic fungi.

