

(2) This soil is then placed in a large pot or bowl, or a hole dug into the ground (perhaps 50cm x 30cm, and 25cm deep) and lined with plastic bags. In this soil a mixture of host plants are sown - members of the grass and legume family have been shown to be infected by mycorrhizal fungi easily: maize and beans are a good combination, or millet or other members of the grasses family with a legume such as lentil. Onions or leeks are good too. These act as bait, allowing the mycorrhizal fungi that are present in the soil to infect their roots and therefore multiply.

(3) These plants are grown on for at least 3 months (depending on season).

(4) At the end of this period the host plants are cut down and all watering stops. This effectively kills the plant and tricks the mycorrhiza that has infected the roots into quickly releasing spores. After one further week the roots of the host plants are pulled up, roughly chopped into 1cm long strips and mixed back into the soil. This soil and root mixture becomes your inoculum.

(5) A small layer of inoculum 1-2 cm deep is added just below the surface of the container into which seed is to be sown, or below the root ball when planting out, thus infecting the roots of the seedling when they pass through this layer.

At Sunseed, we are working to make this technique more accessible to all and so encourage the use of mycorrhizal fungi in gardens and tree nurseries. We would like people to try out this technique, and tell us how they get on.

We have made the instructions available on our website (www.sunseed.org.uk) or please feel free to request a copy via post.

FURTHER INFORMATION

Sunseed Desert Technology aims to develop, demonstrate and communicate accessible, low-tech methods of living sustainably in a semi-arid environment. Sunseed Desert Technology is the Spanish project of the Sunseed Trust Ltd (UK reg. charity 1098353) and a registered Spanish Association (no. 162660). We also practice organic gardening and are a field trial site for low-tech research into tree nurseries and soil regeneration. Hundreds of people work with us as paying volunteers every year.

Further information, including volunteering opportunities at Sunseed, can be obtained from the following addresses:

Sunseed Desert Technology (SDT)
Apdo. 9, 04270 Sorbas, Almería, Spain

www.sunseed.org.uk

email: sunseedspain@arrakis.es

tel. (00 34) 950 525 770

As a registered charity, donations are always appreciated, especially if requesting further information.

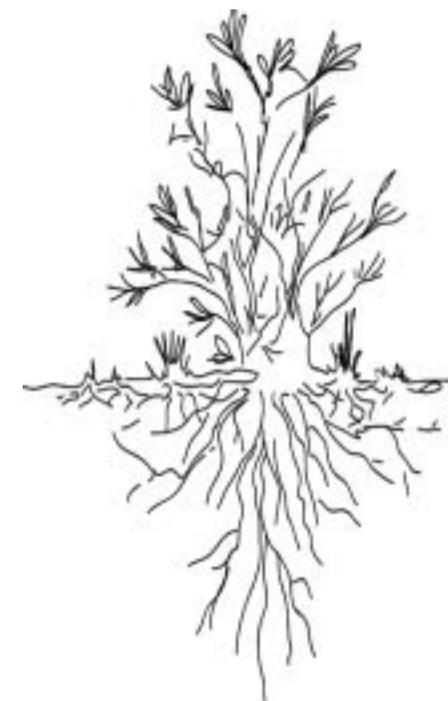
Thank you for your interest.

SDT.MP.08(E): September 2004



**Sunseed
Desert
Technology**

www.sunseed.org.uk



MYCORRHIZAL INOCULATIONS

**A simple technique for improving
the success of plants in arid
zones**

INTRODUCTION

In many semi-arid and arid environments natural vegetation has been lost through human activities such as agriculture. Re-establishment of this vegetation can prove problematic, with low survival rates and poor performance.

In these cases, inoculating plants with mycorrhizal fungi can help increase their survival by enhancing water uptake and nutrient sourcing by the plant. This method is extremely easy to use, costs no extra money, and uses locally available resources.

WHAT IS MYCORRHIZA, AND WHAT DOES IT DO?

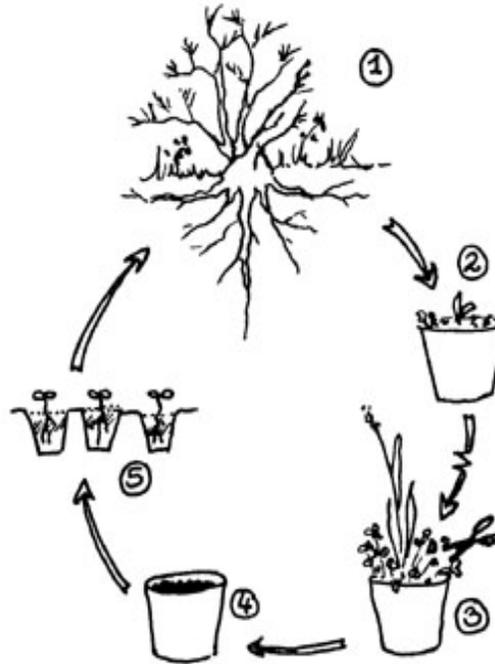
Mycorrhiza is an association between a soil-borne fungus and the roots of plants. Mycorrhizal fungi are a key component of all natural soil ecosystems.

The fine mesh formed by the fungal hyphae functions as an extension of the plant's roots, supplementing its uptake of essential nutrients, particularly phosphorus, by being able to access the very smallest soil pores .

In return, the plant provides the fungus with carbon in the form of sugars from photosynthesis upon which the fungi, as obligate symbionts, are totally dependent.

In an undisturbed environment mycorrhizal fungi will be present on the roots of plants and in the soil in the form of reproductive spores. The roots of young plants will become infected through contact with either of these.

However, in a disturbed environment this infection potential will be much reduced, with fewer existing plants to come into contact with and the spores lost through soil erosion or sterilized by fluctuations in soil temperature.



How to make your own inoculum using "bait"

There two main types of mycorrhizal fungi. The type that we are interested in is by far the most common, and is called the arbuscular mycorrhizal fungi (AMF). Invisible to the naked eye, they form a fine mesh through the soil as well as branched structures (arbuscules) inside the cells of the plants roots. This is where the exchange of mineral nutrients and carbon takes place.

AMF form symbioses with 80% of plant species, including the majority of herbaceous and annual species, and most arid and semi-arid woody species and tropical hardwoods. Many tree species of great economic value are AMF hosts, including citrus, grape, apple, peach, prunus, coffee, cocoa. Most crop plants are AMF hosts too. In arid and semi-arid regions, most native trees share the same AMF as the wild grasses and other under-storey vegetation growing under the tree canopy.

(The other main type is the Ectomycorrhizal fungi; these colonize the roots of most temperate and boreal forest tree species – conifers, oaks, beech etc. This type of fungi cannot be cultured by the method described in this leaflet, but freshly gathered soil from the root zone of existing trees can be used to transmit the fungi to new seedlings. A few plant families do not form mycorrhizas at all, notably the cabbage, amaranth and beet families.)

In revegetation projects in arid areas the lack of mycorrhizal fungus in the soil can be one of the major limiting factors in tree seedling survival.

At Sunseed we have successfully worked with inoculation methods which suggest that infection with mycorrhizal fungi is beneficial for the survival of most plants. This will ensure that their roots are infected with the fungus before they are out-planted.

MYCORRHIZAL INOCULATION METHOD

(1) Soil is collected from underneath an area of undisturbed vegetation, or land that has not been cultivated for a number of seasons. Soil is collected up to a depth of about 15-20 cm.