Mycorrhiza and plant water relations

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A review was given of hypotheses regarding the possible effects of mycorrhizae on different parts of the soil–fungus–plant–atmosphere continuum.

The results were presented of two 2 x 2 factorial (ectomycorrhiza x drought) pot experiments performed in a controlled environment, to elucidate the effects of mycorrhizae and drought on photosynthesis and water relations in Sitka spruce (*Picea sitchensis*).

In exp. 1, mycorrhizae formed by *Paxillus involutus* had a significant effect on plant nutrient concentrations, and, consequently, on net photosynthesis rates in both well-watered and drought-treated plants. Exp. 2 had the same design as exp. 1, but the seedlings were fed in a way which produced mycorrhizal and nonmycorrhizal plants of the same size and N, P, and K concentrations. The plants were subjected to drought or watered, and their shoot water potentials and net photosynthesis and transpiration rates were measured. Despite the considerable effect of drought on these parameters, there was no difference between the mycorrhizal and nonmycorrhizal plants in either the watering or drought treatment.

It is concluded that any major effects of ectomycorrhizae on drought resistance are more likely to be caused by improved nutrition and exploitation of larger soil volumes by mycorrhizal plants than by direct effects of mycorrhizae on plant conductivity.

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