## The interaction of harvester ant activity and VA mycorrhizal fungi

**C. F. Friese** and **M. F. Allen**

Department of Biology and Ecology Center, Utah State University, Logan, UT 84322–5305, U.S.A.

At the Utah State University Wyoming research site, the disks of the Western harvester ant can comprise over 25% of the total surface area. These disks are patch disturbances across the landscape of the semi-arid shrub steppe. The question was asked whether the ants also may be interacting in some way with the VA mycorrhizal fungi growing in association with the surrounding vegetation. Detailed excavation of 2 ant mounds revealed 3 distinct zones of soil and root material. The central zone consisted of a root mat, a region of densely packed roots (60% by volume) that had been clipped and woven into the structure of the mound. This root clipping action appears to be a mound maintenance function by the ants. The clipped root material contained as much as 3,000 times the number of spores found in other zones or in association with the surrounding vegetation. *Glomus mosseae* (Nicol. & Gerd.) Gerd. & Trappe was the dominant spore (63%) in all the samples. The large volume of roots with spores concentrated around ant seed caches creates ideal patches for plant establishment once the mounds are abandoned (approx. 5–10 yrs.)

## Effect of atmospheric sulphur dioxide on the phylloplane fungi of cereals

**N. Magan**

Biotechnology Centre, Cranfield Institute of Technology, Cranfield, Bedford MK43 0AL, U.K.

and

**A. R. McLeod**

Central Electricity Research Laboratories, Kelvin Avenue, Leatherhead, Surrey, U.K.

Phylloplane fungi of ripening cereals are known to be modified by climatic factors and environmental disturbances, particularly fungicide sprays (Magan & Lacey 1986). However, little information is available on the effects of ambient concentrations of atmospheric gases such as sulphur dioxide ($SO_2$).

The effect of different $SO_2$ concentrations (0.05, 0.1 and 0.2 ppm) on *in vitro* germination of yeasts and germination of dominant filamentous fungi was determined in chamber fumigation studies. Secondly, the effect of $SO_2$ on the phylloplane mycoflora of ripening barley was determined in an open-air fumigation system (McLeod *et al.* 1985).

Growth of pink and white yeasts (*Sporobolomyces* and *Cryptococcus* spp.)

https://doi.org/10.1017/S0269727000007326 Published online by Cambridge University Press

was significantly reduced by fumigation with 0.1–0.2 ppm $SO_2$ after 24 h at both 10 and 20 C (Magan & McLeod 1988). Germination of filamentous fungi was less affected, although germ tube extension was. In field experiments populations of *Sporobolomyces roseus* Kluyver & van Niel on leaves of ripening barley were significantly reduced by exposure to 0.04–0.05 ppm $SO_2$. By contrast, those of *Aureobasidium pullulans* (de Bary) Arnaud were significantly higher compared to unfumigated controls.

These results suggest that some species may be used as natural indicators of pollution levels because of their sensitivity to pollutants, e.g. yeasts. The stimulation or inhibition of components of the phylloplane mycoflora on leaves and ears of ripening cereals could result in a change in the ecological balance on plant surfaces and have consequences for the development of fungal pathogens and growth and yield of the crop.

### References

Magan, N. & Lacey, J. 1986. The phylloplane microflora of ripening wheat and effect of late fungicide application. *Annals of Applied Biology* **109,** 117–128.

Magan, N. & McLeod, A. R. 1988. *In vitro* growth and germination of phylloplane fungi in atmospheric sulphur dioxide. *Transactions of the British Mycological Society* **90**, 571–575.

McLeod, A. R., Fackrell, J. E. & Alexander, K. 1985. Open-air fumigation of field crops: criteria and design for a new experimental system. *Atmospheric Environment* **19,** 1639–1649.

## The role of VA mycorrhizas in soil disturbance – included reduction of phosphorus absorption by young maize plants

**D. G. Evans**

Department of Land Resource Science, The University of Guelph, Guelph, Ontario, Canada

This study was designed to test the hypothesis that disruption of the macro-structure of a previously zero-tilled soil is capable of reducing VA-mycorrhizal infection to a degree such that P absorption is reduced. Undisturbed soil cores (within plastic cylinders) were excavated from long-term, zero-tilled plots. Soil removed from these plots, which was first subjected to structurally disruptive forces and then packed into identical cylinders, formed the disturbed comparisons. Maize (*Zea mays* L.), wheat (*Triticum aestivum* L.), spinach (*Spinacia oleracea* L.) or rape (*Brassica napus* L.) were grown in the cores, and P and Zn absorption patterns monitored.

Soil disturbance significantly reduced P and Zn absorption by maize grown in soil originating from three sites differing in local geography and (or) texture. Disturbance also reduced mycorrhizal infection in the three soils. A significant effect of disturbance upon the VA-mycorrhizal infection of both maize and wheat roots (both mycorrhizal), and also upon the P absorption by these species, was observed. None was found with respect to spinach and rape comparisons (non mycorrhizal). Injection of benomyl, a potent inhibitor of mycorrhizal fungi, into the soil surface significantly reduced the influence of soil disturbance upon P absorption. No significant differences were found in VA-mycorrhizal infection within fungicide-treated cores.