

Stock Journal Article for 28 November 2006

Symbiotic fungi aid in phosphorus uptake by wheat

By Geoff Thomas, SAGIT Project Manager

Researchers at the University of Adelaide and South Australian Research and Development Institute (SARDI), funded by South Australian Grains Industry Trust Fund (SAGIT), have confirmed an association between wheat grown on the Eyre Peninsula, South Australia and beneficial, symbiotic arbuscular mycorrhizal fungi (AMF).

Using highly calcareous soil from Cungi, it has been shown that there can be benefits from the relationship between the fungi and wheat, particularly when moderate levels of fertilizers containing phosphorus are applied. Symbiotic plants (i.e. plants living together with the fungi) use the fungi to take up phosphorus from fertilizer and are therefore less reliant on uptake by the roots themselves.

The symbiotic partnership works by the fungi growing extensively within the wheat plant's roots. Using the sugars they obtain from within the plant roots, the fungi send filaments like very thin cotton thread (called hyphae) out into the soil and they actively absorb phosphorus and other nutrients. In one experiment the researchers showed that every gram of soil contained about 20 metres of hyphae – that would be about 100 metres in a teaspoon-full of soil. Under experimental conditions, it was demonstrated that the fungi delivered 50% of the phosphorus the plants received from soil fertilized with fluid formulations or finely ground solid fertilizer. In other words, the fungi took over half of the work of the roots.

The next step of the project will be to find out if wheat roots and fungi grow differently in soil with granules or dispersed fluid forms of phosphate fertilisers. The aim is to find out if the value of fluid fertilizer depends on the activities of the fungal partners. **A major test will be a trial to show how much phosphorus the fungi contribute to a wheat crop in the field, rather than in pots, and whether or not overall uptake and crop yield is increased. This trial is planned to commence in 2007.**

The University of Adelaide together with SARDI are also developing molecular fingerprinting methods to test soils for the presence of the beneficial fungi and to link this with information on disease potential. The data will enable prediction of the degree these fungi may colonise crops and disease risk and provide a useful management tool.

For further information contact: Sally Smith, 08 83036704,
sally.smith@adelaide.edu.au