



## **The impact of cotton growing practices on soil microbiology and its relation to plant and soil health**

Lily Pereg

University of New England, School of Science and Technology, Armidale, Australia (lily.pereg@une.edu.au, 61 2 6773 3267)

Crop production and agricultural practices heavily impact the soil microbial communities, which differ among varying types of soils and environmental conditions. Soil-borne microbial communities in cotton production systems, as in every other cropping system, consist of microbial populations that may either be pathogenic, beneficial or neutral with respect to the cotton crop. Crop production practices have major roles in determining the composition of microbial communities and function of microbial populations in soils.

The structure and function of any given microbial community is determined by various factors, including those that are influenced by farming and those not controlled by farming activities. Examples of the latter are environmental conditions such as soil type, temperature, daylight length and UV radiation, air humidity, atmospheric pressure and some abiotic features of the soil. On the other hand, crop production practices may determine other abiotic soil properties, such as water content, density, oxygen levels, mineral and elemental nutrient levels and the load of other crop-related soil amendments. Moreover, crop production highly influences the biotic properties of the soil and has a major role in determining the fate of soil-borne microbial communities associated with the crop plant. Various microbial strains react differently to the presence of certain plants and plant exudates. Therefore, the type of plant and crop rotations are important factors determining microbial communities. In addition, practice management, e.g. soil cultivation versus crop stubble retention, have a major effect on the soil conditions and, thus, on microbial community structure and function. All of the above-mentioned factors can lead to preferential selection of certain microbial population over others. It may affect not only the composition of microbial communities (diversity and abundance of microbial members) but also the function of the community (the ability of different microbes to perform certain activities). Therefore, agricultural practices may determine the ability of beneficial microbes to realise their plant growth promoting potential or the pathogenic expression of others.

This presentation will review the current knowledge about the impact of cotton growing practices on microbial communities and soil health in different environments as well as endeavour to identify gaps worthwhile exploring in future research for promoting plant growth in healthy soils.