

MBG FOCUS TALK

hosted by Stig U Andersen



Friday 27 September 2019 at 09.00-09.45

Conference Room, Science Park (3130-303)

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Studies on the interactions between inoculated arbuscular mycorrhizal fungi and the root microbiota under field conditions

Arbuscular mycorrhizal (AM) fungi are important members of root microbiota and can be used as biofertilizers for sustainable agriculture. In this study, we assessed the interactions among the introduced AM fungus, indigenous microbial communities, and the plant. Root microbial communities of Welsh onion plants inoculated with a commercial AM fungal inoculum and grown in agricultural fields were investigated by using high-throughput sequencing. The abundance of introduced AM fungus was increased with inoculation and inoculation enhanced plant growth in all the fields, implying introduced AM fungus were able to establish and promote plant growth in a broad range of fields. Inoculation consistently enriched several bacterial taxa, by changing the abundance of indigenous bacteria and introducing new bacteria through the inoculum (inoculum-associated bacteria). Some inoculum-associated bacteria were tightly interacted with introduced AM fungus. These taxa assigned to the genera such as *Burkholderia*, *Cellulomonas*, *Microbacterium*, *Sphingomonas*, and *Streptomyces* and could be the mycorrhizospheric bacteria which could help establishment and/or functioning of the introduced AM fungus. Inoculated AM fungus also interacted with indigenous bacteria with putative beneficial traits, suggesting inoculated AM fungus could recruit bacteria to confer a better plant performance. Four bacterial families, *Methylobacteriaceae*, *Acetobacteraceae*, *Armatimonadaceae*, and *Alicyclobacillaceae*, were consistently reduced with inoculation, possibly due to the indirect effect of the inoculum. Network analysis revealed a cluster of indigenous AM fungi which were negatively interacted with the introduced AM fungus, suggesting a niche competition between these two groups of AM fungi. This cluster also included the indigenous bacteria which negatively correlated with introduced AM fungus, suggesting an inhibitory effect of these bacteria on the inoculated AM fungus. To our knowledge, this is the first large-scale study to investigate the interactions between AM fungal inoculation and the indigenous root microbial communities in agricultural fields at high resolution.