

## **Biological Potential to Meet Crop Nutritional Needs**

The plant microbiome is crucial for plant health. Members of the plant microbiome have the potential to provide protection from diseases, tolerance to abiotic stresses like drought as well as enhanced nutrient acquisition. These emergent properties of the plant microbiota are receiving increased attention for their ability to boost crop yields as alternatives to more expensive or environmentally harmful chemical options. This is particularly evident in their potential to provide nitrogen as a replacement for chemical nitrogen fertilizers, the application of which is increasingly expensive and may even become regulated in future years.

Microbes have already been deployed in agriculture for decades, with the most famous example being the rhizobia which are able to provide nitrogen to legume plants in specialized organs called root nodules. More recently, nitrogen-fixing microbes that do not form such a symbiosis have been commercialized and proposed as inoculants for diverse crop species. In this talk I will discuss the “state-of-the-art” for both rhizobium inoculation as well as new products that may deliver nitrogen to cereal crops. I will frame this discussion in the context of a number of research directions we have taken in this area with the long-term aim of maximizing biological potential to meet crop nutritional needs.