S4P1

Communication among microbes in the plant associated microbiome

Vittorio Venturi

International Centre for Genetic Engineering and Biotechnology (ICGEB), Trieste, Italy

Abstract

Plant associated microbial communities play key roles in biotic and abiotic stress tolerance as well as nutrient acquisition. The rhizosphere (the nearest soil area to the roots) hosts a rich microbial community which provides a series of beneficial outcomes related to plant growth. Plant roots recruit their rhizosphere microbiome from bulk soil and a small number of the microbes then enter the plant colonising the root endosphere. The phylogenetic conservation of rhizosphere microbiomes infers an organized assembly of microbiomes which is directed by mechanisms which are at large unknown. These most likely involve cell-cell interactions amongst microbes, plant-microbe signalling and root exudate effects. Microbial cell-cell communication is a way to dynamically regulate a variety of metabolic and physiological activities in response to the host, environment and microbial neighbors. Plant microbiomes contain a very large number of diverse bacterially produced molecules such as quorum sensing signals, volatiles and secondary metabolites which can play cell-cell signaling roles amongst members of the microbiome. Our present understanding of the numerous different signal molecules which are produced in a microbial community, on how the many different bacteria signal each other and what functions are regulated, is very much in its infancy. Understanding the chemical languages that shape the plant microbiome will be very informative on how these communities contribute to plant health and physiology. And will also lead to the development of prebiotic compounds as well as microbial probiotic competence for a more sustainable agriculture of economically important crops.