

# **The role of plant host rhizosphere signalling in root microbiome recruitment**

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Plants secrete a variety of organic compounds and chemical signaling molecules into the rhizosphere, but we are only just beginning to understand the complexity and plasticity of these root exudates, let alone their biological significance. An intriguing example of this are the strigolactones, which were initially identified in the root exudates of just a few plant species and shown to be germination stimulants for root parasitic plants. Now we know that the strigolactones are present in all plants/plant root exudates and play an essential role as plant hormone and in the symbiotic interaction of plants with AM fungi. In my group, we study the biological relevance of the strigolactones and other metabolites exuded by plants into the soil. Our hypothesis is that many more of the molecules that plants secrete have a signaling function to other rhizosphere organisms, including micro-organisms. So far the latter has been demonstrated for a small number of molecules only, which we expect to represent only the tip of the iceberg. Indeed, it seems that belowground a chemical arms race is going on in which plants evolve specific signaling relationships with beneficial organisms, on which plant enemies listen in. This is illustrated by the large structural diversity in strigolactones. Potentially this also allows plants to use one chemical class in signaling relationships with several different organisms. Also this is perhaps illustrated by the strigolactones, for which it was recently shown that different types of strigolactones recruit different root microbiomes in sorghum. We use a number of targeted and untargeted approaches to further unravel signaling relationships between plants and rhizosphere organisms. This will increase our understanding about the role of the plant and plant signaling in root microbiome recruitment and should result in tools that will help to optimize the use of beneficial micro-organisms in agriculture.