The symposium “Microbe-assisted crop production – opportunities, challenges and needs” (miCROPe 2019 – www.micrope.org) took place from 2-5 December 2019 in the Orangerie of the Schönbrunn castle in Vienna, Austria, with more than 300 delegates from 33 countries. The symposium, which addressed basic and applied aspects of applying beneficial microorganisms in crop production, was jointly organized by the AIT Austrian Institute of Technology and by the Austrian Association of Molecular Life Sciences and Biotechnology (ÖGMBT), to link the experience from the academic sector with the needs of the industry. The symposium addressed mechanisms of holobiont interactions, functioning of microbiota, microbial biocontrol of pathogens and weeds, microbial applications for improving nutrition and abiotic stress tolerance, disruptive application technologies and successful applications. Angela Sessitsch with the AIT Austrian Institute of Technology reports.
homoserine lactones, which are quorum sensing signals produced by many Gram-negative bacteria. Dr. Jenny Kao-Kniffin (Cornell University, USA) reported on exciting concepts of directed evolution of microbiomes, whereas Dr. Klaus Schläppi (University of Bern, Switzerland) discussed microbiota-mediated soil-borne memory effects for the benefit of the next plant generation. Prof. Richard Jefferson (CAMBIA & Queensland University of Technology, Australia) reviewed in his keynote talk the hologenome theory and the importance of the holobiont comprising plant and microbiome for a regenerative agriculture. More applied sessions addressed microbial biocontrol of pests, pathogens and weeds as well as microbial applications for improving nutrition and abiotic stress tolerance. Prof. Gabriele Berg (Graz University of Technology, Austria) addressed the importance of the plant microbiome for plant health. Dr. Karen L. Bailey (Agriculture and Agri-Food Canada) talked about the journey from discovery to commercialization of a biocontrol fungus, Phoma macrostoma, as a bioherbicide for broadleaved weed control. In regard to plant nutrition and improved plant stress tolerance, Prof. Philipp Franken (University of Applied Sciences, Erfurt, Germany) talked about the role of dark septate fungal endophytes such as Serendipita indica and the potential role of melanin abiotic stress tolerance of plants. Dr. Günter Brader (AIT Austrian Institute of Technology, Austria) reported on the development of microbial products for phosphate fertilization. A special session was dedicated to regulatory issues. Two company representatives, Dr. Gianpiero Gueli Alletti (APIS Applied Insect Science GmbH, Germany) and Dr. Faina Kamilova (Knoell, The Netherlands) talked about their insight and experience in regard to regulatory needs for the registration of microbial products, primarily as biocontrol agents. The final session dealt with disruptive approaches for engineering the phytobiome. Here, Prof. Trevor Charles (University of Waterloo, Canada) reported on the role of ACC deaminase in shaping the plant microbiome and the potential to utilize ACC deaminase-enriched cultures for microbiome optimization in operating hydroponic systems. Dr. Michael Ionesco (Lavie-Bio, Israel) talked about the computational predictive biology (CPB) platform of Lavie-Bio to pre-design and optimize product candidates that can overcome product challenges on the road to production. The closing keynote talk was given by Prof. Jos Raaijmakers (Netherlands Institute of Ecology, The Netherlands). Prof. Raaijmakers, a recognized expert in plant microbiome understanding, particularly in regard to disease suppressiveness of soil, discussed a new concept on phytobiome engineering by improving microbiome-associated phenotypes (MAPs). Prof. Raaijmakers presented a theoretical framework that can tackle these bottlenecks in this nascent field of engineering MAPs. The next miCROPe symposium is expected to take place in November/December 2021.