Bonar Hall | Dundee, Scotland, UK

3rd Plant Microbiome Symposium

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Abstracts

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Presenting author	Escudero-Martinez, Carmen
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Presentation type	Either
Session Name	Plant growth and development
Title	IDENTIFYING PLANT GENES SHAPING MICROBIOTA COMPOSITION IN THE BARLEY RHIZOSPHERE
Abstract text	Harnessing the plant microbiota thriving in the rhizosphere is a promising strategy to enhance sustainable agriculture. A prerequisite for this is to identify plant genes shaping the plant microbiome. Here, we used metagenomics information as an external quantitative phenotype in QTL to map the host genetic determinants of the rhizosphere microbiota in wild and elite genotypes of the global crop barley. We identified a locus on chromosome 3H named QRMC-3HS associated with the recruitment of taxonomically distinct bacteria, possibly representing a major determinant of plant-microbiota interactions. Sibling lines with contrasting alleles, i.e., either elite or wild, at the QRMC-3HS locus shaped the microbial composition, validating the microbial role of this locus. Soil-grown barley RNA-seq of root tissue allowed us to select a limited number of candidate genes for this phenotype. Among those, we identified a Nucleotide-Binding-Leucine-Rich-Repeat (NLR) gene. Further inspection of the barley pangenome, revealed that this NLR falls in a region of structural variation, possibly underlining an important agronomic trait. Overall, our results provide novel insights into the footprint of crop improvement on the plant's capacity of shaping rhizosphere microbes and set the stage for future translation to plant breeding.

Number	**S4.4**
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Presenting author	Nishisaka, Caroline S
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Presentation type	Oral
Session Name	Plant growth and development
Title	The impact of soil microbiome diversity on rhizosphere microbial communities' assembly and plant health
Abstract text	The rhizosphere microbiome plays a significant role in the host plant's health, such as defense against soil-borne diseases. However, the understanding of how the rhizosphere soil microbiome diversity impacts plant protection in production systems is still limited. This study aims to evaluate the impact of rhizosphere microbiome diversity in wheat plants inoculated with the soil-borne pathogen *Bipolaris sorokiniana*, with/without the antagonist Pseudomonas sp. CMAA1741, under a gradient of soil microbiome diversity. We hypothesized that the diversity and functionality of the rhizosphere determine the success of the antagonist bacterium establishment in the rhizosphere. Thus, a bioassay was conducted using natural soil, autoclaved soil, and three different dilutions of natural soil on

	autoclaved soil. The results showed that antagonist inoculated treatments resulted in higher plant height and root dry mass, while, in soils with low diversity, the severity disease index and the biocontrol effect of the antagonist were higher across all treatments that received the fungal pathogen with/without inoculant, respectively. Sterilized soils inoculated with both agents had the most effectiveness in pathogen biocontrol, with enrichment of Chtoniobacter and Chitinophaga bacterial genera in this treatment. Also, an increase of Chitinophaga bacterial genus and Alternaria, Chaetomium, and Waitea fungal genera were observed when just pathogen was inoculated in soils. (Support FAPESP 2020/00469-2; 2020/06077-9; 2021/14711-2).

Number	**S4.5**
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Presentation type	Either
Session Name	Plant growth and development
Title	Biological fertilizer in sugarcane: physiological effects and stalk yield improvement
Abstract text	The biological management of the agricultural system is the new frontier for high sugarcane yield. Biological fertilizers composed by a pool of beneficial microorganisms may improve the soil biological balance. Its use can be another alternative to improve the use and efficiency of fertilizers, promote soil conservation and increase sugarcane yield in a sustainable way. Thus, this study was carried out to evaluate the agronomic and physiological sugarcane performances and the effect on soil enzyme activity under biological fertilization. Growth, technological and physiological parameters and soil enzymatic activity in surface layer were analyzed. The use of biological fertilizer altered physiological parameters, contributing to a greater assimilation of CO2, improving net photosynthesis in the sugarcane crop, in addition to increasing the water use efficiency. There was an increase in the enzymatic activity of soil acid phosphatase. The biometric parameters stalk length, stalk diameter and number of stalks per meter were improved by biological fertilizer application. Consequently, there was an increase of 10% in the stalk yield and 8% in the sugar yield.

Number	**S4.6**
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Presentation type	Poster
Session Name	Plant growth and development
Title	Use of Microgeo and different doses of phosphorus in soybean (Glycine max)