February, 16th 2021

Leibniz Centre for Agricultural Landscape Research

Offer for a Master Thesis Project

in the Working Group Microbial Biogeochemistry, Research Area Landscape Functioning

We are seeking for a motivated new member of our team who wants to conduct a Master Thesis Project with us and is interested in microbiomes and bioinformatics. We are offering a student position at our location in Müncheberg together with the Humboldt University of Berlin (Thaer Institute, Faculty of Life Sciences) for a

Master Project (Masterarbeit) in Crop Plant Microbiomics

Background.

Wheat (*Triticum aestivum* L.) is one of the most produced crops world-wide and is also one of top crops cultivated in Europe. As all known land plants, wheat hosts a complex microbial community consisting of thousands of species; called the microbiome. An important way to communicate between each other but also with plant, the microbiome produces specific chemical signals, so called volatiles. Some of them are beneficial for the plant fitness. Information on the taxonomy and functionality of microbiomes can be assessed by using metagenomics. Since chemical pesticides cause many environmental problems (e.g. insect biodiversity losses), a reduction of their use is mandatory and finds meanwhile societal consent. Nonetheless, climate change-associate weather extremes such as drought and flooding through heavy rainfall still weaken the fitness of wheat plants in agricultural production, and make them less tolerant to pests and herbivores.

Master Thesis project. Metagenomics of Volatile Synthesis of Wheat.

You will work on a large metagenome dataset using latest bioinformatic tools. A training and support will be ensured by the group's bioinformatician. The goal of the Master project is to quantify synthesis pathways of specific volatiles (e.g. terpenes) in 30 metagenomes that were generated in an experiment in which drought and flooding stress was simulated with the wheat variety *Triticum aestivum* L. Chinese Spring. Activity of key genes will be proven by RT qPCR. Finally, pathway frequencies will be used in multivariate statistical analyses to reveal

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treatment effects. If reasonable, also pure culture experiments with key microorganisms can be conducted to test for their volatile production.

If you have any questions, please do not hesitate to contact us:

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