

第32回 HiPSIセミナー

(Hiroshima University, The Research Core for Plant Science Innovation)

Presentation Title:

Rhizosphere processes in plant stress tolerance and nutrient uptake

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(School of Integrated Arts and Sciences, K209)

The rhizosphere is a dynamic sphere of life which represents an interface where plant-microbe interactions take place and through which resources have to pass before being captured by roots. Rhizosphere properties emerge through the interaction of plants, microbes and the soil matrix. While rhizosphere properties have long been recognised as a key factor for in plant health and nutrient acquisition, there is still a lack of inclusion of rhizosphere-based strategies in current breeding programmes and agricultural practices. This talk will provide three examples of belowground plant-microbe and plant-environment interactions and examine their potential in the sustainable intensification of agricultural systems. First, a study assessing the beneficial effect of the legume-rhizobium symbiosis on the drought stress responsiveness in the model legume *Medicago truncatula* will be presented. Using plant physiological, metabolomic and proteomic techniques this study concludes that an enhanced allocation of carbon compounds to osmotically active substances increased the drought tolerance of the host. Interestingly, the positive effect of the symbiotic interaction was empirically independent of the initial level of N nutrition. Second, an in-depth description of the extracellular proteome released by wheat roots and proteomic changes in response to P starvation will be presented. Proteins with a predicted localisation to the apoplast constituted the major proportion of stress-responsive proteins. Acid phosphatases were not identified within the soluble extracellular protein samples. The absence of extracellular acid phosphatases was further validated by a targeted proteomic assay (multiple reaction monitoring), indicating that wheat acid phosphatases play a minor role in P mobilisation beyond the immediate root surface and that cell wall remodelling is essential in the response to P limitation in this fine rooted species. Finally, ongoing work will be discussed, assessing the role of root exudates released by various upland rice cultivars in phosphate mobilisation from highly-phosphate fixing Andosol.

***本セミナーは統合生命科学研究科共同セミナーの対象です**
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