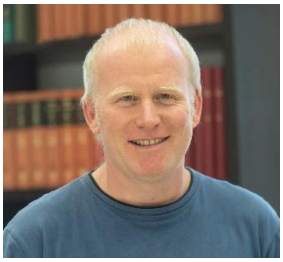
Gabriel Schaaf 教授（ボン大学）研究セミナーと講義のご案内　（農学研究科, 高野順平）



OMU 戦略予算による Visiting Research Professor として Bonn University（ドイツ）の Gabriel Shaaf 教授を招聘し、研究セミナーと講義（２回）をお願いしています。Schaaf 博士は、これまで植物栄養学と脂質シグナリングの分野で活躍され、イノシトールピロリン酸の代謝とリンシグナリングの研究などで先進的な成果を挙げられています。セミナーだけでなく、講義もオープンですので、多くの方の聴講を期待しています。

講義 1,　10 月 28 日（火）9:00-10:30, 中百舌鳥キャンパス, B11 棟 第 1 講義室

"Plant Phosphate Nutrition: From Global Deposits to Mobilization, Uptake and Remobilization"

Description:
This lecture introduces the role of phosphate as an essential mineral element for plant growth and development. We will examine the global status of phosphate resources, highlight the limitations of natural deposits and their uneven quality. Special focus will be placed on plant strategies to mobilize, acquire, and remobilize phosphate.

講義 2,　11 月 4 日（火）9:00-10:30, 中百舌鳥キャンパス, B11 棟 第 1 講義室

"Phosphate Sensing and Inositol Pyrophosphates: Signaling at the Crossroads of Nutrition and Plant Defense"

Description:
This lecture explores how plants sense and respond to phosphate availability at the molecular level. Emphasis will be given to the role of inositol pyrophosphates as key signaling molecules, not only in phosphate sensing but also in other cellular processes. We will discuss challenges of how to detect and analyze these molecules and also explore the roles of these messengers in hormone perception and plant defense.

研究セミナー,　10 月 30 日（木）16:00-17:30, 中百舌鳥キャンパス, B11 棟 第 1 講義室

"Role of Inositol Pyrophosphates in Phosphate Sensing, Plant–Microbe Interactions and Immunity"

Phosphorus (P) is an essential mineral element that often limits crop growth, as only a small fraction of soil P is readily available to plants. With global P deposits being limited and considering that P is a strong global pollutant of open water bodies, enhancing crop P-use

efficiency is a pressing agricultural challenge. Additionally, a significant portion of P in plant seeds is stored as phytic acid ($InsP_6$) which chelates essential micronutrients such as iron and zinc, reducing their bioavailability for humans and non-ruminant animals. In plants, phosphate (Pi) homeostasis is tightly regulated by the interaction between Pi starvation response transcription factors (PHRs) and SPX proteins, which act as high-affinity receptors for inositol pyrophosphates (PP-InsPs), such as $InsP_7$ and $InsP_8$, highlighting their critical role in Pi signaling. However, the synthesis and especially turnover of these signaling molecules remain poorly understood. Using a non-hydrolysable PP-InsP analog and affinity pull-down assays, we recently identified several NUDIX hydrolases (NUDTs) from *Arabidopsis thaliana* as potential interactors of PP-InsPs. Our study investigates the possible involvement of NUDTs in PP-InsP turnover and revealed specialized substrate specificities for PP-InsPs among different NUDT subclades. Additionally, we will share new insights into how PP-InsPs regulate plant–microbe interactions, particularly arbuscular mycorrhiza in the legume *Lotus japonicus* and how tools developed in this study may be employed to enhance nutrient use efficiency and plant immunity.

References:

Laha, D. et al. (2015). VIH2 Regulates the Synthesis of Inositol Pyrophosphate $InsP_8$ and Jasmonate-Dependent Defenses in Arabidopsis. *Plant Cell* 27, 1082-1097.

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Zhu, J. et al. (2019). Two bifunctional inositol pyrophosphate kinases/phosphatases control plant phosphate homeostasis. *eLife* 8.

Riemer, E. et al. (2021). ITPK1 is an $InsP_6$/ADP phosphotransferase that controls phosphate signaling in Arabidopsis. *Mol Plant* 14, 1864-1880.

Schneider, R. et al. (2025). NUDIX Hydrolases Target Specific Inositol Pyrophosphates and Regulate Phosphate Homeostasis and Bacterial Pathogen Susceptibility in Arabidopsis. bioRxiv, 2024.2010.2018.619122 (accepted in *Journal of Integrative Plant Biology*)

Raj, K., Gaugler, V. et al. (2024). *Lotus japonicus* VIH2 is an inositol pyrophosphate synthase that regulates arbuscular mycorrhiza. bioRxiv, 2024.2012.2017.628921.