

## WSU Plant Pathology Seminar

March 3, 2025

### On the origin of root nodule symbiosis: Overview of “when” and “how” it happened



**Dr. Kai Battenberg**

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**Abstract:** Root nodule symbiosis (RNS) is a symbiotic interaction established between some host plants and nitrogen-fixing soil bacteria that allows the host plants to thrive in marginal soils. Evolutionarily, RNS is restricted to a clade of angiosperms consisting of only four orders. However, within this clade, RNS is scattered across 10 distantly related families. Hypotheses to explain this restricted yet scattered distribution of RNS have matured in parallel with the emergence of phylogenetics and phylogenomics. While earlier studies focused more on the timings of the gains and/or losses of RNS, phylogenomics has enabled more recent studies to hypothesize on the potential mechanisms in greater detail. Recent studies tend to suggest that RNS was gained once and subsequently lost by many lineages. On the other hand, some aspects of the genome suggest an incremented change leading to the gain RNS. Due to the obvious agricultural applications of RNS, the genetic underpinnings of how RNS has arisen have been discussed by scientists for decades but remain elusive. This seminar will discuss the key discoveries that the field has made collectively, in tandem with the collaborative efforts that I have been a part of as a graduate student in the US and as a researcher in Japan.

WSU Plant Pathology Seminar Series-Spring 2025 | Mondays 4:10 pm | Clark Hall151in Pullman campus

Zoom Link: [wsu.zoom.us/j/93558513144?pwd=G3JbA1JsE2ANHx3P9QbFnWSUomeuat.1](https://wsu.zoom.us/j/93558513144?pwd=G3JbA1JsE2ANHx3P9QbFnWSUomeuat.1)

Meeting ID:935 5851 3144 |Passcode:1824 |Callin Number:1 646 558 8656

### **Short biography of Dr. Battenberg**

Dr. Battenberg received his Ph.D. from UC Davis in 2017 in plant biology with an emphasis on evolution and systematics. His graduate research focused on the evolutionary history of root nodule symbiosis, a topic he continued to explore as a postdoc at RIKEN in Japan, where he is originally from. Since February 2024, he is the Collections Manager in Stillinger Herbarium at the University of Idaho. His research interest is in plant evolution, specifically, understanding how the “same character” can arise multiple times independently within a single group of plants. He is interested in continuing this research using root nodule symbiosis and other characters as a model.