June 25, 2018

Dear Editor,

We are pleased to submit for consideration our invited methods paper, “An optimized rhizobox protocol to visualize root growth and responsiveness to localized nutrients,” for publication in the Journal of Visualized Experiments. The enclosed protocol is accessible and versatile, and we feel it will be a valuable contribution to the field of root and rhizosphere research.

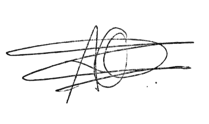
Interest in roots and rhizosphere has grown rapidly in recent years given increasing acknowledgement of their importance to plant nutrient uptake, biogeochemical cycling, and carbon sequestration. However, visualizing roots *in situ* poses a substantial challenge, especially when the goal is to study the development of a single root system over time. Destructive harvesting methods such as shovelomics eliminate the possibility of time-series observations on single experimental units, and more recent non-destructive imaging techniques such as magnetic resonance imaging and x-ray computed tomography require specialized, expensive equipment.

We present a protocol to construct rhizoboxes, clear rectangular units that allow visualization of roots in soil (or a soil-like substrate) over time. Our protocol focuses on the application of rhizoboxes to root plasticity research, in which root proliferation in nutrient-enriched patches is compared to a nutrient-free control patch. We also discuss the ways that other rhizosphere researchers have used rhizoboxes to address other research questions and outline potential future applications. This protocol is inexpensive and approachable in comparison to many published rhizobox experiments, including one recently published in JoVE (Bodner et al. 2017).

Given recent interest in roots and rhizosphere interactions and the diverse potential applications of rhizoboxes to answer these research questions, we feel this protocol is a unique and valuable contribution that is well-suited to publication in JoVE.

Thank you for your consideration.

Sincerely,



Dr. Amélie Gaudin