

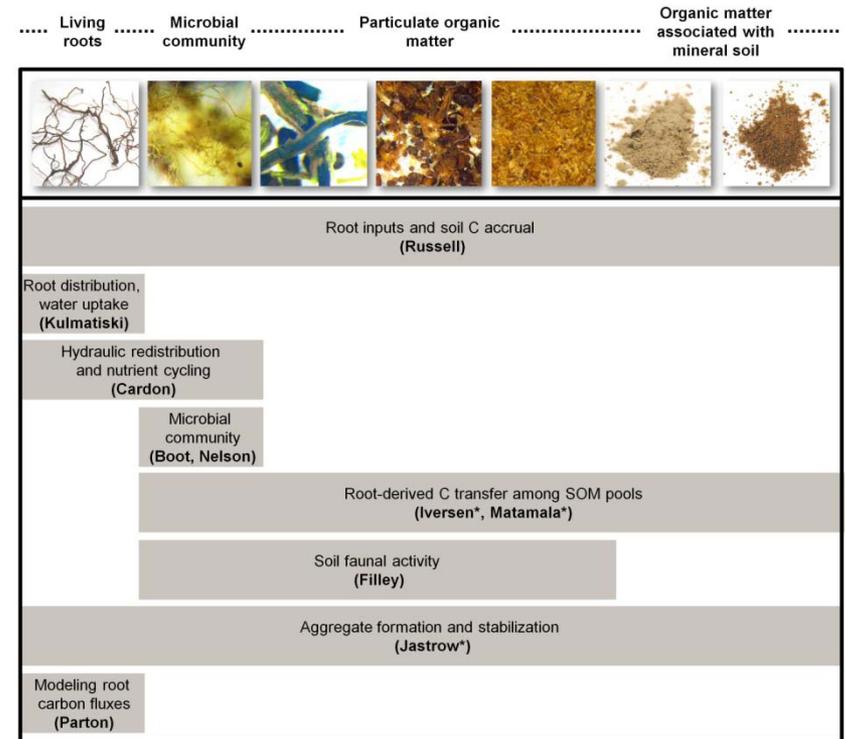
Missing links in the root-soil organic matter continuum

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Co-organizer: Sarah O'Brien, Argonne National Laboratory and University of Illinois, Chicago

Funding: DOE Office of Science, Biological and Environmental Research

- Researchers from Oak Ridge and Argonne National Laboratories co-organized a symposium for the Ecological Society of America on the carbon continuum from living roots to organic matter associated with mineral soil.
- The objective was to synthesize disconnected pieces of knowledge from soil- and root-centric studies into an integrated understanding of belowground ecosystem processes.
- It was concluded that the rhizosphere, soil heterotrophs, and the dynamic soil environment should be the main focus of future research to enhance our understanding of the transformation of root-derived carbon to long-lived soil organic matter.
- Improved conceptual models are needed to synthesize results from multiple, small-scale studies conducted across a diversity of topics.
- With improved communication, belowground research can span ecological disciplines, and also span the continuum from living roots to long-lived soil organic matter.



Co-organized by Sarah O'Brien* and Colleen Iversen*.

Fig. 1 The symposium featured a diversity of speakers working at the interface between plant roots and the soil, including organizers and multiple speakers from ORNL and ANL (*).

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Abstract:

Plant root inputs and the cycling of soil organic matter (SOM) are drivers of important processes such as ecosystem nutrient and water cycling, and long-term soil carbon storage. The relationship between plant roots and SOM can be characterized as a continuum, with fresh root detritus on one end, and highly processed SOM at the other. However, few studies have explicitly linked the turnover of roots with the subsequent fate of root-derived carbon and nitrogen in SOM pools. To continue the dialogue on the root-SOM continuum, we organized a session at the Ecological Society of America annual conference, in Albuquerque, New Mexico, USA, in August, 2009. We gathered a docket of speakers whose efforts were complementary but represented distinct portions of the root-SOM continuum. Our goal was to synthesize disconnected pieces of knowledge from whole-system, root- and soil-centric studies into a more comprehensive understanding of important belowground ecosystem processes, particularly soil carbon and nitrogen cycling. Compelling themes from the symposium centered around the importance of the living rhizosphere, soil heterotrophs, and the soil environment for the transformation of roots to long-lived soil organic matter. The main conclusions of the symposium were: (1) no single experiment can span the root-SOM continuum, and (2) improved conceptual models are necessary to synthesize knowledge gained from studies conducted along the root-SOM interface.

Citations:

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