Soil Microbes Respond Similarly to Forest Harvest in the Pacific Northwest

Douglas-fir (Pseudotsuga menziesii), a historically dominant species in the Pacific Northwest, is the primary tree harvested and re-planted throughout forested regions of Oregon and Washington. Stands are typically in their second or third rotation, but it remains poorly understood how soil microbial communities respond to conventional timber harvest and subsequently drive biogeochemical cycling between rotations. Identifying trends in biogeochemical responses across this region may help forest managers maximize productivity and environmental stewardship.

In an article recently published in the Soil Science Society of America Journal, researchers report on the short-term microbial response to conventional timber harvest, sampling from nine managed, second-growth sites across western Oregon and Washington. Potential enzyme activity, extractable soil C and N, and respiration and leachate composition during microcosm incubations served as indicators of microbial activity. Despite variation in soil type, stand age, and climate, the team found consistent indicators of shifts in available C and N across sites, suggesting pre-harvest co-limitation of the microbial community by C and N, but C limitation with excess inorganic N production one year following harvest.

The study results document the initial microbial response to harvesting and may provide crucial insights about disturbance–recovery patterns and environmental resilience throughout timber harvest rotations.


Low-Cost Method for Measuring Fracture Pathways

Understanding the location of preferential pathways for water infiltration is an issue with application to groundwater recharge and flow. Typically, procedures that map the locations of open fractures in buried bedrock formations are marginally successful and come with great cost. The ability to map these fracture pathways at greater resolution and lower cost represents a value proposition that can be deployed across a wide range of fractured-rock-hosted contaminated sites.

A study recently published in Vadose Zone Journal evaluated the applicability of using inexpensive, readily available passive radon (Rn) detectors as a characterization tool to passively detect pathways in fractured rock that are responsible for transmitting meteoric water from the surface into an underlying aquifer. The researchers utilized standard CR-39 (allyl diglycol carbonate) particle track Rn detector technology, adapted to meet specific criteria, which included a simple, field-rugged, passive sampling design. This methodology has a low cost and is minimally invasive and easy to deploy.

This study demonstrated that radon is useful in detecting communicative fracture networks at the field scale. The results of this promising initial evaluation suggest that further research is warranted. Additional testing in a variety of geologic environments would add to the knowledge base and help to improve methods and practices for implementing the technology.


How the rapidly deployable monitoring portal is installed in the soil column and its position relative to the soil–bedrock interface.

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