Effects of Microbial Growth on Soil Water Flow. (S01-schutter164507-Poster)

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Abstract:

The temporal variation in soil hydraulic properties due to microbial activity is not well understood, particularly under unsaturated conditions. The purpose of this study is to quantify changes in the unsaturated hydraulic conductivity and moisture retention accompanying microbial growth under unsaturated conditions. The hydraulic properties of replicate sandy clay loam field cores were monitored for several months following addition of either glucose or a microbial inhibitor. The soil cores were maintained at room temperature with a soil water pressure head of -100 cm. Soil hydraulic functions were measured at several elapsed times using a continuous flow method which combines direct Darcian analysis with inverse numerical analysis of Richards' equation to provide physically relevant parameter estimates. Both draining and wetting hydraulic functions were measured to determine the effect of microbial activity on soil water hysteresis. Concurrent with the hydraulic property measurements, total and active fungal and bacterial numbers were estimated in parallel soil cores using phase contrast and epifluorescence microscopy. Changes in the hydraulic conductivity function, pore-size distribution, and water retention as a result of microbial growth and decline will be discussed.

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