

Dynamics of spatial and temporal outflow from a soil column influenced by earthworm activity

Sidra Bibi(PhD Student) Dr Loes Van Schaik Insititute of Ecohydrology Technical University, Berlin

Introduction

> Earthworms; ecosystem engineers.

- Physical properties
- Chemical properties
- Soil structure (soil aggregates and macropores formation).
- Burrowing activity may influence the soil moisture retention and water flow.
- > Enhancing infiltration into deep soil layers.





Objectives

We will study the influence of anecic earthworms (Lumbricus terrestris fed on poplar leaves)



Methodology



Experimental setup:

- Rainfall simulations with nozzle above soil column (50 cm high, 29 cm diameter)
- Fourteen small cylinders (5 cm high, 4.8 cm diameter) at the bottom of large cylinder
- Water supply 20 minutes intensity 34 mm/h (twice per week)

Measurements:

- Temporal resolution continuous lumped outflow on scale
- Spatial resolution of outflow in small beakers every hour

Three phases of conducting an experiment

- Analyse the water flow through soil column
- Addition of earthworms we will measure the initial changes
- Fully settled earthworms to observe whether a new steady state in water flow develops.



Intra-wicks temporal variability in different experiments



Time

Spatial distribution of all wicks from 1st experiment



Lumped outflow on the scale

Temporal variability between experiments



-•--Exp 1 -•--Exp 2 -•--Exp 3 -•--Exp 4 -•-Exp 5 -•-Exp 6

Expected Outcomes

We expect the outflow of water from the soil column to change due to the earthworm activity On the one hand the creation of macroaggregates are expected to increase the water retention in the soil and

 On the other hand the macropores are expected to create a spatial variability in outflow and a more rapid reaction of outflow to the irrigation events.

Quick recap



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Sidra Bibi: sidra.bibi@campus.tu-berlin.de Loes Van Schaik: l.vanschaik@tu-berlin.de

Technical University of Berlin, Germany Depratment of Ecology & Landscape www.oekohydro.tu-berlin.de