

Understanding the biogeochemical role of soil microbial communities in VT agricultural riparian zones

VT EPSCoR | NSF

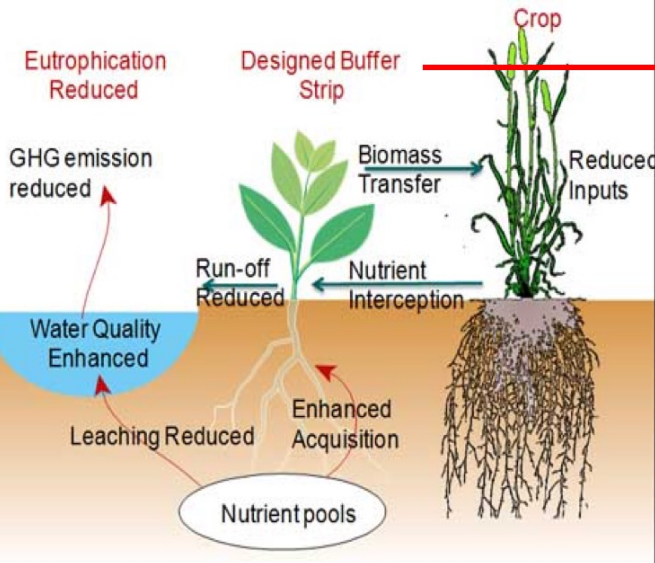
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Introduction

- Riparian zones are integral to managing biogeochemical cycling

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- They can reduce the flow of nutrients such as Phosphorus, Carbon, and Nitrogen into waterways



Riparian Buffer Considerations:

- Field Capacity
- Microbial Community Dynamics
- Existing Nutrient Concentrations

- Riparian zones are integral to managing biogeochemical cycling
- They can reduce the flow of nutrients such as Phosphorus, Carbon, and Nitrogen into waterways
- Soil microbes play an important role in the movement of these nutrients

Study Site & Sampling Scheme

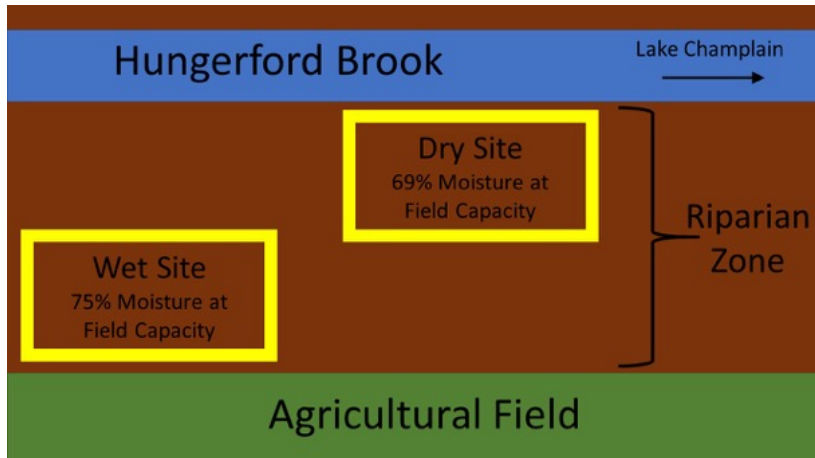
Study Site & Sampling Scheme

- We took 90 intact soil cores from a wet agricultural riparian zone in Swanton, VT
- Within the wet riparian zone, we took 45 cores from the dry site and 45 cores from the wet site
- Future studies will sample from the dry agricultural riparian zone and a wet/dry forested riparian zone in Northern VT

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Wet Agricultural Riparian Zone

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Methods

- The first 15 cores from each site were kept dry
- An average Swanton rainstorm was simulated on the second 15 cores from each site
- Hurricane Irene was simulated on the last 15 cores from each site

Incubation Protocol (cont.)

PAS Gas Sampling

- N_2O

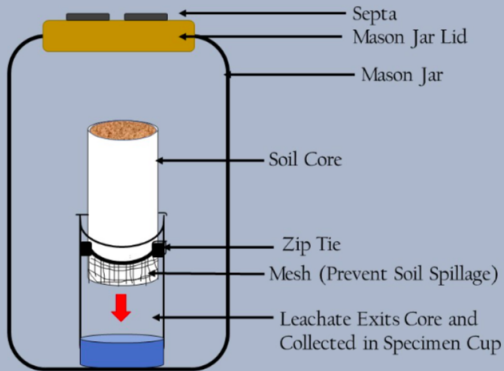
Destructively Sample Soil

- For future enzyme analysis

Leachate Collection

- NH_4
- NO_3

Soil Core Set Up



Incubation Protocol (cont.)

- Gas flux data measured via photoacoustic spectroscopy
- Leachate was collected, labeled, and frozen as needed for future analysis
- Cores were destructively sampled for future enzyme analysis

- Microplating leachate to assess ammonium and nitrate concentrations
- Running leachate samples to assess dissolved organic carbon and dissolved nitrogen
- Microplating soils to assess microbial enzymatic activity