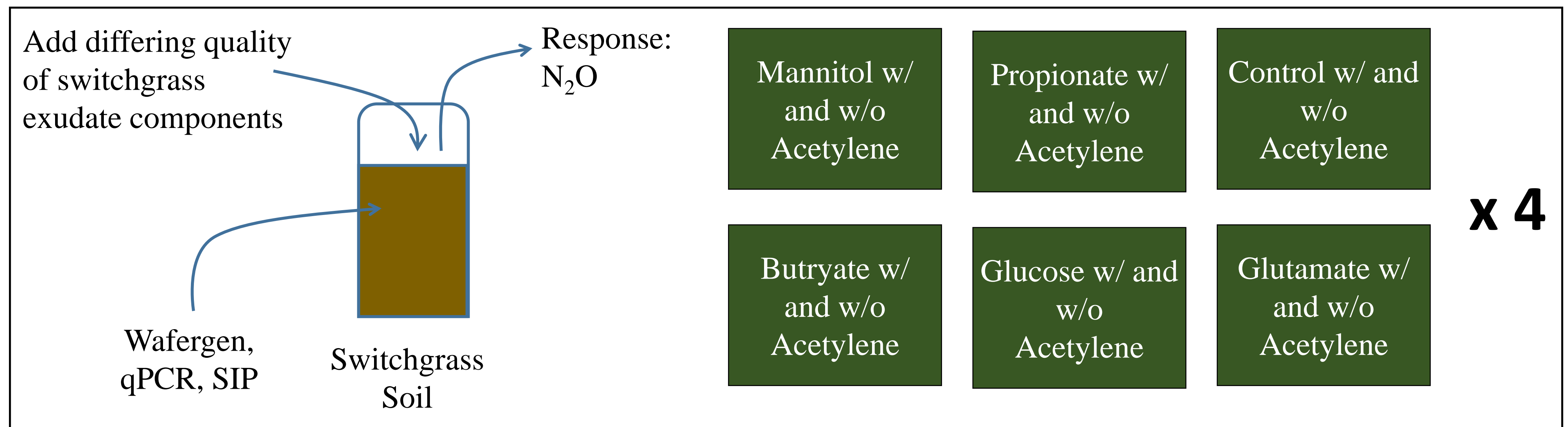


Understanding How Microbially Mediated Denitrification is Influenced by Switchgrass Exudates

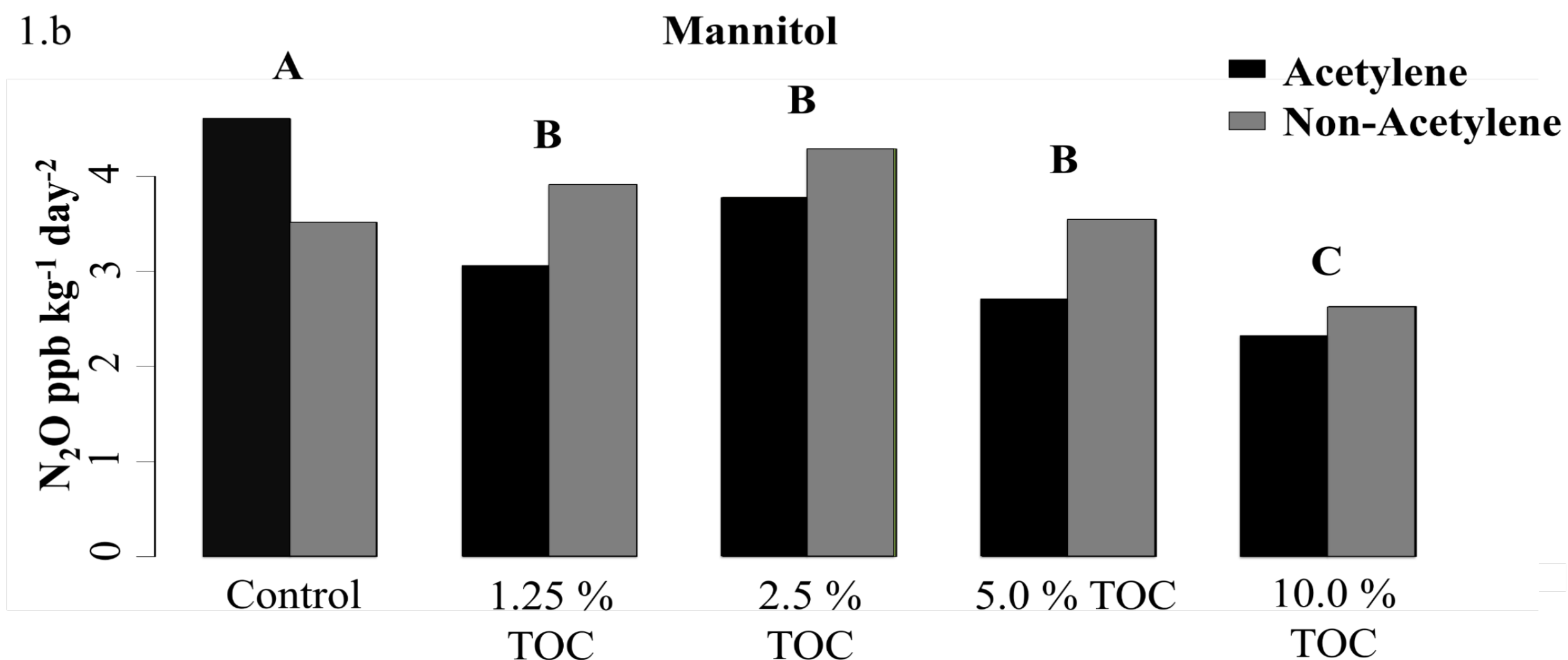
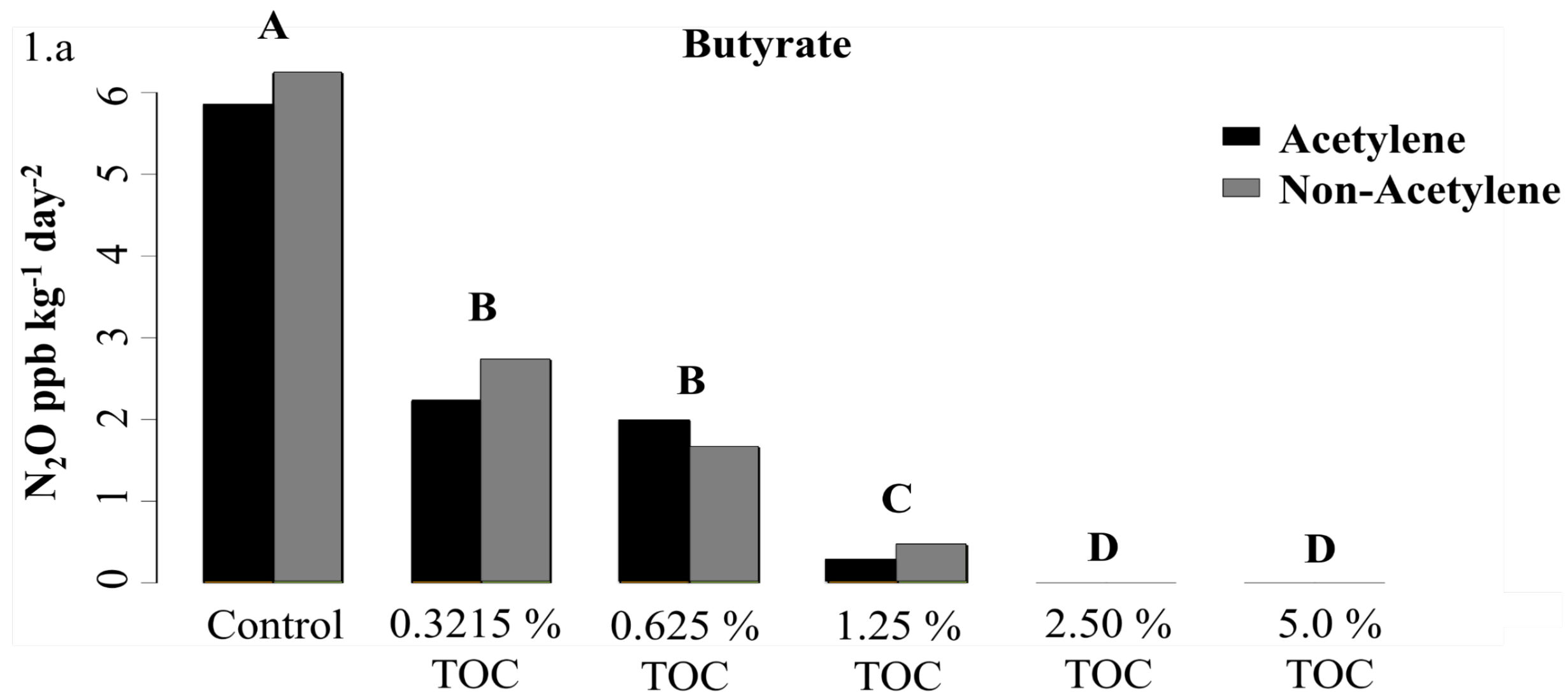
- How does organic carbon quantity and quality affect denitrification rates in switchgrass (*Panicum virginianum*) soil grown on marginal lands?
- How does applying nitrate to organic carbon compounds of varying bioaccessability affect denitrification rates and the ratio of nitrous oxide (N₂O) to nitrogen (N₂) gas emissions? Is this reflected in the microbial community?



- Soil cores (25 cm) from unfertilized switchgrass in Lux Arbor marginal land site
- Organic carbon compounds found in switchgrass exudates added from a range of 0.3 - 5.0 % total organic carbon to the soil
- Samples received high (0.16% N-NO₃ (w/w)) and low nitrate (0.0017 % N-NO₃ (w/w))
- Samples analyzed for N₂O gas 4 times during 8 hr incubation

So far, organic carbon has had inhibitory or no effects on denitrification rates.....

Future Work



1. Learn more about kinetics of the reactions (nitrate that is converted to nitrous oxide) in the soil
2. Use ¹³C and stable isotope probing to assess which microbes are able to utilize organic carbon compounds of varying qualities
3. DNA extraction and sequencing: determine what genes are present in the microbial community
4. Utilize RNA to track microbial pathways involved in breaking down exudates added (KEGG)
5. Network analysis: examine potential interactions between microbial groups in the presence of exudates