

Characterization of bacterial communities in Arctic soil

Gursharan Uppal, Jonathan Van Hamme, and Eric Bottos

Department of Biological Sciences, Thompson Rivers University

Introduction

Environmental Pollutants

- Found throughout the Arctic
- Break down more slowly in the Arctic
- Higher levels in areas of human activity

Microbial diversity

- More diverse communities can better cope with environmental changes
- Diversity indices can be used to characterize microbes within a community and between different communities
- Understanding the diversity provides insight into possibilities for bioremediation

Objective

To determine a baseline database of microbial diversity for understanding the diversity of the region and understanding the potential for microbial remediation of contaminated Arctic soils

Samples

- All samples were collected from sites around Cambridge Bay

Location	Label
Cambridge Dump	D
Metal Dump	M
Tractor Dump	TD
Cambridge Bay Tank Farm	TF

Figure 1. Labeling of samples

Methods

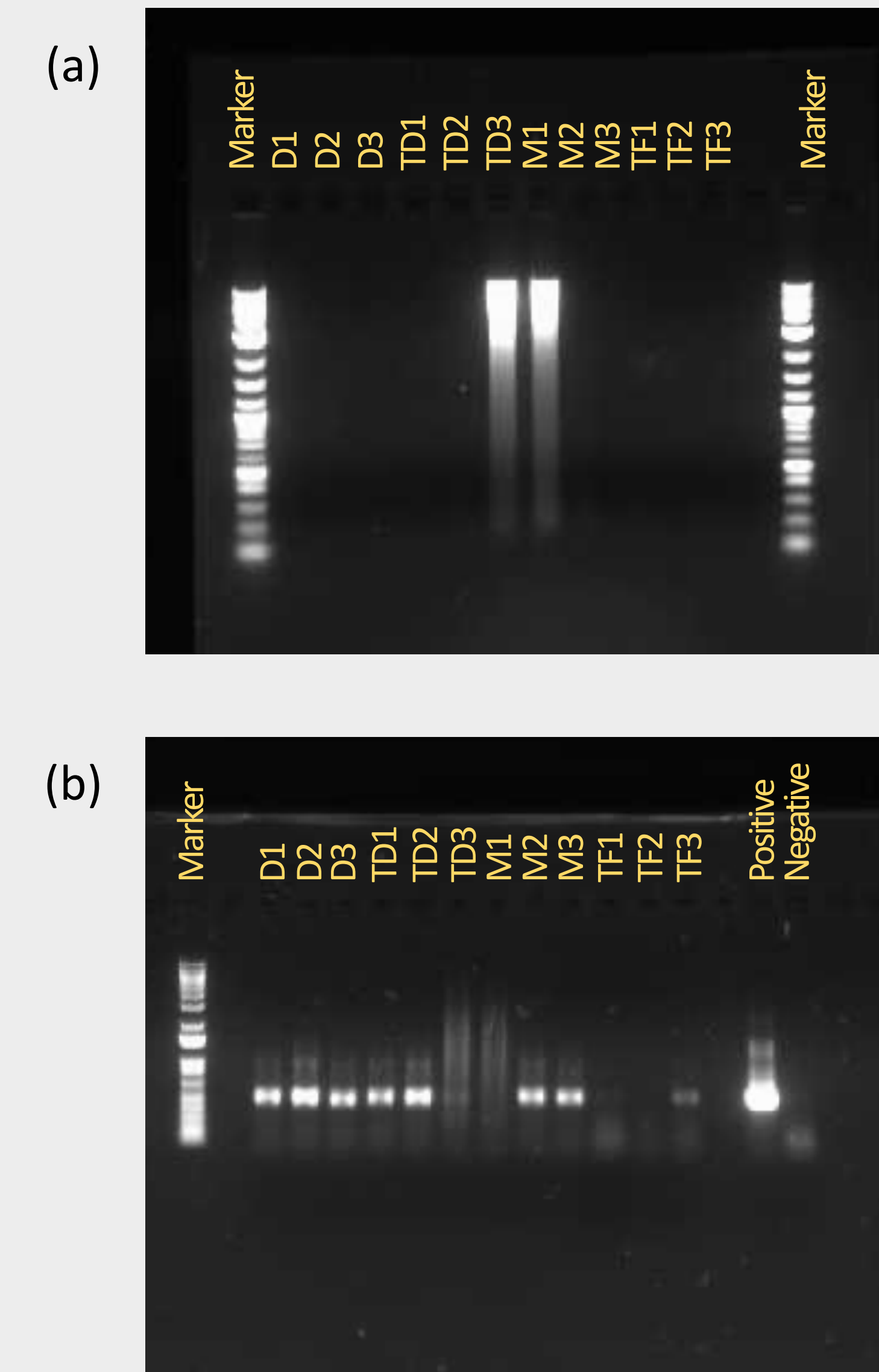
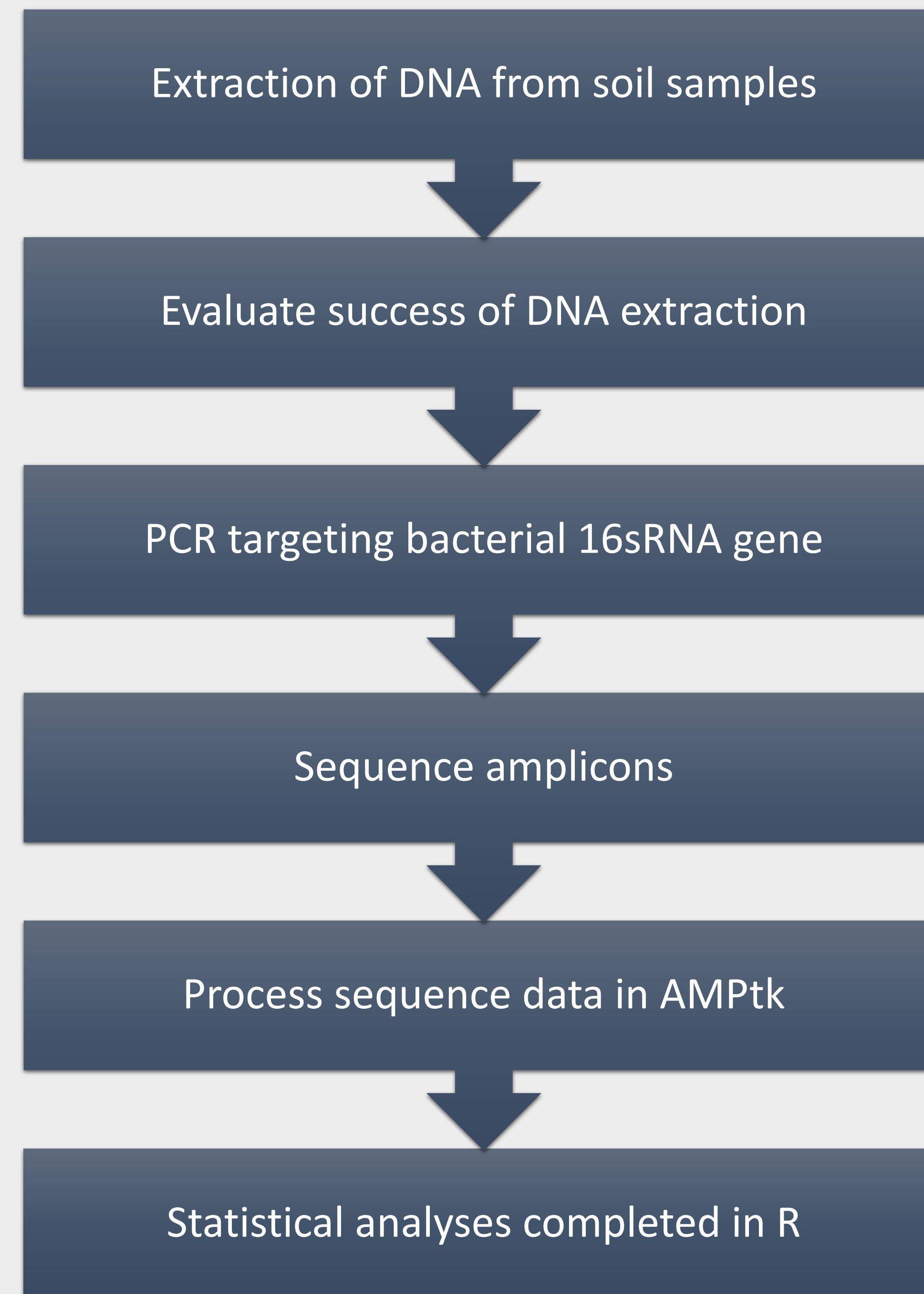


Figure 2. Agarose gel images of (a) DNA extracts, (b) amplicons (where positive is DDE genomic DNA and negative is H₂O)

Results: Beta-Diversity

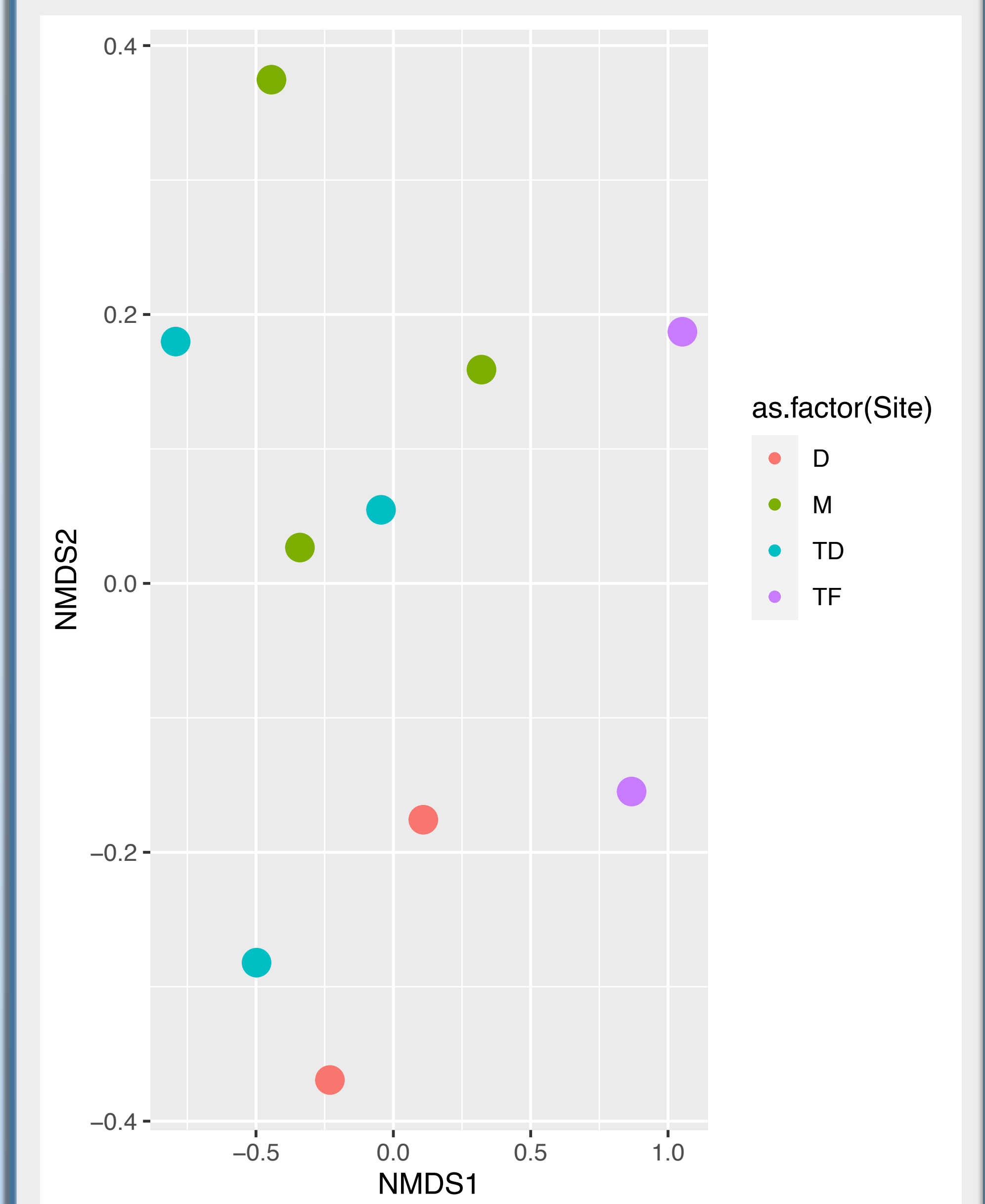


Figure 4. NMDS plot of all samples representing Bray-Curtis dissimilarity between samples.

Results: Microbial Diversity

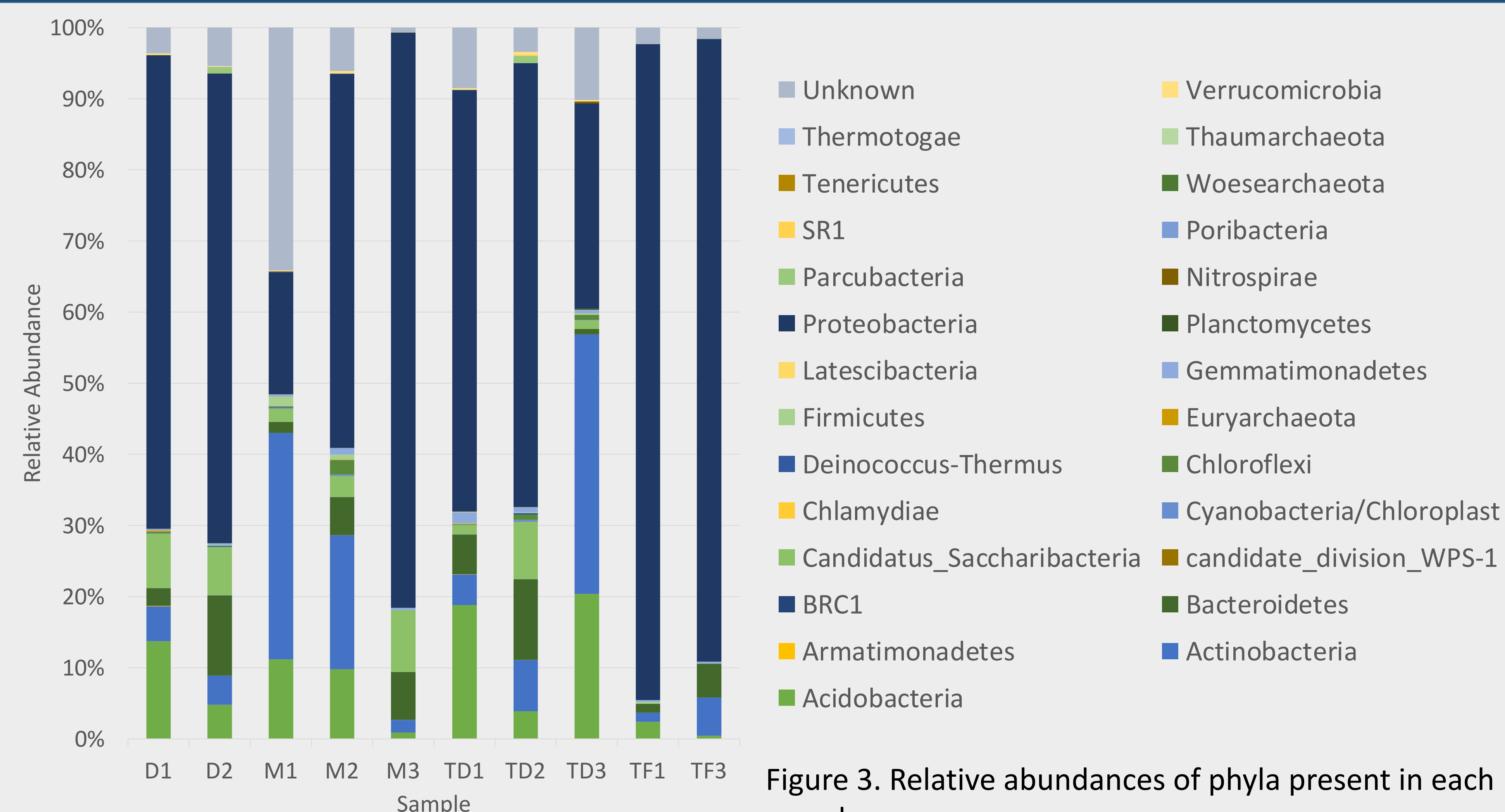


Figure 3. Relative abundances of phyla present in each sample

Conclusion

- TF samples are most dissimilar to all other samples
- Most samples were dominated by Proteobacteria

Future Work:

- Investigate soil samples for environmental contaminants

Acknowledgements

- We are thankful to Dr. Ian Hogg and the staff at the Canadian High Arctic Research Station who assisted with collecting samples for this research.