

Does the Soil Microbial Community Adapt During the Decomposition of Skeletal Muscle Tissue?

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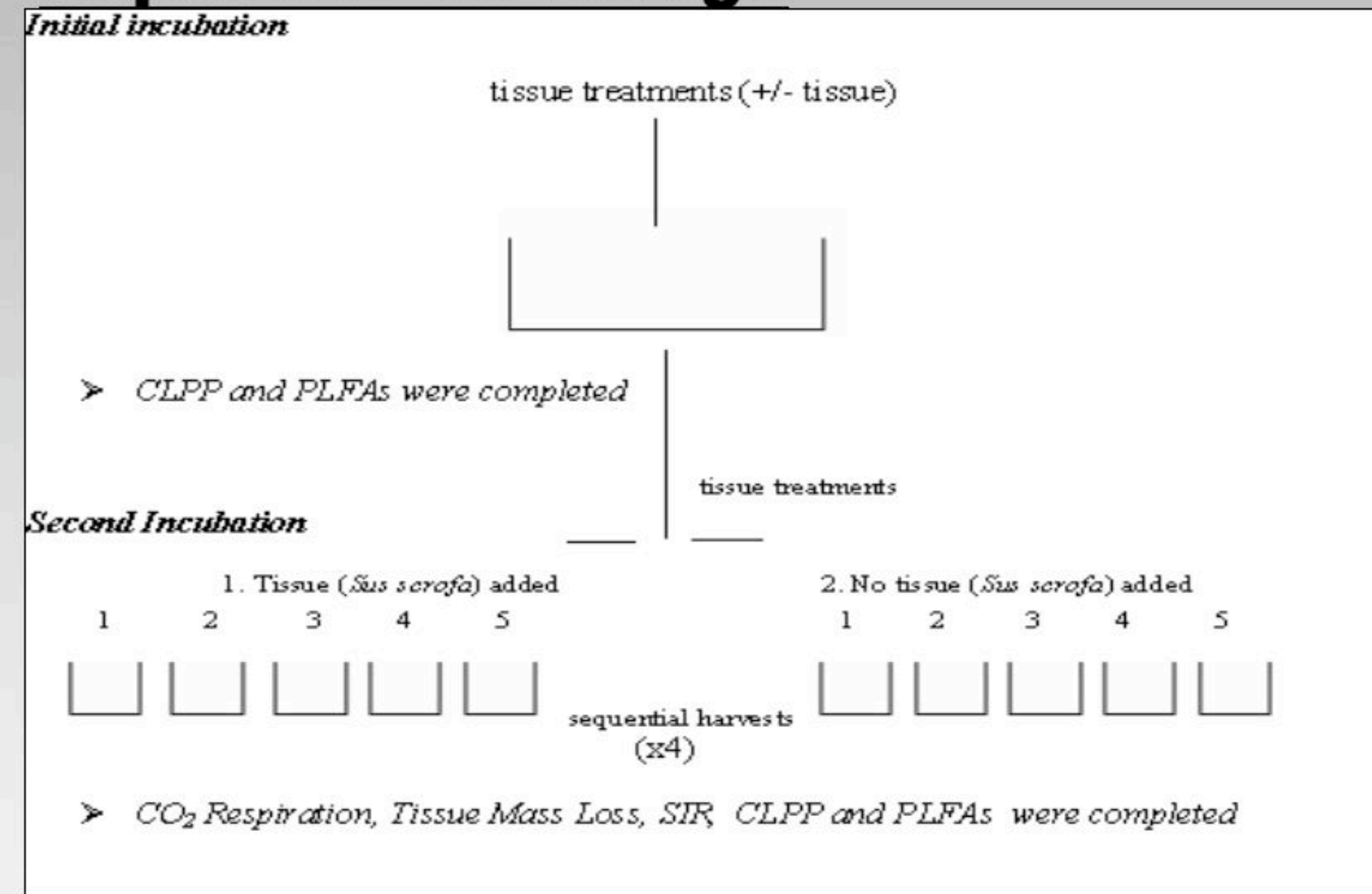


Introduction

Microbial communities play a key role within soil ecosystems (Griffiths *et al.*, 2003). Microorganisms are involved in the decomposition of organic matter which contributes to nutrient cycling and maintains the surrounding ecosystem. However, little is known about the participation of the microbial community during the decomposition of mammalian skeletal muscle tissue (SMT).

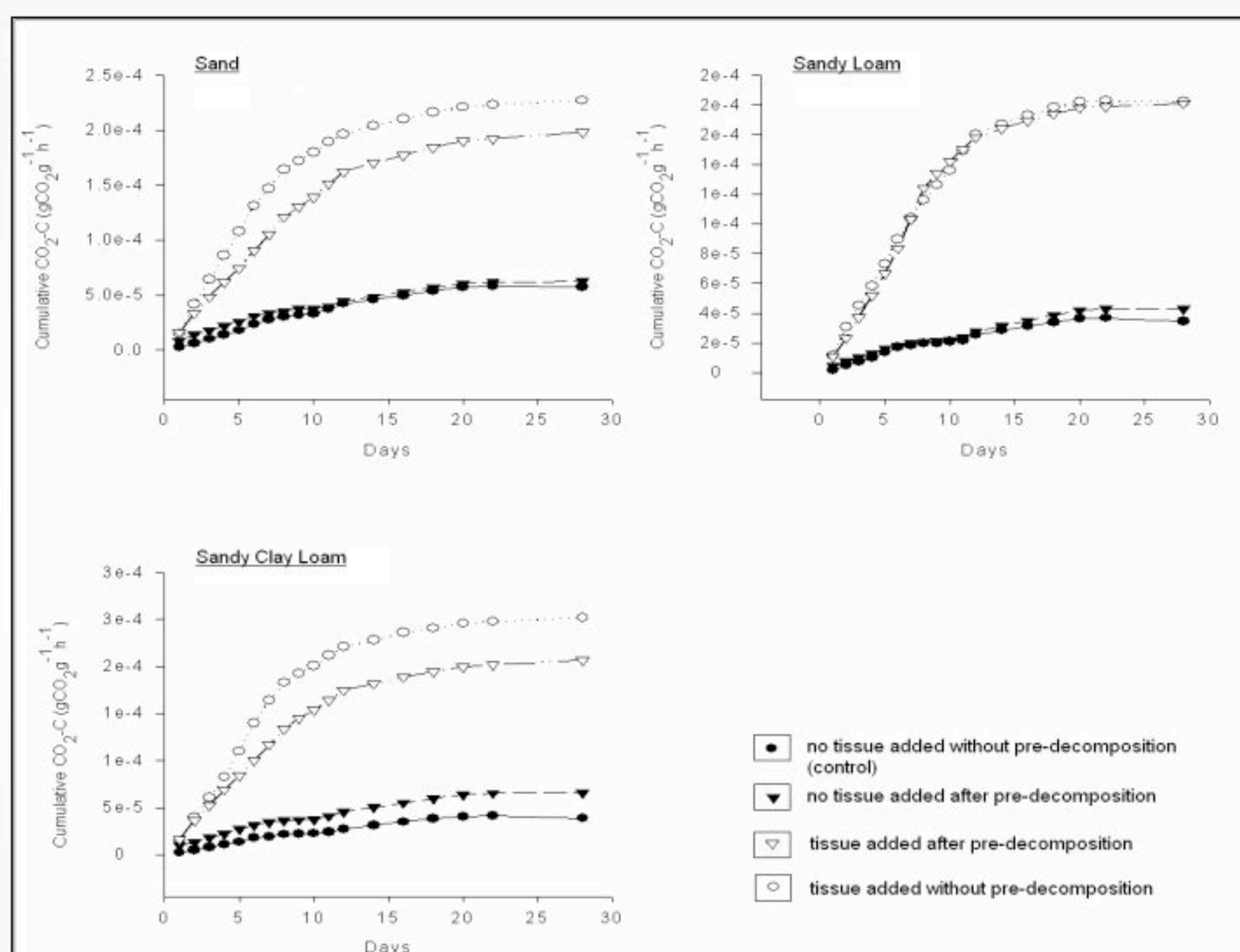
This study assesses the adaptation of the microbial community in various soil environments during the decomposition of porcine SMT (*Sus scrofa*). Three different soil types were used: Bassendean (Sand, pH 5.5 - 6), Spearwood (Sandy loam, pH 8 - 8.5) and Darling Scarp (Kandasol, Sandy clay loam, pH 6)

Experimental Design



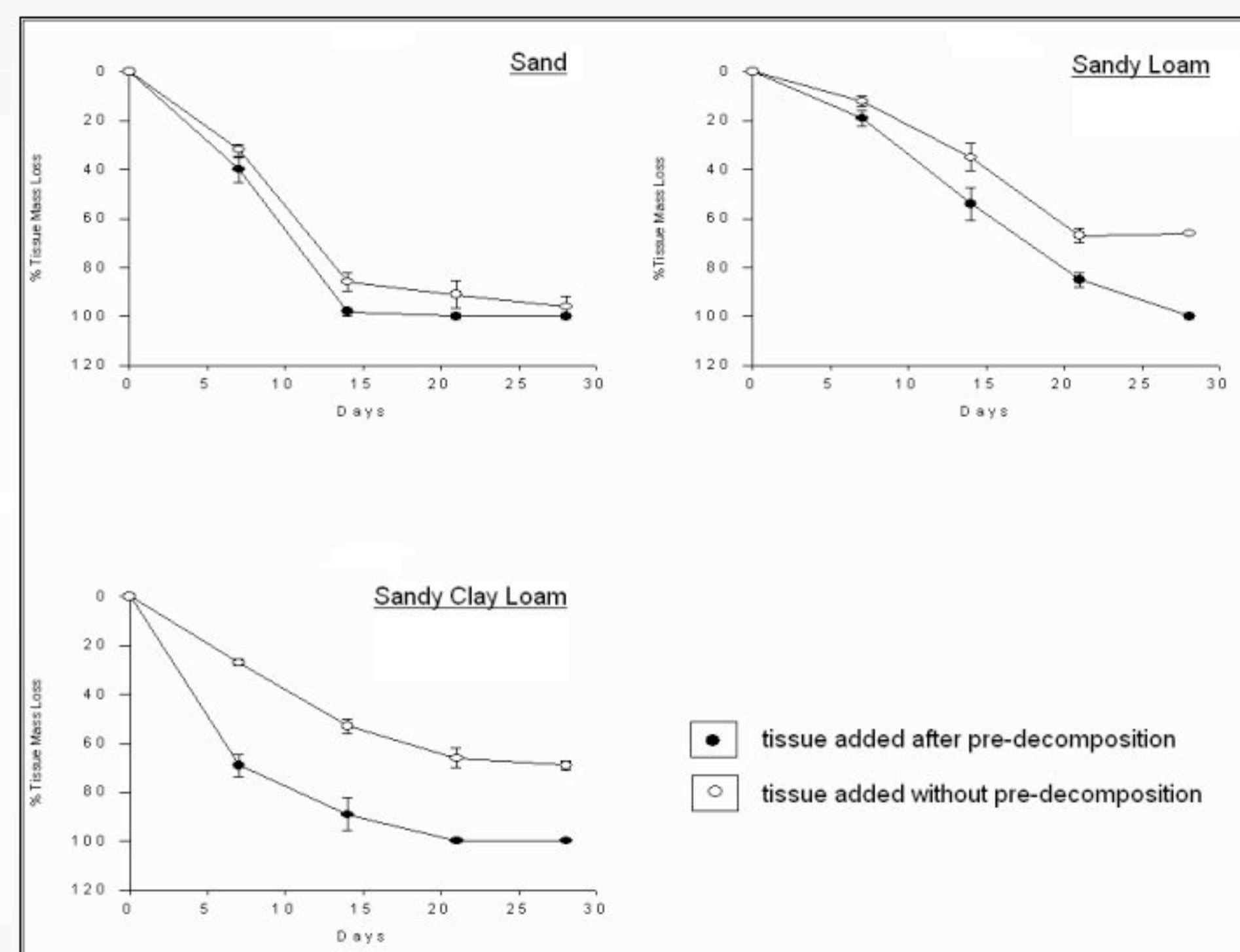
Results and Discussion

Carbon Dioxide Respiration:



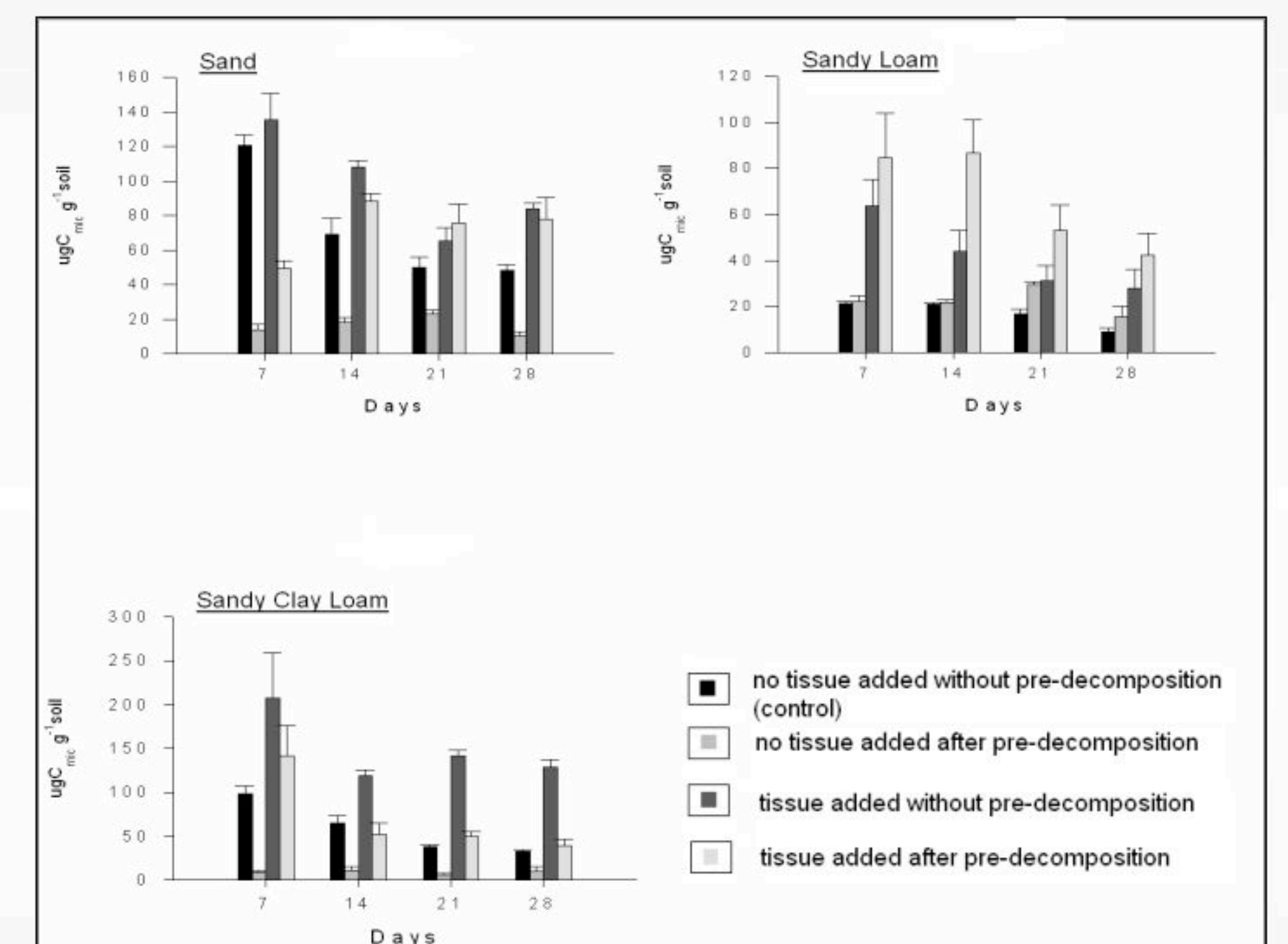
- The second tissue burial resulted in higher microbial activity.
- Within the second tissue burial, lower microbial activity was observed in the soils that received tissue during the initial decomposition.
- However, the sandy loam soil showed little difference in microbial activity between the soil that underwent a pre-decomposition event and the soil that did not.

Tissue Mass Loss:



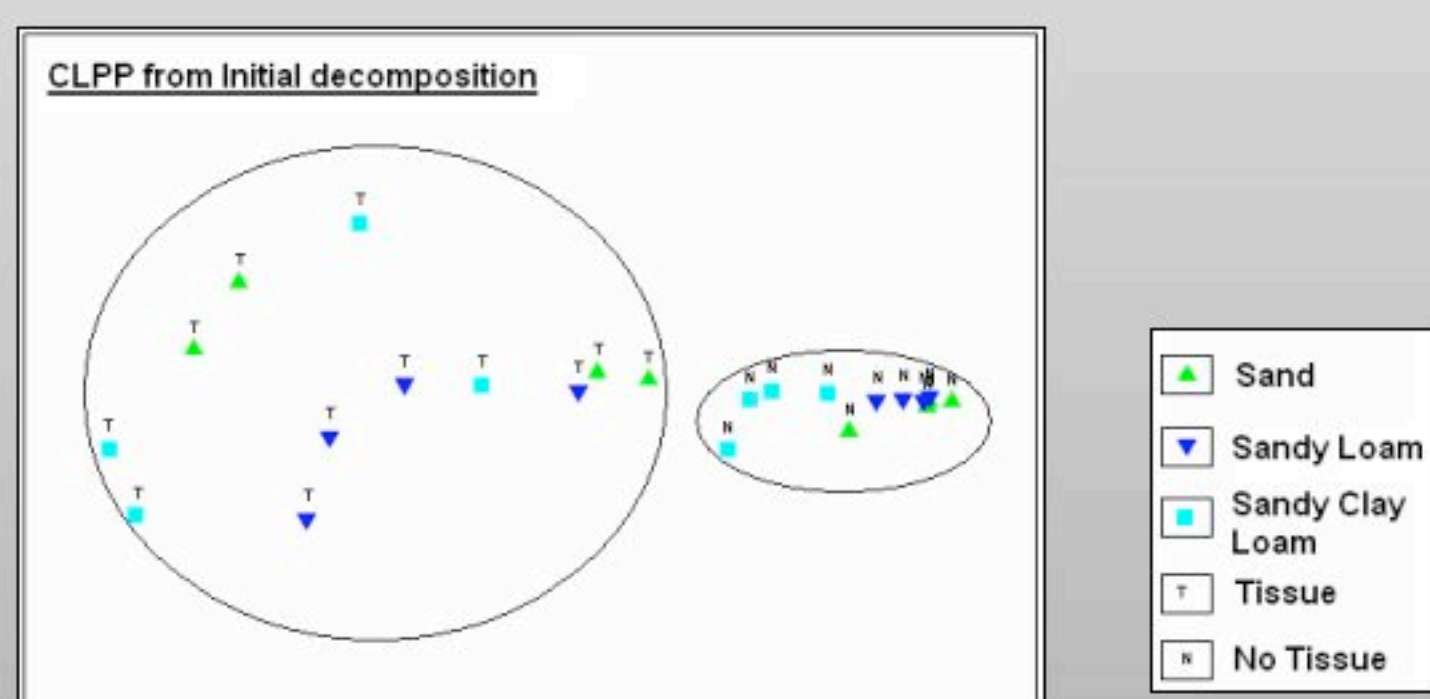
- Soil that was pre-treated with tissue had a greater rate of tissue mass loss
- Comparing carbon dioxide respiration with tissue mass loss showed that even with decreased microbial activity in the pre-treated soil samples, the rate of tissue mass loss was greater than that of the non pre-treated soils. This may indicate a greater efficiency of the microbial community to utilize the SMT in the pre-treated soil samples.

Substrate-Induced Respiration (SIR):

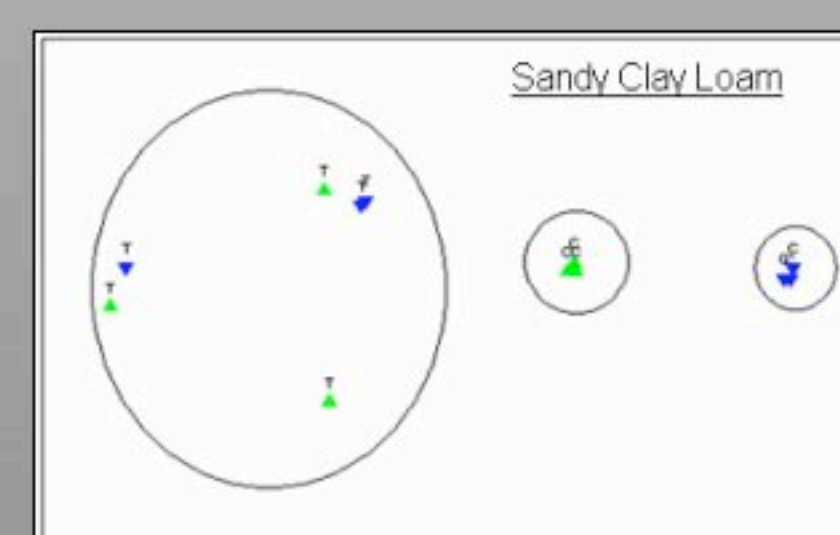
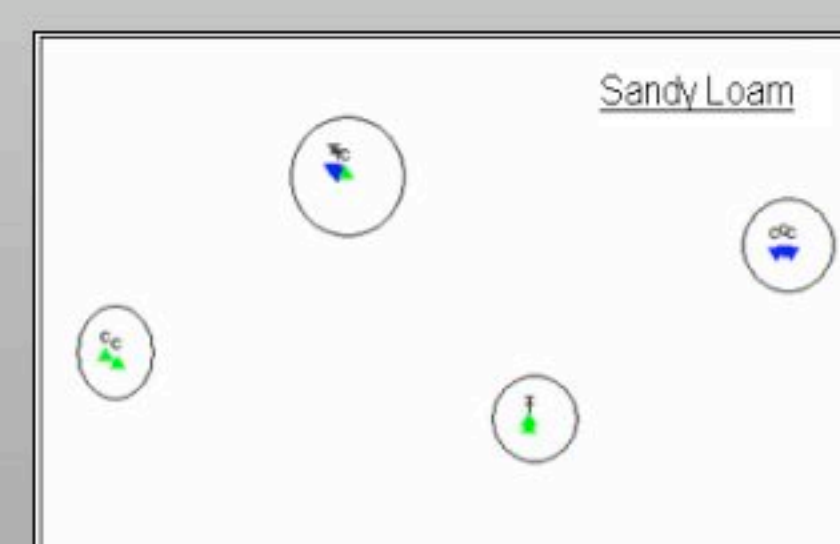
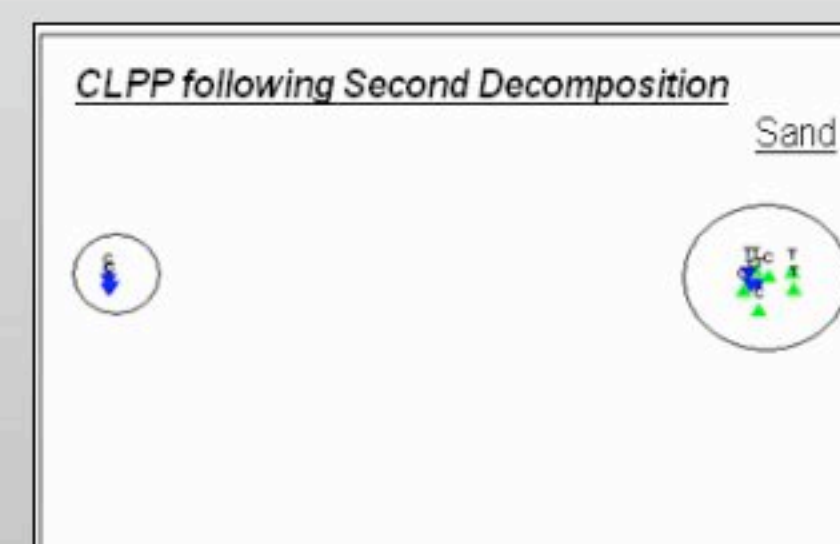


- Microbial biomass within all the soil types decreased over the duration of the incubation. This occurred for most treatment types.
- In the Sand and Sandy clay loam, the samples exposed to SMT during both incubations had lower microbial biomass than the samples that were only exposed to the SMT during the second incubation. We suggest that adaptation has taken place within the communities as decomposition occurred at a higher rate with a lower microbial biomass.

Community-Level Physiological Profiling (CLPP):



- Clear grouping is observed between soil treated with tissue and soil treated without. This indicates functional differences between the microbial communities after each treatment.



- Clear grouping is observed between certain treatments. This illustrates the functional differences between the treatment types.
- The groupings differ between soil type. This may support the idea that the soil environment has an affect on both the functional ability of the microbial community to decompose SMT and its ability to ultimately return to basal composition following SMT addition.

Acknowledgements

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References

▪ Griffiths R.I., Whitely A.S., O'Donnell A.G., Bailey M.J., (2003). Physiological and Community Responses of the Established Grassland Bacterial Populations to Water Stress. Applied and Environmental Microbiology, p.6961-6968