

Soil Amendments: Enhancing NUE through Applications of Soil Amendments

This research theme focuses on understanding the effects carbon quality and root growth, within an array of soil amendments, have on soil nitrogen (N) dynamics in order to minimise chemical fertiliser inputs, reduce N losses (*via* volatilisation and leaching) and to maximise plant nitrogen use efficiency (NUE) and utilisation across a range relevant soils and crop systems. A more comprehensive understanding of the role of C-quality in N allocation between plants and microorganisms is crucial for optimising NUE and agronomic management. While the relationship between C-quality and N-partitioning between plants and soil micro-organisms has been previously described (e.g. Thuille et al. 2014), data are limited. The UK team has shown simultaneous addition to soil of biochar and anaerobic digestate (a nutrient-rich by-product of anaerobic digestion) resulted in markedly different concentrations of soil nitrate-N, labile-C, immobilisation of N by the microbial biomass and N₂O fluxes, depending on the digestate and feedstock from which it was derived. This approach shows promise for limiting N emissions but has yet to be studied in humid-tropical conditions.

References:

Thuille et al. (2014). Carbon quality affects the nitrogen partitioning between plants and soil microorganisms. *Soil Biol. & Biochem.* 81, 266-274.