

Rhizosphere chemistry of pasture species grown in Allophanic soils influences the stability of organo-Al complexes?

Mr. Ritha Kov¹, Dr. Marta Camps-Arbestain,¹ Dr. Roberto Calvelo-Pereira¹

¹*Institute of Agriculture and Environment, Massey University*

In New Zealand, deforestation and subsequent conversion into pastoral land first occurred 150 years ago, and this has caused a general increase in soil C stocks, triggered in many instances by P fertilisation to soils naturally low in available P. However, during these past decades, changes to intensively managed pastures have diminished soil C stocks of Allophanic soils under dairy pasture. While this has been attributed to changes in soil chemistry associated with either (i) local changes in soil pH (e.g., through liming, urea hydrolysis in urine patches), and/or (ii) addition of phosphate and fluorine ligands with P fertilisation, not much attention has been paid to the increase in the organic ligands load at the rhizosphere of common pasture species (e.g., ryegrass and white clover) neither to the potential influence of the type of sward on this. The current study aims at investigating the stability of organic matter (OM)-Al complexes at the rhizosphere of ryegrass and white clover growing in an Allophanic soil. It is hypothesised that (i) the ability of reactive Al to stabilise additional OM input in the rhizosphere of pasture species depends on the extent to which the former is saturated with OM, and (ii) if this saturation has been attained, additional OM input in the rhizosphere may destabilise OM-Al complexes originally present in the soil, especially if this has high complexing ability. For this, soil cores were taken from two paddocks dominated by a mixture of ryegrass and white clover. These were carefully sampled so that the soil under ryegrass was taken separately from that under white clover. Also soil samples under a pine stand nearby were taken for comparison purposes. Samples were processed so that rhizosphere and bulk soils could be separated and then chemically characterised. The results will be presented at the conference.