

# Does plantain affect N transformations in pastures and subsequent N<sub>2</sub>O emissions?

Mitigation of nitrous oxide (N<sub>2</sub>O) emissions from pasture soil is desperately sought to address New Zealand's agricultural greenhouse gas emissions. Plantain (*Plantago lanceolata*) is widely touted as having a mitigating effect on N<sub>2</sub>O emissions due to reductions in excreta N rate, and/or biological nitrification inhibition. However, evidence for this effect is sometimes contradictory, particularly regarding well-drained soils.

This PhD project will examine the effects of plantain on micro-organisms that play a critical role in nitrogen cycle processes, in particular, denitrification wherein N<sub>2</sub>O is transformed to environmentally benign N<sub>2</sub>. The project will be interdisciplinary examining N transformations in conjunction with soil molecular biology, using cutting edge methodologies. The candidate will develop skills in stable isotope science, specifically dealing with the <sup>15</sup>N, as well as molecular biology techniques that will include the extraction of DNA and the interpretation of associated measures of the DNA extracted.

## **Preferred candidate skills experience:**

- Good time management of tasks and deadlines.
- Curiosity and a willingness to learn.
- Creativity and problem solving.
- An ability to formulate a hypothesis.

**Host institute(s) and location(s):** Lincoln University, Lincoln.

## **Project leader(s)/research supervisor:**

Primary supervisor – Prof. Tim Clough (Lincoln University) has successfully supervised multiple PhD candidates at Lincoln University, for over 15 years, with a focus on nitrous oxide dynamics and grazed pasture systems.

Co-supervisor – Dr Marta Alfaro (AgResearch Ltd)

Co-supervisor Dr Shengjing Shi (AgResearch)