

# Nitrous oxide emissions in a white clover based dairy production system



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## Objectives

The objectives of this study was to:

- provide an accurate estimate of N<sub>2</sub>O emissions from a white clover based dairy production system
- investigate annual variation in N<sub>2</sub>O emissions associated with climatic and management variation



## Materials and Methods

Study Area:

- Teagasc Solohead Research Farm, Ireland (52°51'N, 08°21'W) from October 2008 to November 2011

Dairy production system:

- White Clover grassland
- Rotationally grazed with Holstein Friesian cows from November to February (2.35 cows ha<sup>-1</sup>)

N<sub>2</sub>O measurements:

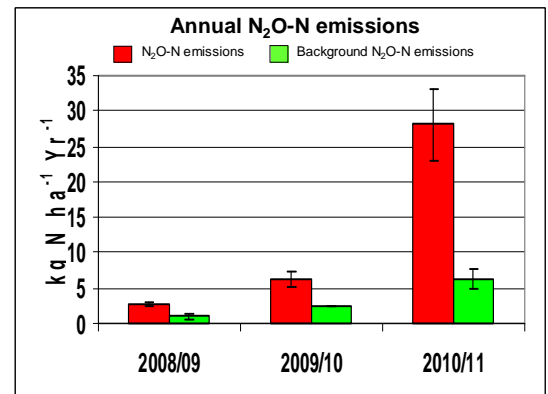
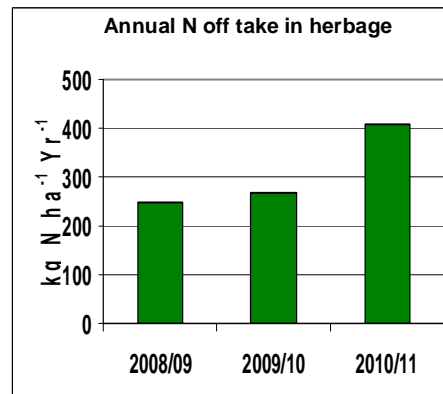
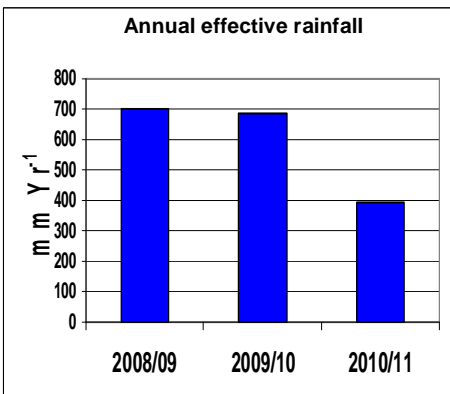
- N<sub>2</sub>O emissions measured with five static chambers per paddock
- Weekly sampling with increased sampling following N fertiliser and slurry application
- Background N<sub>2</sub>O emissions measured on three grass only plots receiving no N application or grazing

Herbage Measurements:

- Herbage yield measured in each paddock
- Herbage samples analysed for N content to calculate annual N uptake in herbage



## Results



- Two wet years (wet soil conditions) followed by one dry year
- High mineralisation of N in 2010/11, which was dry the year
- High N<sub>2</sub>O emissions in dry year 2010/11 associated with high mineralisation of N



## Conclusions

- Large variation in annual N<sub>2</sub>O emissions
- Changes in rainfall was the main cause of annual variation
- High mineralisation of N resulted in high N<sub>2</sub>O emissions

