# Accuracy of a commercially available activity monitor to record feeding and rumination time

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The Irish Agriculture and Food Development Authority

# Background

## Ireland: Seasonal Calving Pasture-based Systems



Grass Utilisation

Calving Pattern

Milk Production

Dry Matter Intake

# Background



- Intake is a major factor governing milk production

- Grazing duration → main factor influencing grass intake, along with grass intake per bite and rate of biting

- *Research perspective:* very difficult to measure cow intake at pasture on commercial farms

- *Farmer perspective:* deviations from normal intake and behaviour can indicate health issues

# Background

Why should cows be any different?

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# IGER behaviour recorders



- Gold standard method

- Validated using visual observations

- Accurately determine eating and ruminating time

**Disadvantage:**

Grazing recorders antiquated, laborious and prone to breakages, only suited to research environment.

# MooMonitor +



**Disadvantage:**

Not yet validated to measure grazing and ruminating time

- Originally designed for health and fertility monitoring in dairy cows
- Recently started incorporating behavioural traits, enabling continuous monitoring of behaviour

Commercially available → ultimate management tool

Multipurpose, practical, cost effective

# Objective

To assess the accuracy of the MooMonitor+ to record feeding and rumination time when compared to the IGER behaviour recorder (gold standard)
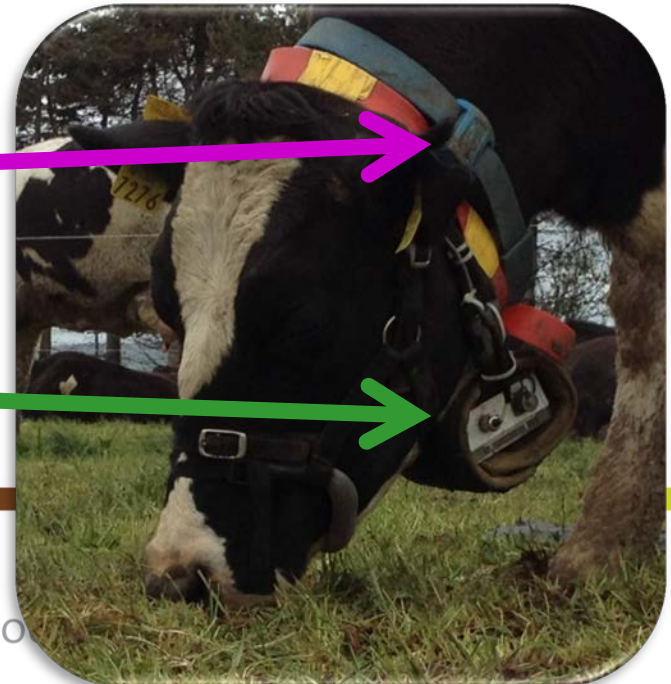
# Materials and Methods

- 20 recordings were taken from six Holstein-Friesian cows

- Over 2 years (2014 & 2015)

- Cows were offered fresh feed in 24-hour allocations

- MooMonitor+ fitted to cows a week before recording commenced

- IGER recorders fitted for a 24-hour period
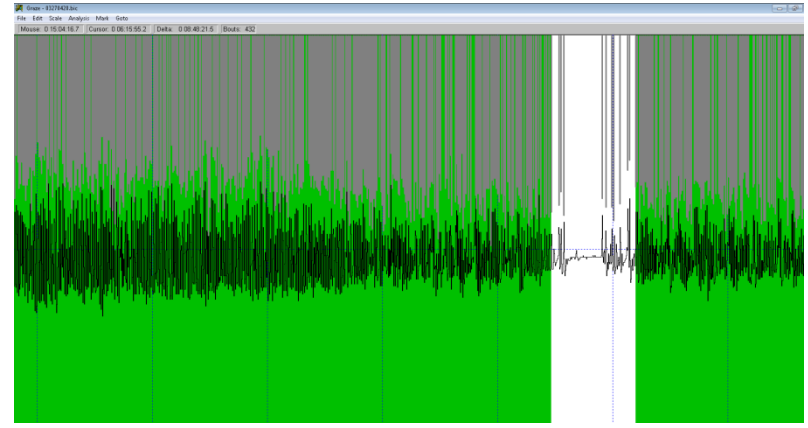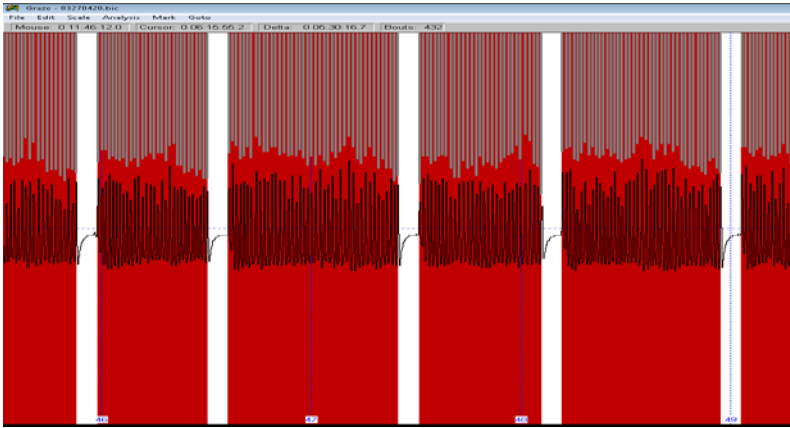
**MooMonitor +**

IGER recorder

The Irish Agriculture and Foo

# Materials and Methods

- Individual IGER files were analysed using "Graze" analysis software

  (Rutter, 2000)



- Data from the MooMonitor+ was summarised into 15 minute intervals
  - Only data corresponding to the 24-hour period coinciding with when the IGER recorders were fitted was analysed.

# Materials and Methods

- The ability to predict IGER-recorded feeding and ruminating using the MooMonitor + was quantified using logistic regression

- Dependent variability was the binary trait of whether or not the cow was feeding during the measured 15 minute period as dictated by the IGER

- Independent variable was the respective binary trait as dictated by the MooMonitor+

- Same approach used to evaluate ruminating

# Results

- A strong (P<0.001) predictive ability was evident

- Sensitivity of the MooMonitor+ compared to IGER was 0.95 for both feeding and ruminating time

- Specificity was 0.97 for feeding and 0.96 for ruminating when the MooMonitor+ was compared to IGER

# Results

The results from this study indicate an excellent concordance between 24-hour feeding and ruminating duration estimated from the IGER recorders and MooMonitor+ meters.

# Conclusion



- The availability of this technology enables a more precise level of continuous real-time behaviour and performance monitoring of individual animals not previously possible.

- If the device is used by farmers for heat detection and if it can be trained to estimate feed intake then the data could be used in national genetic evaluations for feed intake

# Acknowledgements

DAFM RSF 31/S/496



**DAIRYMASTER**

Dairy Research Ireland
funded by Irish Dairy Farmers



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