Agri-Food and Biosciences Institute

EAAP August 2018

# Benefits for sheep farmers of monitoring grass growth, quality and utilisation

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# Overview

I. The need
   - Maximising grass production and utilisation
   - Key factors to improve

II. Project background and approach

III. Benefits and results
   - Grass growth
   - Grass quality

IV. Other benefits and next steps

# The need: to maximise value from grass

- Grass is the cheapest feed source available to ruminant sectors in UK and Ireland (Fig 1)
- Grass yields and utilisation are currently below optimal levels (Fig 2)
- Increasing utilised grass yield by 1t DM/ha and quality by 0.5MJ on beef/sheep farms can:
  - ↑ stocking rate per hectare by 20%
  - ↑ liveweight gain per hectare by 35%
  - ↓ concentrate input per hectare by 21%

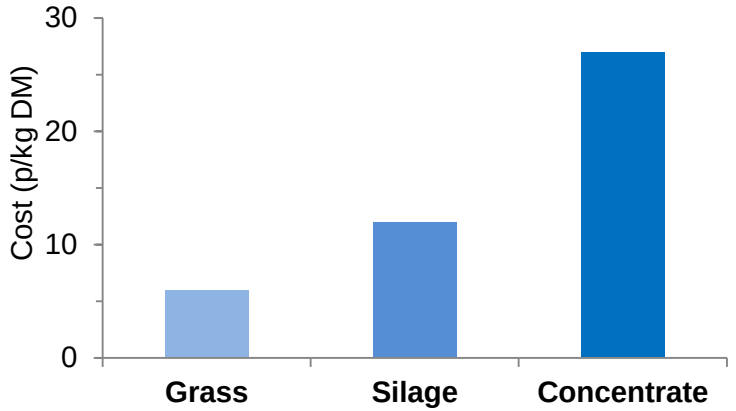



**Figure 1:** Cost of individual feedstuffs

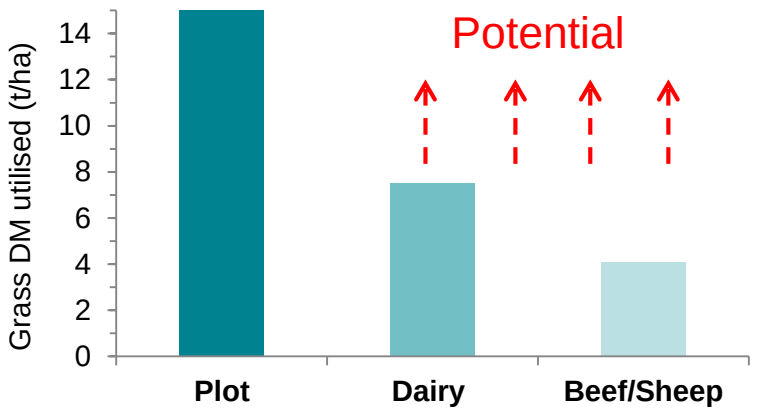



**Figure 2:** Estimated grass utilisation on NI farms (Mayne and Bailey, 2016)

Significant potential to increase grassland performance on farm (by managing grass and animals better)

# Towards more ‘lamb from grass’

**Key factors to improve:**

- Increase uptake of grass measuring to better inform grass management and set ambitious & realistic targets

- Adopt efficient grazing systems

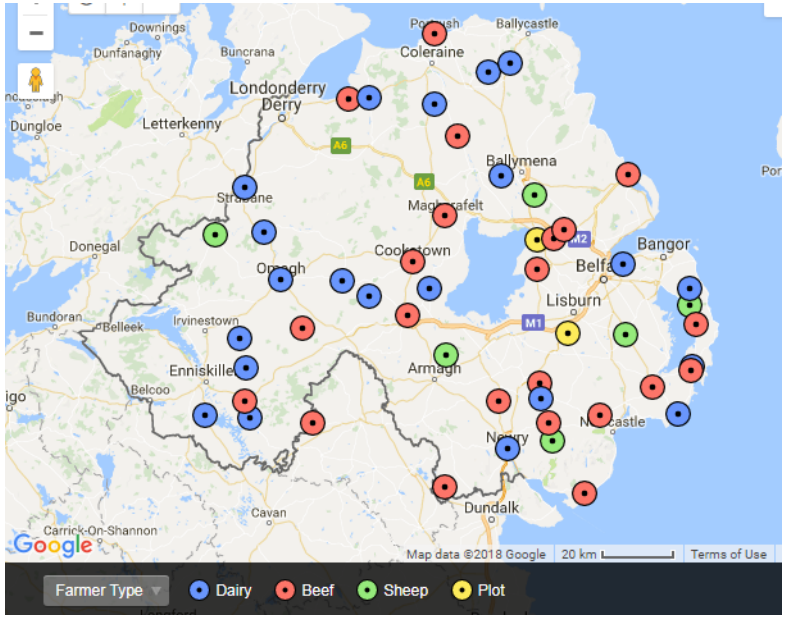
▶ Crucial to work with commercial farmers on a range of production systems

**“Lamb from grass”:**

- 3 year project funded by DAERA and AgriSearch
- Grazing studies and on farm work to:
  - ✓ Identify actual variability in grass production and quality on sheep farms
  - ✓ Monitor livestock performance on different sward types and grazing strategies
  - ✓ Use the data to set more ambitious targets for sheep farms

# GrassCheck

- Long term grass growth and quality monitoring project
- Network of 35 dairy, beef and sheep farms
- Range of systems, land type, growth potential and management intensity
- Measurements:
  - ✓ Weekly grass covers
  - ✓ Samples of grass for quality analyses
  - ✓ Records of inputs and animal performance




2018 GrassCheck farm network

Grass growth

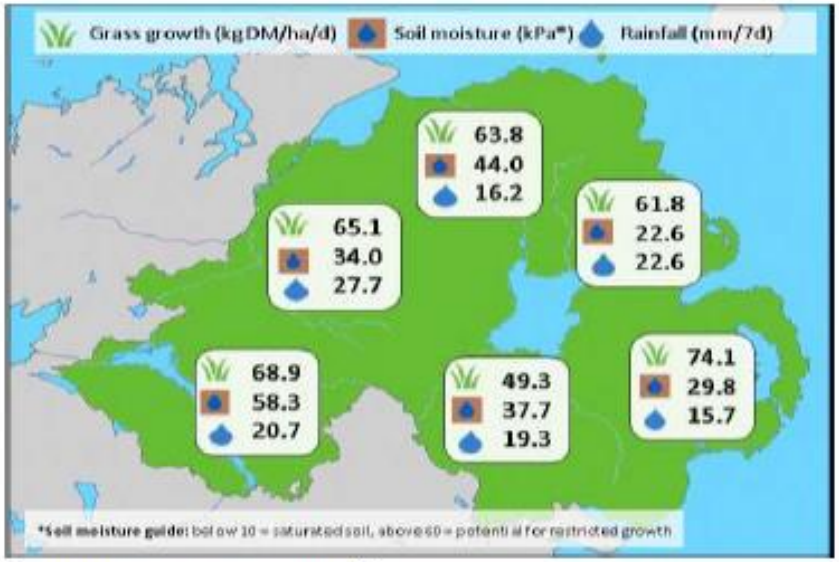
Grass quality

Weather data

Latest info available at agrisearch.org/GrassCheck

# GrassCheck bulletins

## Week Beginning 20 August 2018





| Weekly Grass Growth (kg DM/ha/day) | | |
|---|---|---|
| GrassCheck plots | | 72.4 |
| Dairy farms* | | 76.9 |
| Beef & sheep farms* | | 62.0 |
| Forecast | 7 day | 52.4 |
| | 14 day | 55.1 |

| Grass Quality | Plots | On-farm |
|---|---|---|
| DM (%) | 13.3 | 14.6 |
| ME (MJ/kg DM) | 10.4 | 10.8 |
| CP (% DM) | 17.0 | 20.9 |
| WSC (% DM) | 7.4 | 7.7 |

*On-farm grass growth data supplied by AgriNet

#GrassCheck plots receive 270 kgN/ha/year

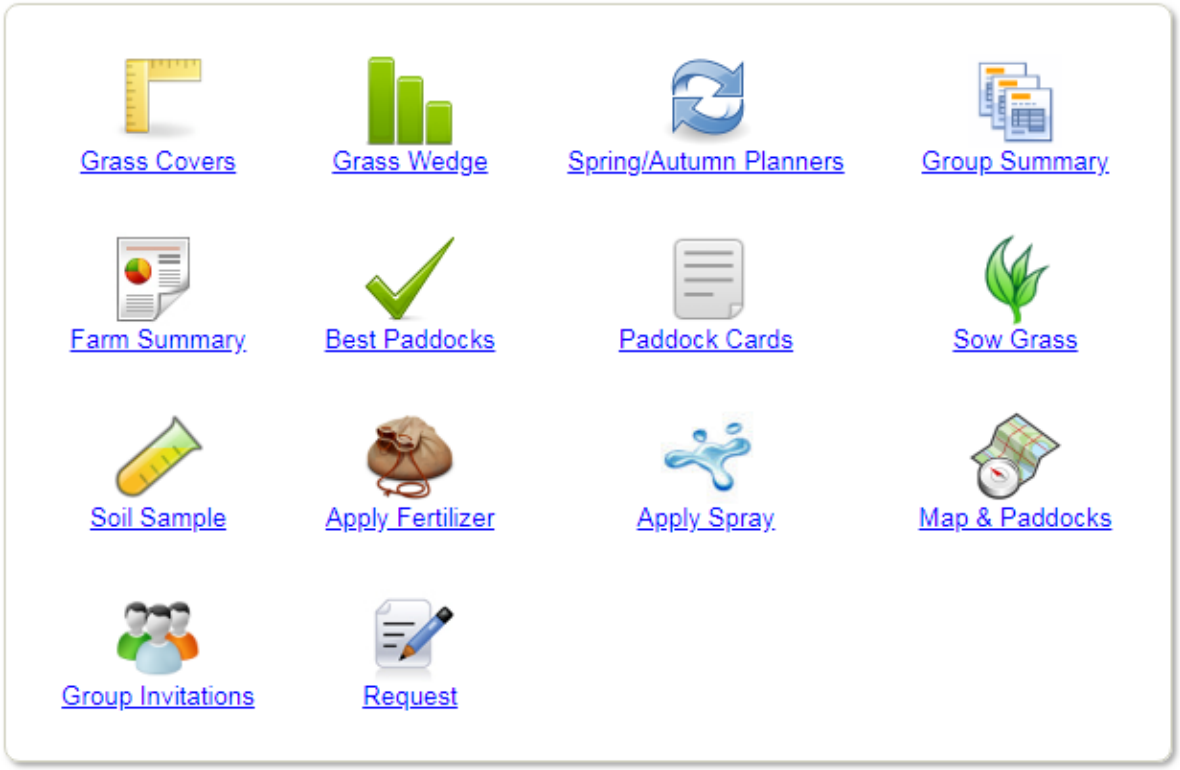
@GrassCheck

MANAGEMENT NOTES:

- Grass growth rates have continued to improve. Several GrassCheck pilot farms have recorded growths of over 100kgDM/ha/day. With cooler weather forecast this is expected to fall. With the current high growth there is an opportunity to make additional winter forage.
- Take out any paddocks which have covers of over 3,500 kgDM/ha. This should be done sooner rather than later to maximise regrowth and to allow for the application of artificial fertiliser before the closed period starts on 15th September.
- The autumn is an excellent time to build potash reserves either through slurry application or MoP / NK fertilisers. Use the CAFRE nutrient calculator (available through DAERA online services) to work out your potash requirements.

# Grass management: tools and guidelines

- Computer programmes such as AgriNet are used by all farmers:



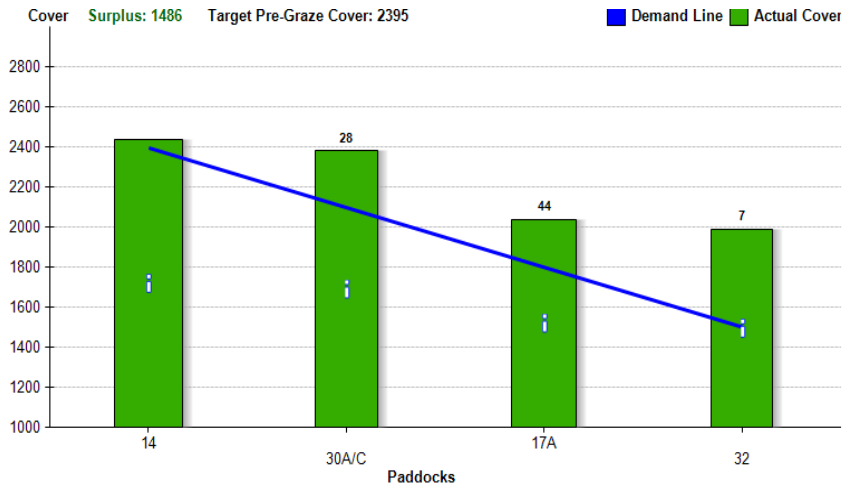
# Grass covers and grass wedges

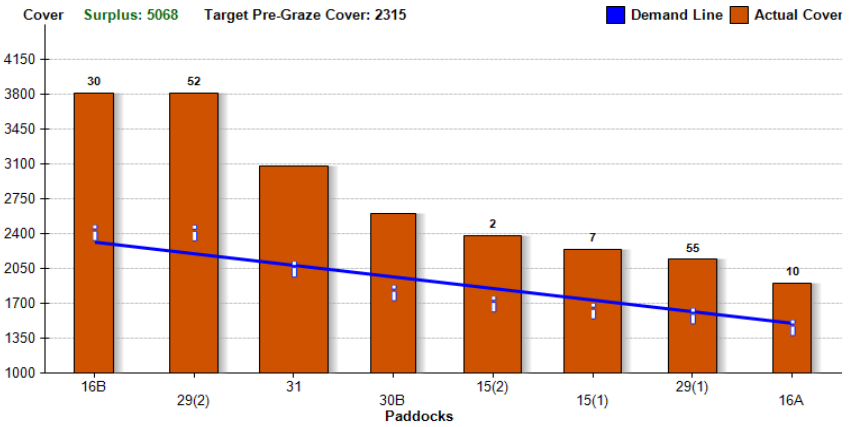
*Ex: farm with 770 ewes and 70 hectares of grassland, at the end of August 2018*

**Weekly grass covers** enable us to:

- Optimise grazing days on each paddock
  (target post grazing height is 4cm, i.e. 1,600 kg DM/ha)
- Identify next paddock to be grazed
- Identify grass surplus
  (if covers > 3,500 kg DM/ha)
- Calculate grazing days ahead and thus forecast deficits

Benefit: Inform grazing management



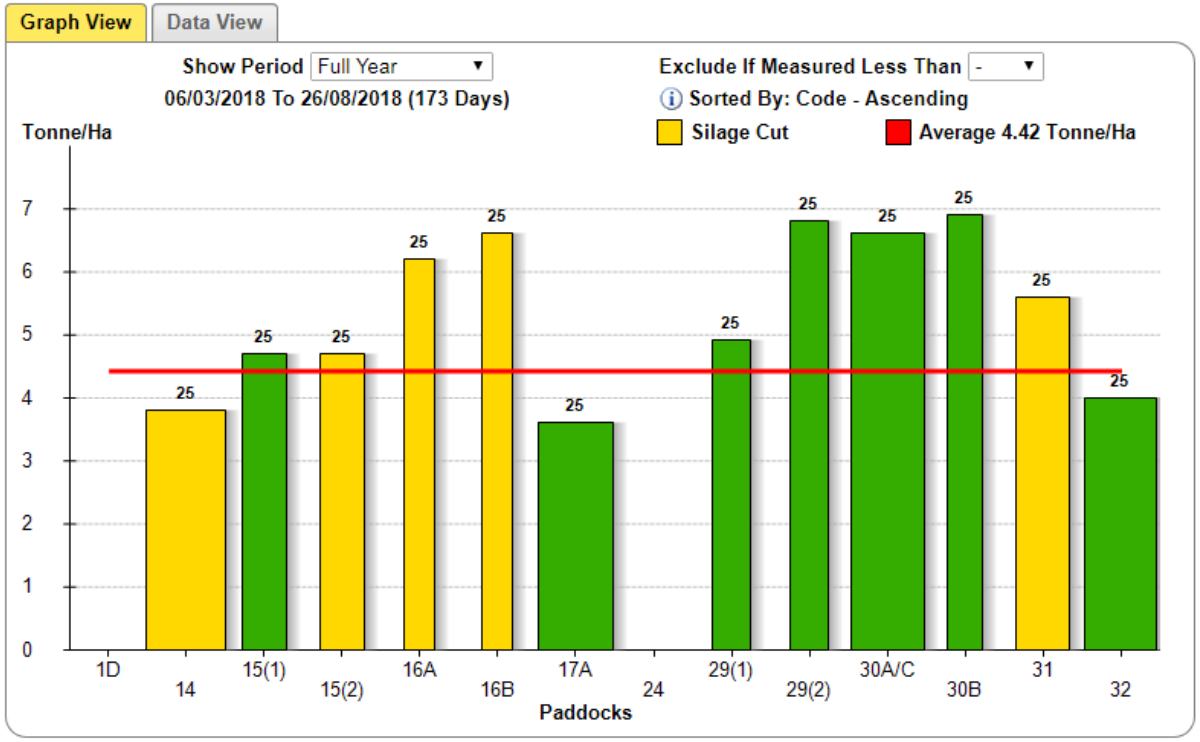



# Grass covers and grass wedges (ctd)

*Ex: farm with 770 ewes and 70 hectares of grassland, at the end of August 2018*

**Weekly grass covers** enable us to:

- Quantify variation in paddock yields and identify best and poorest paddocks




Benefit: inform grass management such as reseeding plans

# Grass covers and grass wedges (ctd)

**Weekly grass covers** enable us to:

- Benchmark with other farms and share management decisions via:

✓ The use of online grass management tool

✓ What's App group

✓ Update meetings with scientists and participating farmers

✓ Farm walks

✓ GrassCheck Bulletin

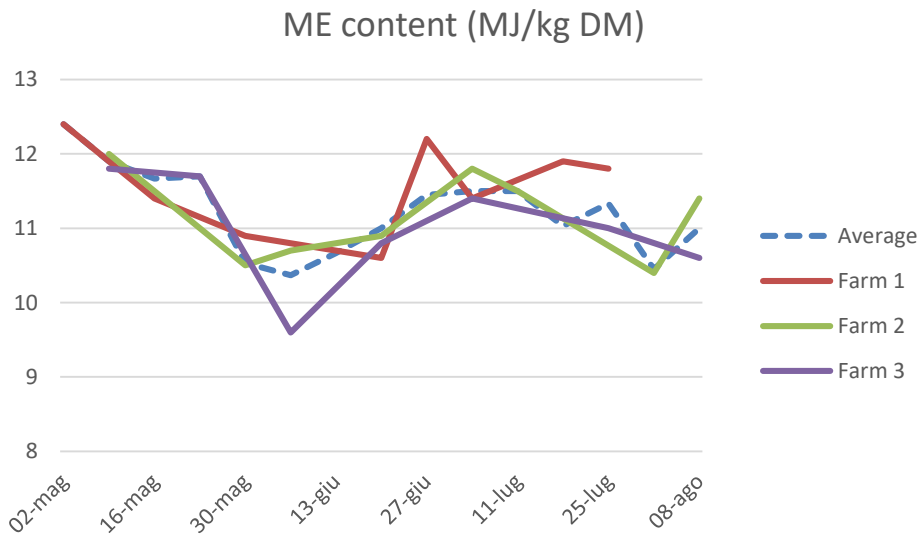
Benefits:

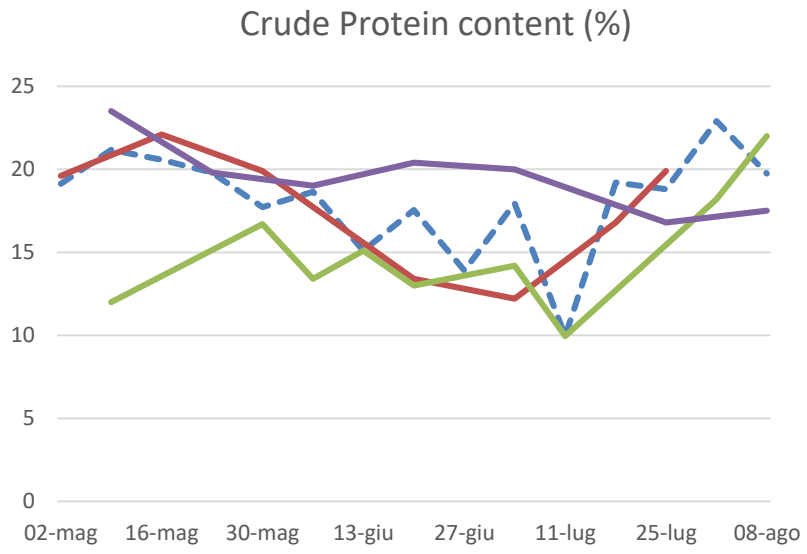
- Set new targets
- Monitor progress
- Improve transfer of information with farmers and researchers

# Grass quality

Monitoring grass quality throughout the season improves the understanding of:

- Key parameters (DM, CP, ME, ADF, NDF, WSC)
- Field to field variations
- Seasonal variation




Benefits: better understanding of the importance of grass quality

# Grass quality: feed back to farmers

## Hillsborough Feeding Information System

In association with

AFBI Hillsborough

### Grass Monitoring Analysis Report

Adviser's name & address

Aurelie Aubry
AFBI Hillsborough

Co.
Tel:- 573
e-mail:- aurelie.aubry@afbini.gov.uk~elizabeth
FAX:-

Farmer's name & address

Farmer address

| | | | |
|---|---|---|---|
| Sample no. | 18-07-0107 | Sward age | 1 - 5 Years |
| Customer account no. | | Regrowth period (weeks) | |
| Customer order no. | | Field location | 37 |
| Cut no. | Unknown | Fertilizer amount | 125kg/ha |
| Sampling time | | Fertilizer type | CAN |
| Sampling date | | Fertilizer applic. date | 15/6/18 |
| Date received | 4/7/18 | Slurry amount | 5000gallons/acre |
| Date reported | 4/7/18 | Slurry type | Cattle |
| Weather conditions | Bright & Sunny | Slurry applic.date | 10/6/18 |
| Sample comments | | | |

### Grass analysis

| | | JUNE Average |
|---|---|---|
| Dry matter (%) | 26.3 | 19.0 |
| Crude protein (%DM) | 14.9 | 17.2 |
| Acid detergent fibre (% DM) | 30.4 | 27.3 |
| Water soluble sugars (%DM) | 17.3 | 16.0 |
| Metabolisable energy (MJ/kg DM) | 11.1 | 11.6 |


Additional comments

## Hillsborough Feeding Information System

In association with

AFBI Hillsborough

### Explanation of terms used in the report

Dry matter is the amount of material that is left after water has been removed from the grass and is expressed as a percentage of the total grass. In normal years, the tendancy is for grass dry matter to increase slowly with maturity so that grass cut in early May can have levels less than 15%. However, as the crop matures, this dry matter can increase rapidly during mid to late May as stems grow and ears emerge, and then increase more slowly as ears ripen.

Crude protein expressed as a percentage in the dry matter varies with the state of maturity of the plant. Grass in late April and early May can have crude protein levels greater than 25% but as the crop matures these high levels fall rapidly. At the extreme, crude protein levels in hay made in late June and early July seldom exceed 10%. Fertilizer application levels can have a dramatic effect on protein levels in the crop although the the free nitrate present in the grass is not included in the crude protein levels (see below)

Water soluble sugars are mainly in the form of glucose, fructose, sucrose and fructans. These soluble sugars are the fermenable substrate for the production of lactic acid, the main preservative in grass silage. Sugars are produced by photosynthesis, a biochemical reaction between carbon dioxide in the air, water and sunlight within the plant explainin how low sugar levels can be found even on sunny days when the grass is suffering from water stress. Sugar levels in the leaf increase during the day to peak about 4pm. Normal levels range from less than 1% of the fresh plant weight t over 5%. It is generally accepted that sugar levels above 2.5% provide sufficient substrate for a rapid and strong silage fermentation.

Nitrate can be likened to unused fertilizer which has been taken up by the plant root system and transported to the leaves but has not yet been converted to protein. Levels in young grass can be greater than 6000ppm but these level fall quickly during times of rapid plant growth. High levels of nitrate in the grass at ensiling can lead to poor fermentation but research at Hillsborough has not found poor fermentations where grass to be ensiled has nitrate concentration less than 1000ppm. Aim to ensile grass with nitrate levels less than 1000 ppm.

The buffering capacity of grass is its ability to resist change in pH. When grass is ensiled, the soluble sugars which ar present in the grass, ferment to form primarily lactic acid which acts as a preservative by lowering the pH. This happens over the first ten days post ensiling and the more rapidly the better. High concentrations of lactic acid usually lead to a stable and and palitable silage. If the initial grass has a high buffering capacity i.e. in excess of 500 meq/kg DM, the initial fermentation may be slow to produce lactic acid and hence lower the pH. This can lead to undesirable fermentations and less stable or palitable silage.

The metabolisable energy (ME) of grass is a measure of it's available energy to ruminants and is closely related to it's digestibility. As grass matures throughout the season and starts to 'harden' and form seed heads, it becomes less digestible and consequently, less of the energy in the plant is available for animal production or growth. Early grass may have ME levels over 12 MJ/kg DM while at the other extreme, hay has an ME level of 8.5 MJ/kg DM. Grass in mid May usually will have an ME of around 11 MJ/kg DM.

Acid detergent fibre is a structural carbohydrate and gives a measure of the maturity of the crop. Young fleshy grass can have levels between 20% and 25% while very mature grass can have levels over 35%.

# Next steps

- Adapt measuring tools to better reflect sheep systems in terms of
  - Sward types and density
  - Rotation grazing groups

- Use this approach to investigate the effects of different grazing strategies on
  - Animal performance
  - Grass production
  - Grass quality

# Key messages

- There is a great potential to increase grass utilisation
- Measuring grass covers is time consuming but very useful to:
  - Inform grazing management (eg rotation, silage cuts)
  - Inform grass management (eg reseeds)
  - Inform research projects
- We need to encourage and make best use of available grass monitoring tools and management systems to
  - Improve transfer of information between farmers and scientists
  - Define more productive targets

# *Thank you!*

Department of Agriculture, Environment and Rural Affairs

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Driving Excellence & Innovation

Many thanks to:

DAERA and AgriSearch for funding,

The participating farmers,

AFBI and AgriSearch staff to help collect data, organise farm events and analyse grass data