



**DairyCo-BGS Demo Farms:
Demonstrating Research in Practice**

Farm visit

Mr Ray Brown and family

The Orchards
Twemlow,
Holmes Chapel,
Cheshire
CW4 8DS

**11 July 2013
10.30 – 14.00**

DairyCo-BGS Demo Farms

The DairyCo-BGS Demo Farms project is part of the DairyCo Grassland, Forage and Soils Research Partnership. This is a five year research collaboration with SRUC (Scotland's Rural College) in partnership with Harper Adams University and the University of Reading.

This encompasses 15 different research projects which span a range of topics under the headings of: grass, alternative forages, soil, out-wintering and economics.

To tell farmers about the latest findings of these research projects, DairyCo and the British Grassland Society (BGS) have set up two demo farms for 2013-2014. These farms will run demonstrations replicating some of the current research trials, showing how they translate into on-farm practices.

More details of the research projects within the Partnership can be found on the DairyCo website www.dairyco.org.uk

Event Speakers:

- Ray Brown, The Orchards
- George Fisher, nutrient management expert, BGS
- Chris Duller, independent soil and grassland management consultant



Farm profile

Background

Ray and his family manage a 300-cow pedigree Holstein herd, averaging 9500 litres/cow. The farm focuses on achieving high quality forage and utilises fields close to the parlour for grazing during the summer months.

Improving nutrient efficiency is important for the farm and the farm have recently invested in a trailing shoe slurry tanker and plans are currently in place for an anaerobic digestion unit.

Farm details

250ha: 130ha permanent pasture
 20ha temporary pasture
 60ha maize
 40ha winter wheat

Soil type: Sandy clay loam – clay soils
Average rainfall: 800mm

Cow numbers (April 2013)

Milking cows		300
Youngstock	0 – 1yr	240
	1 – 2yr	230
Calving Pattern	AYR	

Cow performance (12 month rolling average)

305d Yield (litres)	9500
Fat (%)	4.22
Protein (%)	3.35
SCC ('000)	170
Total concentrates fed (tonnes/cow)	2.2

Grazing (June 2013)

Grazing platform (hectares)	44
Average cover (kg DM/ha)	2500
Pre-grazing target (kg DM/ha)	2600
Post-grazing target (kg DM/ha)	1900

Demonstrations

Demo 1: Dealing with soil compaction

Over 70% of grassland soils in England and Wales are thought to be suffering from some degree of soil compaction. This can negatively impact on soil health and water infiltration into the soil, nutrient efficiency and even grass growth, as indicated by recent DairyCo funded research undertaken at SRUC.

A proportion of the grazing platform at The Orchards farm is exhibiting signs of soil compaction. To address this compaction, the first

demonstration investigates the effectiveness of different soil aeration techniques and measures their impact on soil health and grass growth.

Treatments include:

1. No aeration
2. Spike aerate only (spring)
3. Spike aerate (spring) and sward lift (autumn)
4. Sward lift only (autumn)



Spike aeration (4 March 2013)



Control



Sward lifting



Spike aeration

Initial demo findings:

- Both lifting and spiking improved grass yield initially by 5-10% but there was no additive effect (lift plus spike was no better than lift only or spike only)
- Grass growth was improved in lifted swards, and maintained over the first four grazings
- Advantages from spiking were only maintained for the first two grazings.

SRUC Research: The impact of compaction

Researchers at SRUC (formerly Scottish Agricultural College) are currently investigating the impact of cattle trampling and tractor compaction on soil structural damage and grass yield. In 2011 researchers imposed three treatments on a permanent grassland sward:

1. Trampling by grazing animals
2. Tractor compaction
3. No compaction

Year 1 results: Soil damage



Trampling

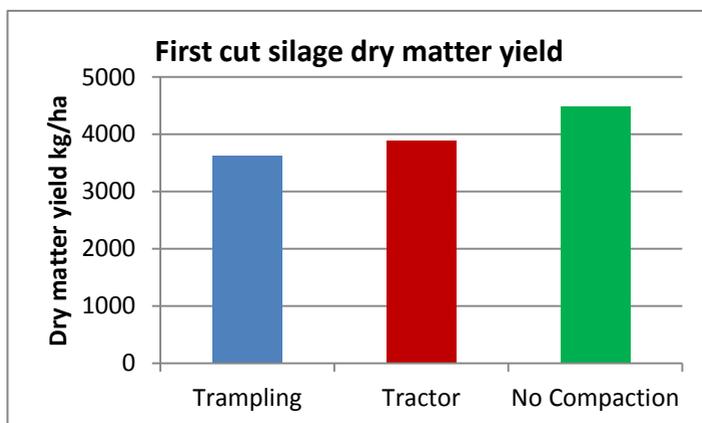
Tractor

No compaction

Both of the compaction treatments (*Trampling* and *Tractor*) exhibited signs of soil structural damage as indicated by the number of large, blocky aggregates in the photos above.

Year 1 results: Grass DM yield

At first cut, the *Tractor* compacted plots had 13.5% lower grass DM yields than the *No compaction* plots, while the *Trampled* plots had a 19% lower grass yield (see below). However, this effect was only evident at the first cut. The study is being repeated this year to investigate how further compaction will impact on grass yields and soil structure. Researchers will also be investigating the effectiveness of sward lifting and spike aeration at alleviating this compaction.



Demo 2: Utilising slurry in the grazing rotation

With rising fertiliser costs, meeting the nutrient requirements of grazing swards by using slurry may have beneficial impacts, both financially and environmentally. Using novel spreading techniques, such as trailing shoe or injector, may allow grass swards to be grazed successfully due to the low levels of sward contamination. However, little research has been done to evaluate grass and dairy cow performance, and the practicality of administering these techniques. Three, five acre paddocks are set up within the grazing area.

Treatments include:

- Fertiliser only
- Alternate applications of fertiliser and slurry
- Slurry only

Soil and slurry samples have been taken and grass cover has been measured at each grazing event.



Soil analysis (February 2013)

Treatment	pH	P index	K index	Mg index
Fertiliser	6.4	4	3	3
Inject slurry	6.8	5	3	3
Fertiliser and inject slurry	6.6	5	3	3

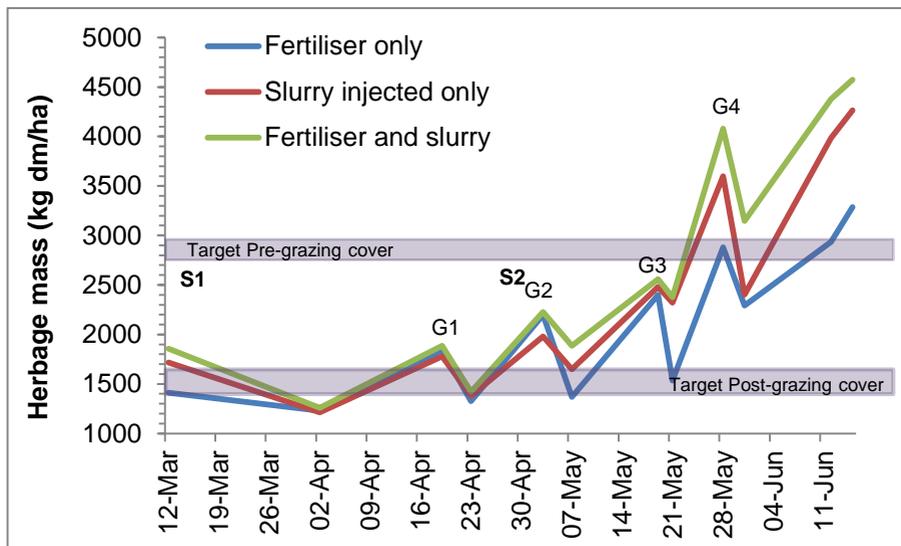
Slurry analysis

pH	Dry Matter (%)	Total N (kg N/m ³)	Ammonium- N (kg NH ₄ -N/m ³)	Total P (kg P ₂ O ₅ /m ³)	Total K (kg K ₂ O/m ³)
7.61	7.24	2.40	1.12	0.73	3.61

Nutrient application

Date	Management	Fertiliser	Slurry	Fertiliser and slurry
28 th Jan	Slurry application		All treatments	
11 th Mar	Nutrient application	90 kg N/ha	30m ³ /ha	90 kg N/ha
19–23 rd Apr	Grazing 1	All treatments grazed with dairy cows		
1 st May	Nutrients application	90 kg N/ha	30m ³ /ha	30m ³ /ha
3–7 th May	Grazing 2	All treatments grazed with dairy cows		
19–21 st May	Grazing 3	All treatments grazed with dairy cows		
28 –2 nd Jun	Grazing 4	All treatments grazed with dairy cows		

Grass DM during grazing (Fertiliser vs. slurry)



Slurry for grazing swards:

- First early application of slurry by injection to grazing swards was accepted by cattle with equal utilisation across treatments
- The second application didn't leave sufficient time for slurry to be washed into soil and caused rejection.

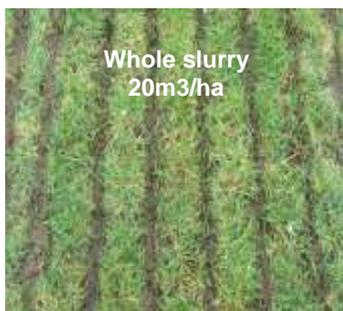


Conclusions for this system:

- For grazing – only use an injected slurry application early and allow at least four weeks before first grazing

SRUC Research: Utilising separated slurry in grazing pastures

- Separated slurry (liquid fraction) differs in its physical and chemical composition compared with whole slurry, generally having a lower dry matter (DM) content (usually 3-4%) and importantly exhibiting a higher available nitrogen (N) content
- This higher available N and lower DM content of the liquid fraction of separated slurry may encourage better grass growth but currently there is little information available on the actual performance of swards grown from separated slurry
- To examine this option, researchers at SRUC are investigating the performance and grazing behaviour of mid-late lactation cows grazing pastures treated with either:
 1. Whole slurry
 2. Separated slurry or
 3. Fertiliser.
- This will supply key information about the capacity of nutrients from separated slurry to support grazing animals, with researchers also examining grass growth and herbage quality throughout this nine week experiment.



Chris' 'Top Tips'



Addressing compaction in soils

- Manage your grazing and silage making to help prevent compaction in the first place
- Compaction could easily be costing you £400 a hectare each year in lost production, invest in field infrastructure such as tracks, temporary fencing and drainage and use machinery with flotation tyres and lower axle loadings
- Get to know your soils so that you can spot signs of damage before your fields deteriorate so badly that cultivating and reseeding is your only option
- Start by looking at your soil in obviously damaged areas around troughs and gateways, look at your soil in perfect conditions where it gets no trampling or traffic – under a fence-line or even in the back garden! Once you know what 'really good' and 'really bad' looks like, go and dig in your fields to see how they compare
- Identify the depth and severity of any compaction – options to improve are:
 1. Do nothing but monitor to check that soils are recovering
 2. Implement management strategies to help speed recovery (such as back fencing, avoiding heavy slurry applications, reduced stocking rates)
 3. Machinery options to break compaction areas – aeration or sward lifting
 4. Cultivation and reseeding.



George's 'Top Tips'



Slurry and nutrient management

- Get your slurry analysed for nitrogen, phosphate and potassium contents (N, P, K). The nutrient content of your slurry depends on the feeding system you operate. Having your own figures means that you can plan manure and inorganic fertiliser use accurately to meet grass and crop requirements. *If you don't measure it properly, you can't manage it properly...*
- Apply as much as you can in the growing season when your grass and crops can use the slurry nutrients
- Think of slurry as a resource, not as a waste for disposal
- Apply your slurry widely across the farm, not just around the farm steading – this will help reduce build-up of P and K in the soil
- Try and leave at least 3 to 4 weeks between slurry application and grazing, particularly when it is dry
- Work to a nutrient management plan, which includes crop/grass nutrient requirements for each field and how you are going to meet these from soil reserves, slurry and inorganic fertilisers
- Make sure you have a manure application risk map for the farm and follow the NVZ regulations, even if you are not in a NVZ – the regulations are best practice.



DairyCo-BGS Demo Farms 2013-2014

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Demonstrations:

1. Alleviation techniques for soil compaction
2. Utilising slurry in the grazing rotation
3. Nutrient requirements for grassland (RB209 validation).

Mr Rob Taverner

Lower Brenton Farm
Kennford
Exeter
Devon
EX6 7YL

Demonstrations:

1. Dealing with compaction at reseeding time
2. Selecting seed mixtures
3. Optimising soil nutrition on grazing pastures.

You can keep up to date with what is happening on the DairyCo-BGS Demo Farms by visiting www.dairyco.org.uk

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