



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

Farm Visit

Trink Dairy

Mr Chris and Mrs Rachel Knowles

Borea and Trink Farms

Little Trink

St Ives

TR26 3JG

16 September 2014

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 20 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 a series of demonstration farms across the country. 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

Speakers

- Mr Chris Knowles, Host Farmer
- Mr Chris Duller, Independent Grassland Adviser
- Mr Norton Atkins, Harper Adams University Researcher
- Dr Debbie McConnell, DairyCo R&D Manager



Farm profile

The Knowles family currently run a 325 cow herd with 285 youngstock (25% Jersey x 75% Friesian) at Trink Dairy between Hayle and St Ives, Cornwall. Since the late 1990's they have operated an extended grazing system, which was their solution to the low milk prices of that period. The grazing platform at Trink comprises 250 acres, with a further 250 acres off-land, all of which is down to either short or long-term grassland. Clover is used in most of the grazing swards.



Soils at Trink are classified as Moretonhampstead type, described as loam over granite with typical characteristics of a gritty, freely draining, medium soil with a humus surface horizon in places. Although these soils are more suited to extended grazing than heavier, wetter soils Chris still notices the influence of soil compaction, especially where fields have been trafficked and during prolonged or intense wet weather events.

Over recent years Chris has been using a soil aerator annually as a matter of course. As part of the DairyCo-BGS Demo Farms Project the Trink Dairy has been running trials to investigate the influence on soil condition and grassland productivity of a) the type of aerator used and b) the timing of undertaking the aeration operation.

Pictures: Chris and Rachel Knowles and one of the demo fields at Trink.

Farm Details

Staff	2 full time employed 1 full time family 1 part-time family
Production (l)	5500
Butterfat	4.6
Cell count	120
Concentrate per cow	1 t
Concentrate per l	0.18 kg
Calving	Spring block

Grazing

Cows are generally turned out on 10th February and are in by night from the 1st November onward depending on weather. Average annual grass growth is 13t/ha DM, with an average cover of 2150 kg DM/ha across the farm at peak growth (29th July 2014).

Farm SWOT

Strengths: A simple system which is profitable and sustainable in terms of keeping costs manageable.

Weaknesses: Natural constraint of the soil type and exposure (moorland) and the narrow lanes accessing the holding.

Opportunities/Goals: To achieve a work/life balance. Trying to sell more surplus stock and improve our replacement rate.

Threats: The market and price volatility and that we seem to be experiencing more extremes of weather.

Farm Walk

Stop 1: Soil Aeration

Two fields are involved in the aeration demo; the first is undergoing surface aeration treatments, whilst the second has deeper compaction and will be used to demonstrate sward lift treatment.

These demos are important because sandy, light soils are often overlooked in terms of treating compaction.

The aims are to assess:

- I. The influence of timing, spring compared to autumn aeration
- II. The influence of the type of aerator used.

Field 1 – Surface Aeration



1. Spring, Slit Aerator
2. Spring, Aerator plus Harrow
3. Autumn, Slit Aerator
4. Autumn, Aerator plus Harrow
5. Control, no treatment

Field Performance (since mid-Feb 2014)

Tonnes DM	8.8
Kg per day	46.8

	pH	P	K	Mg	Lol*(%)
mg/l (index)	6.2	25.4 (2)	95 (1)	115 (3)	9.5

*Lol = Loss on Ignition measure of organic content

The first treatments for plots 1 and 2 were carried out on 19th May 2014 (Spring 1). Initial results are presented below although no conclusions can be drawn as data collection is on-going.

Soil Bulk Density – 22/08/2014	
Aerator 1	0.94 g/cm ³
Aerator 2	0.96 g/cm ³
Control	1.00 g/cm ³

Soil Moisture – 22/08/2014	
Aerator 1	18.4%
Aerator 2	18.2%
Control	17.8%



Soil from plot 2 a few days after treatment, showing the slit created by the aerator.

Field 2 – Sward Lift Aeration

Being close to the farm yard this field receives more trafficking and trampling than others. It was also poached by heavy stocking during wet conditions in February 2014.

The whole field was aerated with a surface slitter in April 2014, however soil pits revealed a deeper pan with higher packing density, blocky structure and low infiltration rate at 10 – 20cm.

	pH	P	K	Mg	LoI*(%)
mg/l (index)	5.7	40 (3)	131 (2-)	137 (3)	13.4

Sward Lifter Plot (0 – 5cm)	
Soil Moisture – 22/08/2014	17%
Soil Bulk Density – 22/08/2014	1.14 g/cm ³

Pan Depth (top)	
May 2014	10cm
August 2014	14cm

The test plot will receive its first treatment in autumn 2014.

[DairyCo Research: The impact of compaction](#)

Researchers at SRUC and HAU 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: cattle trampling, tractor and no compaction.

Results:

a) Impact of compaction on soil structure.



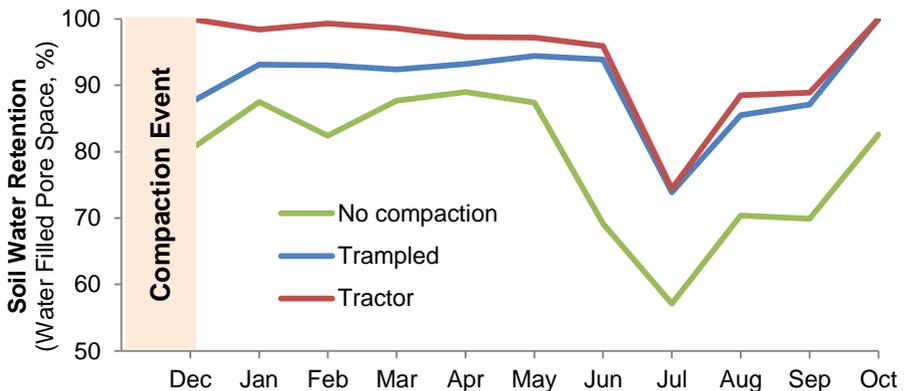
Trampling

Tractor

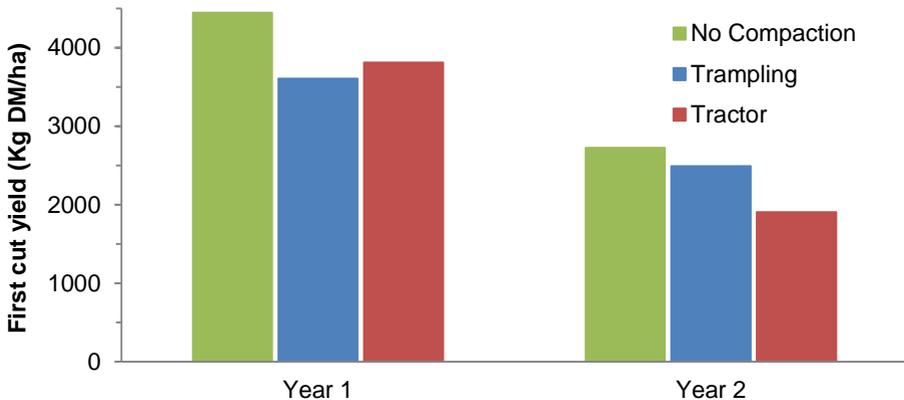
No compaction

Compaction had a negative effect on soil structure, increasing bulk density of the soil and resulting in an increase in the number of large, blocky, angular aggregates (as indicated above).

b) Impact of compaction on soil water filled pore space



c) Impact of compaction on first cut grass dry matter yield



Initial findings:

- Both tractor and cattle compaction increased soil bulk density as indicated by large number of blocky, angular aggregates
- Compaction increased water retention in the soil by 17%
- Trampling and tractor compaction reduced first cut grass yields by approximately 20%.

Stop 2: Outwintering Heifers

Heifers are currently outwintered on grass with silage bales and infrequent supplementary cake. Small, well positioned fields are chosen to limit the amount of land sacrificed. They are rejuvenated in the spring with partial cultivation and box-seeder.

The first winter of our demonstration will be 2014/15. It will consider the following factors:

- Choosing a site for outwintering; what's most important to consider?
- Choosing a stocking rate?
- Supplementary feeding decisions?
- Repair and reseeding decisions?

Outwintering field 2013



**Before rejuvenation, 28th April
2014**



**A few days after
rejuvenation, 9th May 2014**



Early regrowth, 3rd June 2014

DairyCo Research: Outwintering replacement heifers

The trend towards expanding herd size creates extra accommodation requirements for youngstock. Options for expanding include:

- Constructing extra buildings (*high capital*)
- Purchasing in-milk heifers (*biosecurity*)
- Woodchip pads
- Out-wintering replacement heifers.

At present little is known about the current practices of out-wintering or how the performance of outwintered animals compares with those housed during the rearing period. Researchers at HAU and SRUC are running a 4 year study to find out more.

Year 1: Survey of current outwintering practices in GB

Seventy farmers participated in a survey in 2012. Participants each had an average of 9.7 years experience out-wintering heifers.

The top 4 reasons for out-wintering heifers were:

1. To reduce the cost of heifer rearing
2. To improve animal health and welfare
3. To reduce labour input
4. To alleviate pressure on buildings.

Characteristics of farms that are outwintering replacement dairy heifers in Great Britain (GB)

	Mean	Min.	Max.
Herd size	368	35	1100
Milk yield (kg/cow)	5360	2700	9800
Replacement rate, %	20	10	35
Heifers < 1 year old	69	0	500
Heifers > 1 year old	95	0	360

Site selection:

Choosing free-draining, dry soils was the primary criteria for selecting a suitable area to out-winter heifers and assisted in:

- Avoiding poaching
- Avoiding run-off
- Providing dry lying areas.

Animal performance:

Over the out-wintering period farmers estimated:

- LWG of 0.54 kg per day
- 96% of heifers gained (59%) or maintained (37%) BCS.

Year 2: On-farm monitoring

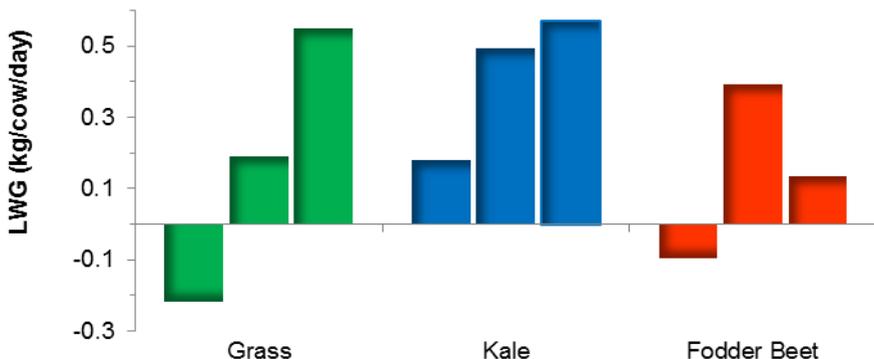
Out-wintered heifer performance in winter and first lactation, soil condition and effect of a mineral bolus is being measured on low input, spring calving, cross bred dairy herds in 2013:

- 9 farms – 3 grass, 3 kale, 3 fodder beet
- 360 heifers – 40 on each farm
- Half of the heifers were given a mineral bolus

Measurements include: forage quality and utilisation, LWG, milk yields, health and fertility.

Results:

Average daily liveweight gains of animals on each of the farms



Effect of mineral bolus on the performance of animals across the nine farms

	- Bolus	+ Bolus
Daily gain, kg	0.25	0.25
Final weight, kg	424	424
Final condition	2.4	2.5

Initial findings:

- Forage type had no effect on animal performance but regular weighing was crucial to achieve target LWG
- Mineral boluses significantly increased the quantity of trace elements in blood plasma but had no apparent effect on LWG over the outwintering period

Year 3: Suitability of outwintering systems for HGM heifers

The performance of housed heifers during the rearing period and in the first 100 days of lactation will be compared with heifers outwintered on kale, fodder beet and deferred grazing in 2014-2015.



For more information on any of the DairyCo Research Projects visit www.dairyco.org.uk/research-development or call 024764782051.

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DairyCo

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