



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

Farm visit

Chynoweth Farm Partners

Mr Simon, James and Rob Foote
Chynoweth Farm
St Allen
Truro
TR4 9DG

**7 July 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 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 a series of demo farms for 2014-2015. Some of these farms will run demonstrations replicating some of the current research trials, showing how they translate into on-farm practices.

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

Speakers:

- Mr James Foote, Host Farmer
- Prof Liam Sinclair, Professor of Animal Science, HAU
- Dr Louisa Dines, Senior Lecturer in Agronomy, HAU
- Dr Debbie McConnell, DairyCo R&D Manager



Farm profile

Background

Simon, James and Rob Foote currently run a 230 cow Holstein herd. One third of the 10000 litre, AYR calving herd is milked through two De-laval robots and the family have recently designed and built a customised slurry lagoon to recover methane to supply heat and electricity to the farm.

The family are in their second year of growing lucerne silage and aim to reduce feed costs through replacing a proportion of bought in soya and rapeseed with lucerne. The farm is now growing 28 ha of lucerne alongside maize, grass and winter wheat.



Farm details

Soil type (s)		Clay loam soil
Rainfall		1000 mm
Crops farmed (ha)	PRG + IRG	61
	Winter wheat	15
	Maize	44
	Lucerne	28

Lucerne

One of the first forage crops, lucerne (commonly known as alfalfa) is a high protein nitrogen-fixing legume. Lucerne silage, if harvested at the leafy stage, can have protein contents in excess of 20% and as a result is an excellent source of protein. Typically, lucerne has a high, rapidly digestible fibre content and similar to most legumes, a high buffering capacity in the rumen, due to its mineral composition. Although ME content of lucerne is typically lower than other crops (9 - 11 ME), lucerne is an excellent complement to maize silage.

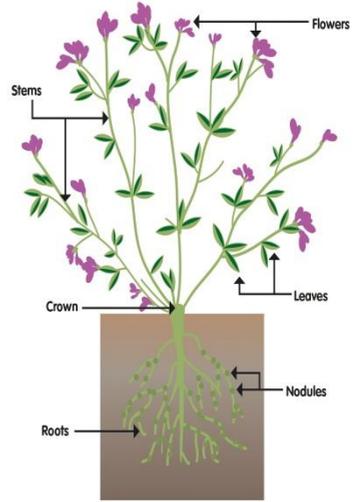


Table: Advantages and disadvantages of lucerne.

Potential advantages	Potential disadvantages
High yielding (12t DM/ha/yr)	Needs multiple cuts (3–4 per year)
High protein (18–22% CP)	Low energy levels (10MJ of ME)
No requirement for applied N	Moderate requirement for phosphate (P), sulphur (S), magnesium (Mg) and high requirement for potash (K) and calcium (Ca)
Once the crop is established, it can suppress weeds	Slow establishment which means weeds can dominate
Forage rich in digestible fibre	If not managed correctly there may be increased risk of bloat in grazing animals
High levels of minerals and vitamins	Has a requirement for boron (B), molybdenum (Mo) and manganese (Mn)
Contains high quality amino acids (similar to those in milk)	

Farm walk

Stop 1: Growing lucerne

Lucerne was established for the first time on Chynoweth Farm in early May 2013. Seventeen hectares (v. Marshall) was sown as a straight stand of lucerne at a seed rate of 25 kg/ha (cost = £170/ha). Land was previously used for wheat, grass and potato production.

2013:

Cultivation process:

1. Soil test pre-cultivation (pH 5-6), sea sand applied (see below for current test results)
2. Spray with Herbicide
3. Plough
4. Subsoil and Pan buster
5. Light cultivator
6. Drill with power harrow

Table: Soil analysis results on adjacent fields of either north or south-facing aspect (second year ley) prior to first cut 2014

	North-facing field	South-facing field
Soil pH	7.3	7.2
Phosphorus (mg/l; Index)	38.6 (3)	29.4 (3)
Potassium (mg/l; Index)	258 (3)	309 (3)
Magnesium (mg/l; Index)	92 (2)	104 (3)
Organic Matter (%)	5.7	11.3

The crop was harvested twice in 2013 with an estimated yield of 17.5 t FW/ha/cut. Slurry was applied after each cut via dribble bar technology at a rate of 27.5 m³/ha.

2014:

In 2014, a further 7ha of lucerne were sown in April. This was again sown as a straight stand of lucerne however this has not established as well as last years' crop due to redshank invasion (see below).

First cut for the second year lucerne was harvested on 11 June and re-growth has performed well (see below). This harvest was followed by 27.5 m³/ha of slurry.

Photo: Lucerne established Spring 2014



Photo: Three week regrowth on 30/6/14 of second year lucerne



Prior to first cut, there were clear differences in the appearance of the lucerne crop on fields of different aspects. The table below shows the estimated yields at first cuts taken from quadrat clips on each field.

Table: Difference in crop performance on adjacent fields of either north or south-facing aspect (second year ley) prior to first cut 2014

	North-facing field	South-facing field
Plant size (g/plant)	326.4	490.8
Plant density (number of plants/m²)	50	67
Estimated yield (t/ha)	6.53	9.82

[DairyCo Research: Growing Lucerne](#)

The main barrier to use of lucerne in GB is the establishment phase; once established, the crop will typically persist for 4 - 6 years under the correct management. However, if a poor establishment has been achieved it can be difficult to recover the crop as lucerne is autotoxic and will not withstand overseeding of additional plants.

A number of DairyCo-funded establishment trials are being undertaken at HAU, SRUC and University of Reading to provide information on different strategies to maximise establishment. One of the biggest challenges at establishment is weed infestation and so a clean seed bed is key to successful establishment. Researchers are currently investigating whether the presence of a cover crop (spring barley) reduces the weed burden (see photo's below) compared to a pure stand of lucerne. Researchers are also investigating whether spring or autumn establishment is preferential for lucerne production.

Photo: HAU plot trials investigating lucerne grown with (RHS) and without (LHS) spring barley as a cover crop.



Stop 2: Feeding Lucerne

The farm includes lucerne in the diet of both the robot and conventionally milked cows at a rate of approximately 1.5 kg DM/cow/day (5-6 kg FW/cow/day). This equates to 15% of the forage dry matter intake. The lucerne is fed as part of a TMR which includes (amongst other ingredients): chopped fodder beet, whole crop wheat, haylage and first cut silage. Lucerne is chopped to approximately 5cm.

Table: Analysis of first and second cut of lucerne from 2013.

	First cut	Second cut
Dry matter (%)	24.3	25.5
Crude Protein (g/kg DM)	168	168
D-value	64	63
Metabolisable Energy (MJ/kg DM)	10.2	10.1
pH	4.7	4.7

DairyCo Research – Feeding Lucerne

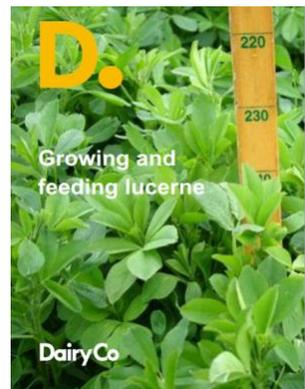
While lucerne is one of the most widely fed forages globally, many questions still remain as to how we maximise the value of lucerne in dairy cow diets in GB. As a result, researchers at Harper Adams University (HAU), University of Reading and Scotland's Rural College (SRUC) are undertaking a four year programme of work funded by DairyCo to identify optimum feeding strategies for lucerne. Over the next few years, researchers will investigate:

- The optimum rate of inclusion of lucerne in dairy cow diets when combined with maize and/or grass silage
- The effect of plant maturity at harvest of lucerne silage on forage quality and cow performance
- The effect of chop length of lucerne on ensilability, forage digestibility and cow performance



For further information on any of the DairyCo research projects visit www.dairyco.org.uk/research-development.

Our guide on growing and feeding lucerne, can be downloaded from the DairyCo website www.dairyco.org.uk.



Contact details

DairyCo:

Ms Becky Miles
Cornwall Extension Officer

T: 07500 873258
E: rebecca.miles@dairyco.ahdb.org.uk

Dr Debbie McConnell
R&D Manager

T: 02476478704
E: debbie.mcconnell@dairyco.ahdb.org.uk

British Grassland Society:

Ms Charlotte Evans
Technical Project Manager

T: 07960007649
E: charlotte.evans@britishgrassland.com

Dr George Fisher
Project Manager & Acting Director

M: 02476696600
E: george@britishgrassland.com

Harper Adams University

Prof Liam Sinclair
Professor of Animal Science

T: 01952 815332
E: lsinclair@harper-adams.ac.uk

Dr Louisa Dines
Senior Lecturer in Agronomy

T: 01952 815034
E: ldines@harper-adams.ac.uk

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