Issue 42 | May 2021

Milk Manager NEWS

Farm Advisory Service
National Advice Hub
T: 0300 323 0161
E: advice@fas.scot
W: www.fas.scot

Contents

This month's editor:
Lorna MacPherson

The European Agricultural Fund for Rural Development
Europe investing in rural areas

SAC CONSULTING

Scottish Government
Riaghaltas na h-Alba
gov.scot

Milk Manager NEWS

Market Update

UK Wholesale Dairy Commodity Market

- Fonterra's latest on-line GDT auction (4th May) resulted in a small decline of 0.7% in the weighted average price across all products, reaching US $4,162/t. However, the current average price is significantly higher than 12 months ago, at only $2,836/t. Butter and cheddar showed the greatest price reductions, with butter falling 12.1% to $5,035/t and cheddar by 4.5% to $4,274/t. The biggest price rises were seen in butter milk powder (up 14.4% to $4,222/t) and skim milk powder (up 2.0% to $3,433/t). Full results are available at https://www.globaldairytrade.info/en/product-results/

- There was very little movement in average UK wholesale prices of dairy commodities for the month of April, with the biggest change in butter, down 4% on the March price. Prices for butter and cream increased in the run up to Easter and then started to decline as demand dropped off and milk volumes continued to rise, although at a somewhat slower rate than last year due to the cold, dry weather.

Commodity	Apr 2021 £/T	Mar 2021 £/T	% Difference Monthly	Apr 2020 £/T	% Diff 2021-2020
Bulk Cream	£1,405	£1,471	-4	£900	56
Butter	£3,450	£3,430	1	£2,390	44
SMP	£2,150	£2,100	2	£1,720	24
Mild Cheddar	£2,980	£2,960	1	£2,880	3

Source: AHDB Dairy - based on trade agreed from 22nd March – 23rd April 2021. Note prices for butter, SMP and mild cheddar are indicative of values achieved over the reporting period for spot trade (excludes contracted prices and forward sales). Bulk cream price is a weighted average price based on agreed spot trade and volumes traded.

- Skim milk powder prices also remain firm, with continuing demand from the Far East as China rebuilds its pig herd, supporting powder prices.

- Cheddar prices remain strong due to low stocks and increasing demand as the food service sector starts to open up more.

- With some milk buyers posting price increases for May, the market indicators AMPE (Actual Milk Price Equivalent) and MCVE (Milk for Cheese Value Equivalent) are up 0.57ppl and 0.49ppl respectively from March. Increases in AMPE are mainly on the back of a rise in the skim milk powder component, while a higher MCVE price is due to increases in the mild cheddar and whey powder components.

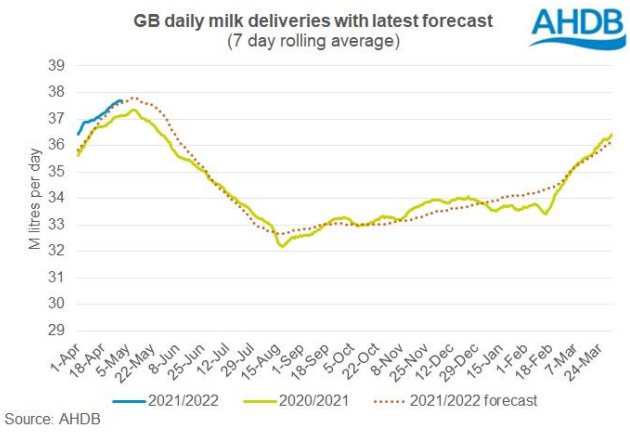
	Apr 2021	Mar 2021	12 months previously	Net amount less 2.4ppl average haulage – Apr 2021
AMPE	33.11ppl	32.54ppl	23.69ppl	*30.71ppl*
MCVE	33.45ppl	32.96ppl	30.71ppl	*31.05ppl*

Source: AHDB Dairy

- As of the week ending 7th May, spot prices for milk have been holding steady at 18 to 23ppl with little change over the past two weeks due to low volumes being traded. Domestic cream prices have firmed slightly from the previous week to £1.29 to £1.32/kg ex works, with an export price equivalent of £1.35 to £1.39/kg.

UK Milk Deliveries and Global Production

- Recent cold weather in April and early May has hampered grass growth, which is slightly behind the previous two-year average in many parts of the country, dampening milk volumes. However, GB milk deliveries are still higher than the same time last year. As of the week ending 1st May, deliveries to GB milk buyers were up 0.6% compared to the previous week and 1.6% above the same week last year (equivalent to 580,000 litres). It should be remembered that milk production was curbed last year as many farmers were asked to reduce milk output (Müller requested their farmers to reduce output by 3% from 8th April until end May 2020). Current production levels are shown in the graph below against last year's production and the 2021/2022 forecast.



Source: AHDB

- Milk volumes are back in the EU-27, with production for February down 0.5% compared to February 2020 as the main milk producing countries (France, Germany and Netherlands) have had lower output compared to last year.

- Global milk production from the six key producing regions (US, Argentina, New Zealand, Australia, EU and UK) for the first two months of this year are above last year's production, with February deliveries up 1.3% on February 2020. Out of the six regions, only the EU produced less milk.

Monthly Price Movements for May 2021

- Four of the main Scottish milk buyers have held their April price for May. However, all of them have announced price increases for June, indicating positivity in the market place for continued demand for dairy products as the country moves out of lockdown.

Commodity Produced	Company Contract	Price Change from Apr 2021	Standard Litre Price May 2021
Liquid & Cheese	**Arla Farmers UK**	*+1.31ppl liquid +1.36ppl manufacture*	31.55ppl liquid 32.79ppl manufacture
Cheese, Liquid & Brokered Milk	**First Milk**	*+0.5ppl*	29.43ppl manufacture
Cheese	**Fresh Milk Company (Lactalis)**	*No change*	27.75ppl liquid 28.91ppl manufacture
Liquid & Manufacture	**Grahams**	*No change*	27.0ppl
Liquid & Manufacture	**Müller Direct**	*No change*	27.0ppl (includes 1ppl direct premium and -0.25ppl Scottish haulage charge)
Liquid & Manufacture	**Müller (Co-op)**	*+0.51ppl*	30.39ppl
Liquid & Manufacture	**Müller (Tesco)**	*+0.86ppl*	32.13ppl
Liquid, Powder & Brokered	**Yew Tree Dairies**	*No change*	27.1ppl Standard A litre price

Other News

- Tesco's Sustainable Dairy Group is seeing a 0.86ppl increase from 1st May, bringing its liquid standard litre to 32.13ppl for Müller suppliers and 31.88ppl for Arla suppliers after their haulage deduction. This price is 0.62ppl above the same month last year. Promar's cost of production data from October 20 to September 21 shows an increase of 0.94ppl to 31.99ppl, with variable costs at 17.86ppl, overhead costs at 11.90ppl and depreciation at 2.23ppl. There is a further 0.14ppl adjustment for feed, fuel and fertiliser to set the new quarterly price at 32.13ppl.

- Müller have announced a 1ppl price rise for June, bringing their liquid standard litre up to 28ppl for Scottish suppliers taking part in their Advantage scheme. They stated the rise is due to strong market demand for liquid milk products in conjunction with the recent cold weather reducing spring milk volumes.

- Grahams are also responding to the increased demand for dairy products and the lower than normal milk volumes at this time of year with a 1ppl increase for June and, assuming no significant market changes, a further 1ppl rise for July which will take their price up to 29ppl.

- At the end of April, Yew Tree Dairies announced a 2ppl price increase from 1st June, bringing its liquid standard litre up to 29.1ppl.

- Lactalis are also rewarding their suppliers with a 1.25ppl price rise from 1st June, bring their liquid standard litre to 29ppl and manufacturing standard litre to 30.16ppl.

- The UK average farm-gate milk price for March was 29.72ppl, which is 0.7% below the February milk price (29.91ppl) according to Defra. These prices include retailer aligned contracts where milk price is based on a cost of production formula.

- First Milk have recently announced several enhancements to their First4Milk Sustainability Plan, with the aim of being a leader in sustainable dairy farming. Their key ambitions for its members and operations are:
  - Reaching net zero carbon emissions by 2040 and at farm level reduce carbon footprint by 50% by 2030. For milk transport and processing, achieve net zero by 2035.

- Each member's farm has a target of sequestering 100,000t of CO2 each year by 2025.
- By 2025, increase milk from forage by 10% so that there is less reliance on imported feed ingredients.
- By 2030, renewable fuel sources will be used for all transport and processing activity.
- Reduce antibiotic use by a further 10% by 2025. Their farms have already excelled in this area with an average usage of 15.5mg/kg PCU which is 23% less than the RUMA 2020 target of 21.0mg/kg PCU.

- Arla is heavily focused on its goal of achieving carbon net zero by 2050 and has recently published data from its 8100 farm suppliers which showed that its average dairy farmer produced 1.15kg of CO_2e for every kg of milk produced. The most efficient farms are at 0.9kg, which is well below the FAO's global average of 2.5kg. Arla have also proposed five recommendations that all dairy farmers can act on to reduce emissions:

  1. Increase milk yield with more efficient feeding.
  2. Reduce feed waste.
  3. Extend animal life and improve animal welfare.
  4. Better land use management.
  5. Precise fertiliser management.

  As of June all Arla farmers can benchmark their carbon footprint data with other farms of a similar size in their geographical area via a digital platform. This process called "Climate Checks" will allow farmers to identify areas and recommendations for improvement.

lorna.macpherson@sac.co.uk, 07760 990901

Straights Update

Straights prices for delivery in artic loads as of early May are as follows (varies depending on location):

£/T for 29t loads delivery + £8/t haulage to central belt	May 21	Jun 21	Jul 21 - Oct 21	Nov 21 - Apr 22
Proteins				
Hipro Soya	389	388	390	393
Rapeseed Meal	317	317	Jul 317 Aug-Oct 275	Nov-Jan 272
Maize Distillers Pellets	294	287	287	275
Starch				
Wheat	210	211	Jul 212	200
Barley	178	179	159 (new crop)	175
Maize	258	258	258	239
Fibre				
Imported Sugar Beet Pulp	232	232	233	199
Soya Hulls	186	184	184	186

Source: Straights Direct, Cefetra and Graindex on 7th May. Barley and wheat prices are based on delivery to central belt (for North-East, deduct £5/t for wheat), courtesy of Mark Bowsher-Gibbs, Senior Consultant, SAC Consulting. Prices do not include seller's margin.

Global News

- Weather conditions across the globe are causing unease for the three biggest maize exporters (US, Brazil and Argentina). Brazil is suffering from dryness and the US from cold weather, raising concerns about the availability of maize (as well as wheat) as 2020 harvest stocks shrink and demand increases from China. Brazil's second biggest maize producing state, Panara was rated 92% "good" in the first week of April but by the end of the month, only 40% of the crop was rated "good". The USDA estimated the Brazilian maize crop at 109mT in April. However, if dryness continues it is though that this could decline to only 90mT.

- The Chicago Board of Trading maize futures have soared above $7/bushel on the back of concerns around production estimates in Brazil, having increased by 40% since the end of March. The US has already sold its surplus from the 2020 harvest and it is estimated that the US will have 34.3mT of maize in stock at the end of the season, which is equivalent to about one month's supply. By 2nd May, planting of the US maize crop was 17%

complete, below the five-year average by three percentage points.

- Closer to home, weather has been favourable in the Ukraine for winter and spring crops, with the possibility of record levels for wheat and maize production in 2021. Wheat production is estimated at 28.6mT compared to only 24.9mT in 2020 and maize could reach 36.6mT (compared to 29.5mT), increasing exportable supplies.

- Argentina, the world's 3rd largest maize supplier may be facing an increase in grain export taxes, adding to the bullish trend in cereal prices. As of 15th April, its maize harvest was only 14% complete compared to the five-year average of 25% at this stage, due to too much rain. Progress in the soya harvest has also been slow and as of the end of April, was only 32.9% complete, compared to 68.2% as the same time last year. At this time soyabean futures were at their highest level since June 2013.

UK and Scottish News

- There is continued demand for last season barley as supplies dwindle and become increasingly harder to find. Use in animal feed remains high and with export interest from the Netherlands for May and June, prices are likely to remain firm until new crop is available. The recent rains have been welcomed due to concerns about the condition of this year's spring crop and barley's discount to wheat has since widened to around £32/t for old crop and £25/t for new crop.

- The domestic rapeseed market remains bullish with high global demand for oilseeds and global stock levels falling. Prices for new crop are close to £460/t delivered.

- Alternatives to cereals include bread waste (very limited availability) and biscuit meal, which is currently a good value source of energy and starch. There are plenty of potatoes in stores and it is likely that prices could drop further (£25/t for full loads delivered as of 21st April).

- There is huge variation in the price of distiller's dark grains depending on what is in store. The Vivergo bioethanol plant is reported to be recommissioned later this year/early 2022 on the back of the government's proposal to increase renewable ethanol in fuel from 5 to 10% and this would greatly increase animal feed supplies.

lorna.macpherson@sac.co.uk, *07760 990901*

Rumen Fill: How Important is this for Dry Cows?

Turning dry cows out to grass may seem like an easy option and a benefit in areas where forage stocks have been tight. However, there are many problems associated with having dry cows at grass, including gaining too much condition before calving and increased risk of milk fever. Displaced abomasum can be more common in the spring time when forage changes are taking place and the risk also increases at grass.

The uterus displaces the abomasum during pregnancy but once the cow has calved it moves back into its normal place. However, if forage intake is low before or just after calving (i.e. poor rumen fill), there is more room for the abomasum to move and it is less likely to sit on the floor of the abdominal cavity, under the rumen. A full rumen will help prevent the abomasum from moving and twisting out of its correct position.

Assessing rumen fill can give a good indicator of feed intake over the last two to six hours. It is assessed from the left-hand side of the cow, looking at the area underneath the short ribs and in front of the hook bone. A cow with a rumen fill score of 1 will have a hollow appearance with a rectangular shaped area under the short ribs, indicating poor intakes (see photos below). A rumen full of fibre will appear distended and bulge out from underneath the short ribs (score 5). The ideal score for milking cows is 3.

Dry matter intake and hence rumen fill in dry cows is very important as cows that calve down with poor intakes will also have poor intakes in early lactation, making them more susceptible to negative energy balance, condition loss and transition diseases (including displaced abomasum). Poor rumen fill during the dry period has also been associated with lower milk production in the first four weeks after calving.

Rumen fill score 1

Rumen fill score 3

Rumen fill score 5

Source: Cow Signals

The target rumen fill score for dry cows is 4+. When grass is making up a high proportion of the dry cow diet, passage rates may be typically higher compared to a conserved forage ration and so rumen fill scores may be slightly lower. This is where the benefit of restricting grass intake and providing low quality forage such as straw, wholecrop, hay or big bale silage to fill up on comes in handy, along with minimising the risk of gaining condition in the run up to calving.

Cows that gain condition over the dry period are more at risk of body fat mobilisation in early lactation (and lower feed intakes). Liver function is reduced due to fat infiltration, which can lead to ketosis. Cows with ketosis have a much higher risk of developing a displaced abomasum through a reduction in feed intake.

Data from Premier Nutrition's Transition Management Service has shown that the higher the rumen fill score, the greater the dry matter intake in close-up dry cows; each extra 0.25-point rumen fill score was associated with an extra 0.65kg of dry matter intake (+5%). Poor rumen scores during the dry period were linked to reduced milk yield in the first month of lactation, along with less total solids produced. A score < 3 was associated with 1.5kg/day milk less and an increased risk of milk fever, ketosis, retained foetal membranes, acidosis and left displaced abomasum after calving. Therefore, the majority of dry cows should have a rumen fill score of 4 so that > 80% of fresh cows achieve the target rumen fill score of 3.

lorna.macpherson@sac.co.uk; 07760 990901

Changes Abound for the Farmed Water Environment

In the March edition, the importance of good slurry management and the need to ensure appropriate effective capacity was discussed. With the closure of the Scottish Government's consultation on the future of slurry management and application, all cattle sectors are likely to see an impact. An overview of the consultation can be found at https://www.gov.scot/publications/delivering-scotlands-river-basin-management-plans-silage-slurry-anaerobic-digestate-improving-storage-application/pages/4/ but this article will provide a quick summary.

While cattle numbers across Scotland are arguably on the decline and have been for several years now, the trend towards larger herd sizes presents problems when it comes to storage and management of waste materials and by-product. The total amount of slurry produced in Scotland is estimated to be in the region of 6.35 million tonnes per annum and as more cattle are being housed for longer periods of time that amount is predicted to continue rising, despite reducing cattle numbers.

As Scotland continues to develop a strategy to safeguard the farmed environment and mitigate against climate change, a focus on natural capital and water more specifically makes sense. Good water quality impacts the business resilience of farms, but indirectly biodiversity and public good too. Simple and small steps can also be taken

with regard to slurry storage and handling that present obvious and easy wins.

Broadly speaking, the consultation proposes to update the General Binding Rules (GBR) and make significant changes to the Water Environment (Controlled Activities) (Scotland) Regulations 2011 (CAR).

With regard to section 6 of the consultation targeting silage storage, the proposals suggest that current regulations should be extended to include silage produced as an energy crop, storage of silage in a silo and considerations on the discharge of silage effluent to a constructed farm wetland. The current regulations centre around silage storage and impacts stores built between 1991 and present day, but the consultation proposes to include all stores built prior to 1991. A four-year transitional period is proposed to allow farmers and landowners to bring their structures to standard where required.

In section 7 of the consultation targeting slurry storage, those farms that have less than six months of effective storage should make arrangements to increase their storage to a minimum of 22 weeks for cattle and 26 weeks for pigs when farming outside of a Nitrate Vulnerable Zone (NVZ). As with silage stores the removal of pre-1991 exemptions are proposed.

Section 9 of the consultation is about more efficient application of slurry and liquid digestate, and broadcast application typically with a splash plate is proposed to be banned. The banning of splash plates is aimed at reducing the loss of harmful ammonia to the atmosphere and with emission reductions of between 70 to 80% with alternative methods, this presents a real easy win in the fight against climate change. This will come as no surprise to farmers and landowners that have heard rumblings of this over the past year. It is hoped that this step plus investment in slurry application through schemes like the recent Sustainable Agriculture Capital Grant Scheme can bring us in line with practices common on the continent.

Other changes are also planned and those concerned and looking to act can find more information using the above link. Additionally, for more information on how farmers can work to protect their farmed water environments and maximise the efficacy of slurry and other organic and inorganic fertilisers, Farming and Water Scotland has a range of materials and advice notes https://www.farmingandwaterscotland.org/.

alexander.pirie@sac.co.uk; 01292 525036

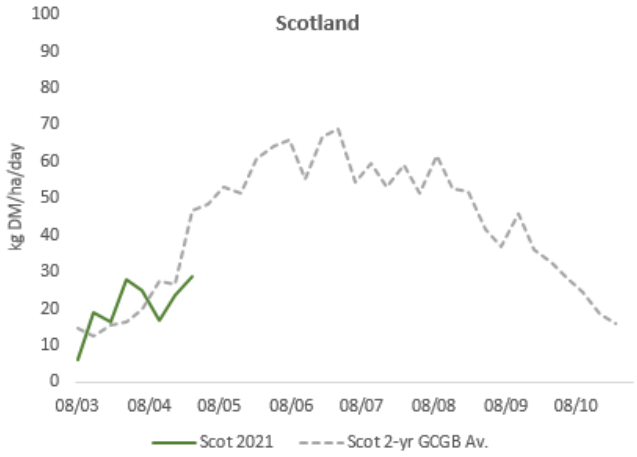
Maximising Grazing Performance this Summer

With feed prices soaring, herds which graze cows in the summer months have the potential to reduce concentrate costs by making the best use of grazed grass.

Grass Growth

The cold, dry weather experienced in April for much of Scotland means that grass growth is behind the two-year average based on data collected from GrassCheck GB farms as shown in the graph below.

Grass growth across GB



Source: Scottish GrassCheckGB Growth Rates w/b 26/4/21

Growth rates for Scottish dairy farms in the GrassCheck project were 43kg/DM/ha/day. Dairy farms will be achieving higher growth rates than the combined figures shown above due to having higher overall farm grass covers compared to beef and sheep farms. As soil temperatures begin to rise, growth rates should recover, but rain is needed to increase soil moisture contents as this will be the limiting factor on many farms.

Grass Quality

Despite slow growth, grass quality is excellent with GrassCheck farms recording the following average fresh grass analysis for the w/b 26/4.

Nutritional parameter	Value
Dry Matter	25%
Crude Protein	17.4% DM
Sugars	23.6% DM
ME	12.4 MJ/kg

On a well-managed grazing system, mid lactation cows have the potential to eat 16 to 18kg/DM/day or 64 to 72kg of fresh material at the DM % of the samples above. With the average ME as good as many purchased concentrates, grazed grass has the potential to produce M+ 23 to 27 litres. The table below shows how to calculate the potential milk yield from grazed grass and these figures can be adapted to suit your own system if you know the quality of your grass.

Calculations	Milk from Grass
Energy from 16kg DM = 16 x 12.4	198 MJ
Less Maintenance* 70MJ	128 MJ
Energy Required for Milk Production** = 5.5MJ so 128/5.5	23 litres

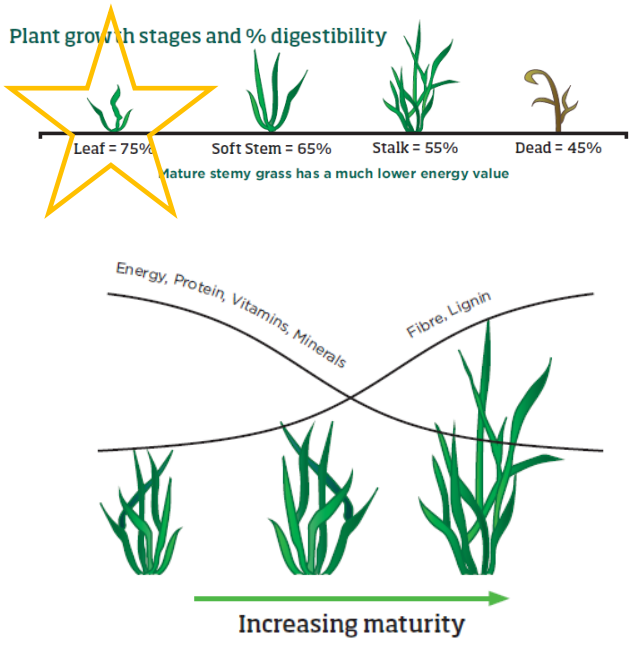
**Maintenance = 10% body weight + 10MJ so a 600kg cow has a maintenance requirement of 70MJ.*
*** Milk at 4.2% butterfat and 3.4% protein requires 5.5MJ to produce one litre of milk. Milk at 4% butterfat and 3.2% protein only requires 5.3MJ to produce one litre of milk.*

Once you know the potential of your grazed grass you can then compare this to your current herd performance. Using the FAS Milk from Forage Calculator (https://www.fas.scot/milk-from-forage-calculator/) allows you to assess the impact of buffer feeding and parlour concentrate. This will allow you to see if you are substituting grass for other feeds by reducing the cows' capacity to eat grass (particularly if feeding poorer quality silage) or whether supplementary feeds are enabling you to achieve higher milk yields. Supplementation with buffer feeding or concentrates only should match any deficit between the energy requirement for maintenance and milk production and the energy intake from grass.

Managing Grass for Maximum Milk

To achieve high dry matter intakes and maintain grass quality, which will reduce the reliance on buffer rations and concentrates, grass must be managed carefully to ensure it is grazed when quality is highest.

The two pictures below, produced by QMS as part of their "Better Grazing = Better Business" campaign shows how the digestibility of grass declines as the amount of stem increases. An increase in digestibility increases the ME of the grass and the intake potential.



Source: QMS

To maximise dry matter intake and milk from grass, you should target grazing swards at the "3-leaf stage" when digestibility is highest. The aim should then be to graze across the farm keeping the plant in the growth stage, avoiding the build-up of stem and dead material. A simple rule of thumb is to enter grazing paddocks when the sward is 10cm high and come out when it is 4cm. This ensures that there is sufficient leaf left for the sward to regenerate.

Rotational grazing is often associated solely with block calving herds, but it can play an essential part in maximising grass utilisation on all dairy farms where cows are grazed. A move from set stocking to rotational grazing can increase the utilisation of grass by up to around 50%, reducing the acres required for grazing. This could allow more silage to be cut, beef calves to be grazed or reduce the reliance on rented ground.

More information on setting up a rotational grazing system can be found on the FAS website. https://www.fas.scot/environment/climate-change/optimising-livestock-productivity/livestock-productivity-measures-dairy/grass-

utilisation/getting-started-with-rotational-grazing-for-the-dairy-herd/

FAS advisers can also advise on summer rations and supplementing cows at grass. Many also have access to plate meters and would be happy to provide guidance on measuring grass.

alison.clark@sac.co.uk; 01776 702649

The Use of Field Beans for Dairy Cows

Field beans are a viable alternative to soya and other purchased proteins in dairy cow rations. Many dairy farmers in Scotland and the UK have moved away from soya due to milk processor demands and concerns around environmental sustainability. While protected rapeseed meal is the obvious alternative and has been proven to substitute for soya at no detriment to milk yield or quality, beans are another option to consider.

Beans growing at SRUC's Crichton Royal Farm

The availability of beans for purchasing cannot always be guaranteed. They are most commonly grown for human consumption and those that do not make the grade end up on the animal feed market. Home-grown beans offer some advantages, with these being a legume and increasing soil nitrogen content, reducing the need for bought in fertiliser. Although beans will be cheaper on a cost per tonne basis compared to soya, the financial impact of the change will depend on the relative costs of soya and cereals that they replace.

Beans are very palatable and an excellent source of protein and energy, with an energy content similar to that of cereals and soya. However, the protein content is significantly lower than soya at only 29% on a dry matter basis (table below). This means that nearly twice as much needs to be fed to achieve a similar protein level in the diet. However, cows do not have a requirement for crude protein and the important thing from a rationing point of view is that there is sufficient rumen degradable and bypass protein in the diet for the desired level of milk production. The protein in beans is highly rumen degradable, with less bypass protein compared to soya. Therefore, an additional source of bypass protein may be required to maintain milk yield. The starch content is more slowly degraded in the rumen compared to starch from cereals and this is a benefit for rumen health if beans substitute for some cereals.

Nutritional value of beans vs soybean meal

Parameter	Field beans	Hipro soybean meal
Dry matter (%)	86	88
ME (MJ/kg DM)	13.3	13.4
Crude protein (% DM)	29.0	55.2
Starch (% DM)	44.7	6.3
NDF (%DM)	15.9	10.5
Lysine (% protein)	6.2	6.2
Methionine (% protein)	0.8	1.4

Source: Feedipedia

Beans should be processed due to their hard seed coat. This will prevent them passing whole through the digestive tract and allow sufficient digestion of the protein and starch. Rolling or coarse grinding is recommended.

Many studies have shown that soya can be replaced with beans in dairy cow rations without affecting milk output or compositional quality. However, this depends on the level of substitution and being able to balance the ration to maintain rumen bypass protein levels, particularly for higher yielding cows. The main concern is the low methionine content of beans in relation to soya, particularly when dairy rations are already often typically deficient in this essential amino acid. Supplementary methionine may be necessary to maintain milk output and milk protein content.

Researchers at the Agri-Food and Biosciences Institute (AFBI) in Northern Ireland reported that

feeding medium levels (4.7 kg/day) of beans to mid-lactation dairy cows had no detrimental effect on performance. Further research at AFBI looked at feeding various levels of beans to freshly calved cows up until 140 days in milk. The concentrate portion of the diet contained either 0%, 35% or 70% field beans (intakes of 0, 4.2kg and 8.4 kg/cow/day). The diet with 8.4 kg beans replaced all other protein sources (soybean meal, rapeseed meal and maize gluten). Diets contained the same protein percentage, although starch levels were slightly higher with the 8.4 kg of beans.

Milk quality (fat and milk protein content) and yield were reduced where beans were included at 8.4 kg. The lower milk fat content was likely due to the high dietary starch and the reduction in milk protein was attributed to a shortage of methionine, which is essential for milk protein synthesis. The researchers concluded that beans should be included at no more than 4 to 5 kg/cow/day.

Another study looked at completely replacing soybean meal (and partially replacing maize) by including beans at 17.1% of dry matter intake (equivalent to 4.4 kg/cow/day). The control diet with soybean meal and the treatment diet with beans were the same protein and energy content and the cows were averaging 41kg milk/day at the start of the study. There was no effect of treatment on intake, milk yield, fat or protein percentage and fat or protein yield (Cherif et al 2018), showing that beans were a viable protein source for high yielding cows.

To conclude, beans can be used as a substitute for soya in dairy rations. Maximum inclusion rate is up to 5 kg/cow/day and above this, unless the diet is properly balanced to meet DUP requirements, milk yield and protein content are likely to be affected. Supplementary methionine may be a benefit to maintain yield and milk protein content when beans are fed at rates over 5kg.

The July edition will report on the results of a trial at SRUC's Acrehead Farm where beans were fed in place of soya to high yielding early lactation cows.

lorna.macpherson@sac.co.uk, 07760 990901

References available upon request.

The Value of White Clover to Dairy Producers

Increasing the white clover content of pasture can provide many benefits to your business. It could also aid the industry to become more sustainable both economically and environmentally.

N Fixation

With the price of fertiliser being variable throughout the year and a considerable cost to a dairy business (on average 0.74ppl from Feb 2020 to Jan 2021 for the Sainsbury's Dairy Development Group), it is important to consider ways to reduce the amount of fertiliser required. One way to reduce Nitrogen (N) fertiliser inputs is through increasing the white clover content of your pasture. The optimum ground cover of 30% white clover to 70% grass as an average across the season is the key to grass/clover sward management, as this has been found to provide the best exploitation of the clover's nutritional and nitrogen fixing attributes alongside high yielding grass (Aber, 2020).

A visual guide to assessing the clover content of your pasture

Source: Aber, 2020.

At 30% of the sward cover, white clover can fix up to 180kg N/ha/year. On a 100ha grassland farm this is the equivalent of 52 tonnes of ammonium nitrate fertiliser (Farming for a Better Climate, 2018) and a saving of £11,752 at a price of £226/t.

Herbage Production

In addition to the direct savings on N fertiliser, white clover will benefit the performance of any grass in the vicinity. The increased nutrient content of the grass will also benefit any livestock grazing the pasture. Research at Moorepark by (Hennessy and Mccarthy, 2019) showed that grass-white clover swards receiving 150kg N/ha grew the same quantity of herbage as grass-only swards receiving 250kg N/ha (13.5t DM/ha). This is backed up by research from Clonakilty

Agricultural College which found that incorporating white clover into intensively managed swards increased annual herbage production by 1.2t DM/ha, on average, relative to grass-only swards.

Nutritional Value
White clover is also a valuable source of nutrition for dairy cattle, as shown in the following table.

Nutritional comparison of white clover and perennial ryegrass on a dry matter basis

	White Clover	Perennial Ryegrass
Digestibility (D-Value) (%)	75-82	65-75
Crude Protein (%)	27	17
Calcium (%)	1.6	0.6
Magnesium (%)	0.18	0.16
Phosphorus (%)	0.6	0.3
Copper (mg/kg)	10	6.5
Selenium (mg/kg)	0.6	0.2

Source: Drummond and Pawsey, 2016

Milk Yield
The same research from Moorepark and Clonakilty which found that white clover boosts herbage production also found a correlating increase in milk yield, with milk solids increasing by 36kg/cow and 48kg/cow respectively. Research by (Dineen *et al.*, 2018) which reviewed current research on pasture with a 31.6% white clover content found that daily milk solids yield per cow were increased by between 0.12kg and 1.4kg.

Conclusion
With many milk contracts now coming with obligations to monitor and reduce carbon emissions, the use of white clover can help to reduce N fertiliser inputs and their associated emissions as well as increasing overall grass yield, improving animal nutrition and milk solids.

james.orr@sac.co.uk; 01292 525252
References available upon request.

Dates for your Diary - Webinars and On-line Events

- 25th - 27th May - **The Alltech ONE Ideas Conference**. For more information please visit: https://one.alltech.com/
- 27th May - **Safe Use of Veterinary Medicines**. On-line training course for farmers. For more information contact Philippa Groves at Embryonics t: 01606 854411 or email: accounts@embryonicsltd.co.uk
- 14th - 16th June - **DIY Artificial Insemination Course**. Dumfries. For more information contact Philippa Groves at Embryonics t: 01606 854411 or email: accounts@embryonicsltd.co.uk
- 14th - 16th June - **Herdsman Foot Trimming Course for Farmers**. Dumfries. For more information contact Philippa Groves at Embryonics t: 01606 854411 or email: accounts@embryonicsltd.co.uk
- 14th - 16th June - **Herdsman Foot Trimming Course for Farmers**. Dundee. For more information contact Philippa Groves at Embryonics t: 01606 854411 or email: accounts@embryonicsltd.co.uk
- 17th-21st June - **Royal Highland Show**. Ingliston, Edinburgh.
- 24th June - **Safe use of Veterinary Medicines**. On-line training course for farmers. For more information contact Philippa Groves at Embryonics t: 01606 854411 or email: accounts@embryonicsltd.co.uk
- 30th June - **Holstein UK AGM**. For more information please visit: https://www.holstein-uk.org/events/huk-agm-2021

For any further enquiries regarding the information in this newsletter please contact:

Lorna MacPherson (Dairy Consultant)
SAC Consulting Office
Thainstone Agricultural Centre
Inverurie
Aberdeenshire
AB51 5WU
Email: lorna.macpherson@sac.co.uk
Tel: 01467 625385
Mobile: 07760 990901
Fax: 01467 620607

Funded by the Scottish Government and EU as part of the SRDP Farm Advisory Service.