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Milk Manager NEWS

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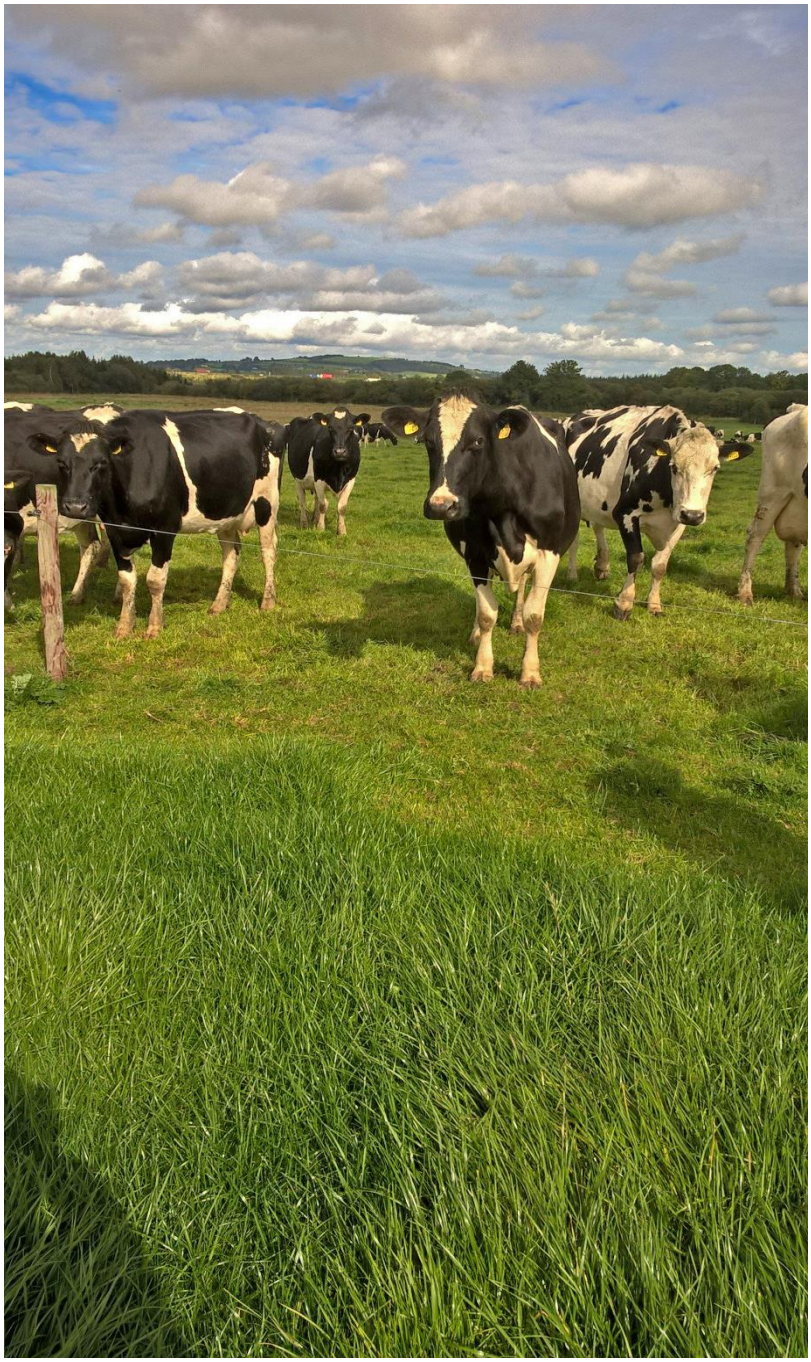

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The European Agricultural Fund for Rural Development
Europe investing in rural areas

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Market Update

UK Wholesale Dairy Commodity Market

- Fonterra's latest on-line GDT auction (7th July) resulted in a massive 8.3% increase in the weighted average price across all products, reaching US $3,197/t. This was a big increase on the previous auction on 16th June, where the average increase in products was just 1.9%. All products on offer showed a positive rise (ranging from 1.9% to 3.8%). The only exception was anhydrous milk fat which fell 0.2%. Full results are available at https://www.globaldairytrade.info/en/product-results/

- UK dairy commodity prices have seen an upsurge in June, especially for fats, as demand has remained strong in the retail sector and easing of lockdown restrictions in both the UK and Europe has increased the demand for products going into the food service sector. Prices have also been supported by falling milk production, partly seasonal and partly due to dry weather conditions affecting grass growth. For the month of June, butter increased by an average of £380/t and cream by £220/t from May prices.

Commodity	Jun 2020 £/T	May 2020 £/T	% Difference Monthly	Jun 2019 £/T	% Diff 2020-2019
Bulk Cream	£1,390	£1,170	19	£1,450	-4
Butter	£2,980	£2,600	15	£3,240	-8
SMP	£2,050	£1,750	17	£1,820	13
Mild Cheddar	£2,910	£2,900	0	£2,830	3

Source: AHDB Dairy - based on trade agreed from 1st to 26th June 2020. Note these prices are indicative of values achieved over the reporting period for spot trade (excludes contracted prices)

- While milk supply is falling due to its seasonal trend, milk is not in short supply. As a result, the spot milk market has been fairly quiet, trading at 27.5 to 28.5ppl, and up to 1.5ppl more for those requiring milk at short notice. In comparison, the average delivered price for spot milk in May was 19.89ppl. Cream prices continue to climb on the back of the rising butter price, with bulk loads trading between £1.40 to £1.43/kg ex works (for the week ending 3rd July).

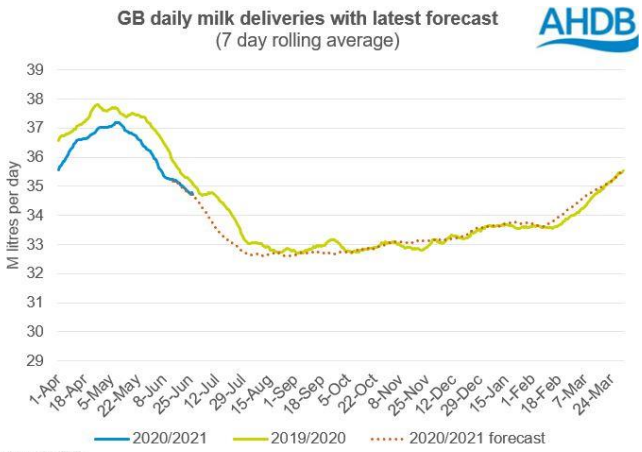
- Market indicator MCVE has remained relatively stable due to its pricing mechanism being largely made up from returns from mild cheddar, which has seen very little price movement. The June AMPE price has increased by 4.81ppl from May, due to significant increases in butter and SMP components of 1.87ppl and 2.80ppl respectively.

	Jun 2020	May 2020	12 months previously	Net amount less 2.4ppl average haulage – Jun 2020
AMPE	29.37ppl	24.56ppl	28.41ppl	*26.97ppl*
MCVE	30.89ppl	30.49ppl	30.37ppl	*28.49ppl*

Source: AHDB Dairy

UK Milk Deliveries and Global Production

- GB milk deliveries are very close to forecasted levels, being 0.9% below the previous week and 1.1% below the same week last year (w/ending 27.6.20), equivalent to 370,000 litres.



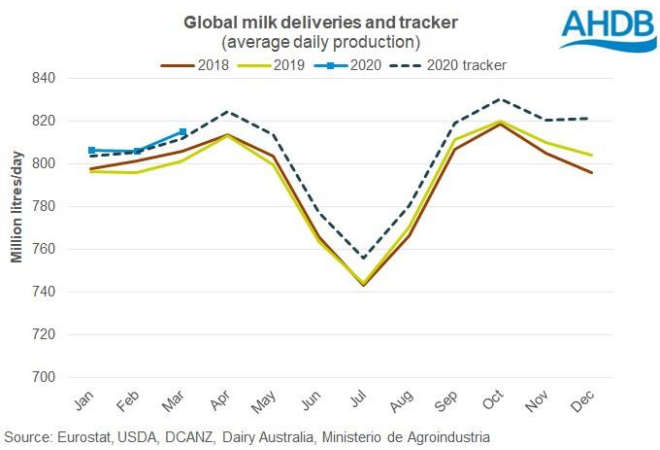
Source: AHDB

- AHDB Dairy have revised their forecast for the 2021 production year down by 83 million litres compared to their March forecast. Production is expected to be back by 0.7% compared to the previous year, with an output of 12,437 million litres forecasted. The impact of coronavirus and some farmers having to reduce production at the request of their milk buyer was estimated to take 55 million litres off production for April and May.

- Milk production in the EU (excluding the UK) is 1.9% up on the year to date until April, with deliveries for the month of April being 0.4% up on the same month last year.

- Global production is ahead of last year as shown in the following graph. Deliveries for March in the five key milk producing areas (EU, USA, Australia, New Zealand and Argentina)

was up 1.7% compared to March 2019 to a daily average of 815 million litres. March production in the EU was up 1.2% and 2.8% in the US.



Source: Eurostat, USDA, DCANZ, Dairy Australia, Ministerio de Agroindustria

Monthly Price Movements for July 2020

Commodity Produced	Company Contract	Price Change from Jun 2020	Standard Litre Price July 2020
Liquid & Cheese	**Arla Farmers UK**	*-0.61ppl liquid -0.63ppl manufacturing*	28.17ppl liquid 29.26ppl manufacture
Cheese, Liquid & Brokered Milk	**First Milk**	*No change*	26.75ppl liquid 27.63ppl manufacture
Cheese	**Fresh Milk Company (Lactalis)**	*No change*	26.50ppl liquid 27.61ppl manufacture
Liquid & Manufacture	**Grahams**	*+1ppl*	25.50ppl
Liquid & Manufacture	**Müller Direct**	*No change*	26.25ppl (includes 1ppl direct premium)
Liquid & Manufacture	**Müller (Co-op)**	*No change*	29.82ppl
Liquid & Manufacture	**Müller (Tesco)**	*No change*	31.51ppl
Liquid, Powder & Brokered	**Yew Tree Dairies**	*No change*	25.1ppl Standard A litre price (to be paid on only 63% deliveries)

Other News

- From 1st July, Sainburys are increasing their milk price for their Müller and Arla suppliers by 0.21ppl on the back of their latest cost tracker. Müller farmers will be paid 30.91ppl for a standard liquid litre and Arla suppliers will receive the same level of increase but taking into account their haulage charge, will receive 30.79ppl. The latest quarterly tracker puts feed costs up by 0.33pl, fuel price down 0.08ppl and fertiliser down 0.04ppl, accounting for the 0.21ppl increase.

- The Tesco Sustainable Dairy Group are reducing their milk price from August by only 0.08ppl. This takes their milk price down to 31.43ppl (Müller) and 31.18ppl (Arla). The annual cost tracker for the 12 month period until September 2020 puts the cost of production at 31.63ppl (based on variable costs of 17.47ppl, overheads at 12ppl and depreciation at 2.16ppl). Adjusting for fuel, feed and fertiliser reduces the above costs by 0.2ppl to achieve the 31.43ppl Müller price.

- The dairy hardship fund available from DEFRA for English dairy farmers that have suffered as a result of the coronavirus outbreak is now open for applications. Only farmers that have experienced a 25% drop in their milk price in April and May compared to the price paid for February deliveries qualify for a maximum pay out of £10,000. DEFRA's initial announcement on 6th May was that farmers who had lost 25% of their income could apply. However, when further clarity was given in early June it was made clear payments that were only to be paid on the basis of a 25% drop in milk price. Therefore, farmers who reduced production to comply with processor request will have lost out on income but are unlikely to have lost 25% of their milk price.

- DEFRA has now launched a dairy contract consultation in UK milk purchasing contracts. This is in response to a review back in 2018 carried out by the Groceries Code Adjudicator on fairness in the supply chain. The consultation aims to review how contracts are used in the dairy sector and whether there is a need for legislation to prevent farmers being exposed to unfair treatment and bearing the brunt of market volatility, with price drops being pushed onto the farmer, with less impact on retailers and processors. Legislation would remove the ability of processors to change contract terms and pricing mechanisms (as well as retrospective penalties and price cuts) without negotiation, allowing more emphasis on risk being placed on processors and retailers,

rather than pushing the risk onto the primary producers. DEFRA will be reviewing details and evidence (in agreement with devolved governments) until 15th September 2020 and farmers are encouraged to provide information and put their views forward at the following link https://consult.defra.gov.uk/agri-food-chain-directorate/contractual-relationships-in-the-uk-dairy-industry/

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Straights Update

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

£/T for 29t loads delivery + £8/t haulage to central belt	Jul 20	Aug 20	Sep 20 - Oct 20	Nov 20 - Apr 21
Proteins				
Hipro Soya	316	312	308	315
Rapeseed Meal	229	213	213	Nov-Jan 217 Feb-Apr 222
Maize Distillers Meal	243	243	-	-
Starch				
Wheat	166	170	171	176
Barley	136	133	134	139
Maize	181	182	182	171
Fibre				
Imported Sugar Beet Pulp	187	187	187	177
Soya Hulls	161	161	161	166

Source: Straights Direct and Cefetra on 9th July. Barley and wheat prices are based on delivery to central belt (for North-East, deduct £5/t for wheat), courtesy of Julian Bell, Senior Rural Business Consultant, SAC Consulting. Prices do not include seller's margin.

Global News

- The USDA Quarterly Stocks and Acreage Report published on 30th June indicated the area of maize planted at 37.2 million hectares, back by 2 million hectares on what farmers said were to be planted in March. The drop is likely due to the fall in maize prices caused by the COVID-19 pandemic and is estimated to cut the US crop output by 21 million tonnes. The forecasted hot dry weather over the next two weeks could impact yields and lend support to prices, including UK wheat prices. In Europe, grain production is expected to fall due to the wet autumn and dry spring.

- One of the biggest surprises from the USDA report was the lower acreage of soyabeans at only 83.8 million acres compared to the estimate of 84.76. Current condition of the US soyabean crop is reported to be 71% good/excellent compared to only 54% for the same time last year. The forecast over the next week for hot/dry weather may however cause a slight deterioration in crop condition. If yield estimates are reduced on the back of unfavourable weather, carryout for the 2021 crop year could drop to well below 300 million bushels, against a projected carryout of 395 million bushels from last month's USDA estimates.

- Crop forecasts have increased in Australia where wheat output is expected 10.8mt (71%) higher than last year at 26mt due to excellent winter rains. Crop forecasts are also rising in Russia resulting in the easing of wheat export restrictions.

- Overall, the USDA is expecting an 87mt rise in world grain output to 2,258mt, consumption up 52mt to 2,201mt and stocks to rise 48mt to 687mt to 114 days of use. This would be the highest stock to use level in 33 years since 1987. It is likely that only a serious drop in global crop conditions in the next few months would make a major difference.

- The reduction in demand for rapeseed oil with the COVID-19 lockdowns, means there will be a large carry over of both rapeseed meal and oil into the new harvest season. In the EU, typically 40% of rapeseed oil goes into the food service industry. The rapeseed harvest in the EU is looking lower than last year but with current demand also low, it is unlikely the market will pick up unless demand returns to pre-COVID-19 levels, but this will take time.

UK and Scottish News

- In the UK the latest Planting and Variety Survey results from AHDB indicate an even lower English wheat area and a further increase in the UK and Scottish spring barley area. This is pushing wheat to a large price premium over barley because the expectation is the UK will be importing wheat and exporting barley. Wheat

prices in Scotland are at an unusual discount to English values because wheat sowings are more severely reduced than in Scotland. In both Scotland and the UK, the price of imported maize may be the main cap on our own grain prices; wheat domestically and barley in export feed markets. A significant unknown is what wheat and barley yields will be across Scotland and the UK; current expectations are fairly low. For barley crops the dry spring has stunted growth (reducing straw length) and accelerated maturity with harvest expected about a week earlier than last year. If barley yields were particularly poor this could narrow the price discount to wheat.

- Malting barley markets remain quiet with a lack of buyers, despite the recent opening up of pubs. It remains to be seen whether consumer habits return to normal, but it is likely that the reduced demand will continue for a while yet. There are still massive stocks of the 2019 crop and so the 2020 crop intake will likely be restricted. Export brewing malting barley prices in the south of England for harvest are in the low to mid £130's/t at present. Prices for low nitrogen distilling barley are not yet known. While there is uncertainty over distilling demand, probably the largest uncertainty is the yield and quality of the Scottish distilling barley crop. This will dictate the extent to which distilling prices mirror or deviate from brewing values in the south.

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What is Cow Behaviour at Grass Telling You?

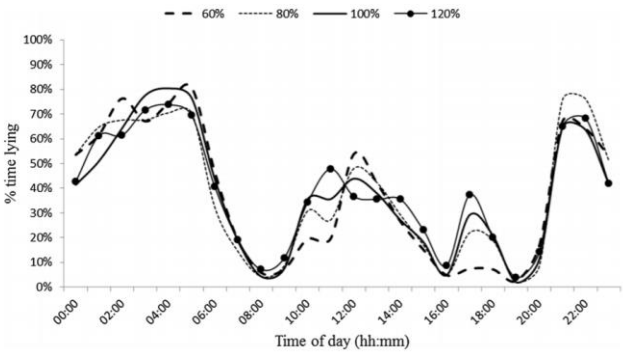
Grazing is an important time where cows can exhibit their species-specific behaviour, which cannot always be seen when the cattle are housed indoors. There is ample space when cows are grazing to allow expression of their natural behaviour, which can provide information about the quality of the grass and therefore milk production. A change in behaviour is important to observe as it indicates that the cow is experiencing either an internal or external challenge. Lying time is a behaviour that has been studied in detail with relation to animal welfare and this behaviour is key for milk production. If lying time is restricted, the cow will respond with behavioural and physiological changes which can impact the volume of milk produced.

Typically, a cow in early to mid-lactation at pasture will lie down for up to 10 to 14 hours, although feed allowance can impact these timings. Lying times will increase with greater feed allowance due to lower competition for feed and water. Therefore, if cows are spending more time lying then this means that the cow is able to get her daily intakes to meet her milk production (Figure 1). As a cow progresses in her lactation, lying time will increase due to lower milk yields resulting in lower grass intakes.

Longer lying times can indicate that the cow has been able to reach her feed intake sufficiently at each grazing bout, without spending time searching for grass. Similarly, these cows will be the ones which are more likely to spend time lying following milking, whereas cows which have not reached their intake capacity will spend more time grazing following milking. Stocking rate will impact on lying times, with a high stocking rate resulting in shorter periods of lying due to competition for feed. Decreasing stocking rate can result in longer lying times and cows tend to graze the grass to a lower height at a slower rate which allows paddocks to be used for longer. This will allow the paddocks behind in a rotational grazing system a longer period to recover from grazing.

Nutritional effects can be assessed using the daily pattern of lying time as that will provide more information than the total lying time. The time of day that cows spend lying down can indicate if their intake capacity is being reached quickly or slowly. Periods of lying are important for rumination to occur.

Figure 1. The % time spent lying per hour of dairy cows at pasture with four feed allowances: 60%, 80%, 100% and 120% of a cow's intake capacity.



Adapted from O'Driscoll *et al*., 2019.

A cow at pasture will typically spend approximately 9.5 hours per day grazing with a higher number of feeding bouts compared to housed cattle. Over the course of a day, there are two main grazing bouts, one in the morning and a second one in the afternoon – generally the periods straight after milking. During the hours of daylight, cows will tend to search for grazing and will move away from the herd to find fresh grass. Grazing intake tends to increase in the evening prior to sunset, this is potentially due to the quality of grass changing to lower protein and fibre content but higher dry matter and sugar content. In the hours of darkness, grazing activity and intake can be reduced to zero due to cows being prey animals and remaining close to the herd.

Grazing behaviour of dairy cows will change as the nutritional quality of the grass changes and similarly behaviour will change if access to the pasture is restricted at different periods over the day. When cows enter a new paddock or the next strip of grass is opened, there will be an initial bout of grazing time with low lying times. As the grass is utilised, lying times will increase due to the lower allocation of feed available to the cows. Grass is the cheapest feed on the farm; therefore it is key to utilise grass effectively throughout the grazing season which in turn will ensure lower costs of milk production for that period of the year.

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Calf Rearing - What Fits Best for your Farm?

Rearing calves is a specialist skill. On many farms historically the farmer's wife had this task and her expertise and stockmanship were paramount to the future replacements for the business. These first eight weeks are crucial to the growth, health and well-being of the calf. Every farmer has their own system of rearing calves and this is often dictated by buildings, labour availability and what one wishes to spend. Traditionally calves have been fed milk twice a day using buckets or teat feeders. However, over the last few years the trend has been to move away from buckets and teat feeders to automatic feeding systems where hygiene and disinfection of teats must be carefully managed. Teat feeding also encourages oesophageal groove formation, negating the possibility of milk passing to the reticulorumen instead of the abomasum, which can cause stomach upsets-and in severe cases death.

Feeding high quality colostrum immediately after birth (4 litres or 10% of bodyweight) is key to getting the calf off to a healthy start and on track to double birth weight at eight weeks. At this point the calf should be eating a minimum of 1kg of dry feed per day. Extra care is required where Johne's, disease is in the herd and that the mother's milk is not fed. Within a good calf rearing enterprise, clean fresh water, high quality calf starter feed, a dry bed and good ventilation all play their part to achieving a healthy calf.

Farmers have choices regards feeding systems and the decision will depend on buildings/labour/size of operation and what they are prepared to spend. The majority still opt for twice a day feeding which

is time consuming but management-wise efficient. Ad-lib milk feeding is not practiced so much nowadays due to scour risk and not getting enough dry feed into the calf, thus lowering liveweight gains at weaning.

Automatic feeders offer warm milk to the calf on a regular basis. Feeds can be provided little and often, mimicking natural suckling behaviour. These systems save on labour (roughly 10 minutes per calf over a bucket feeding system), rely on good stockmanship, require a high quality free flowing powder and close monitoring to ensure calves are drinking enough milk on a daily basis. Keeping the area around the feeder dry is important as damp bedding can cause naval disorders and increasing the risk of respiratory problems.

Once a day milk feeding is illegal in calves less than four weeks of age but does come with benefits. Milk is fed at a higher concentration in the mornings (typically 200g/litre and fed at 3 to 4 litres) and the success of the system relies on good uptakes of dry feed for the remainder of the day. A starter feed with an ME of at least 12.5MJ/kg DM and a minimum 18% crude protein should be fed, with calves eating up to 2kg/day to help achieve the target liveweight gain of 0.8kg/day. A positive from this system is better intakes of forage due to earlier rumen development and the ability to adapt quicker at weaning than other systems.

This system does save on labour by up to 40% and growth rates and starter feed intakes are increased (see table below). There is also low capital input, with the system being easy to manage. Quality of milk fed is very important as is the temperature it is fed at for all systems, which should be between 35 to 38˚C.

The effect of feeding system on calf weight at 77 days and total calf care time

	Automatic feeding	Once daily with teats	Twice daily with teats	Twice daily with trough
Total calf care time including vet time (seconds/calf/day)	38	23	36	27
Calf weight at 77 days (kg)	95	94.8	93.2	90.5

Source: Teagasc, Milk Feeding Systems (https://www.teagasc.ie/media/website/animals/beef/dairy-beef/Segment-002-of-Section3-Milk-feeding.pdf)

Further information on feeding management for calves can be found in the FAS Technical note TN 681 available here https://www.fas.scot/downloads/technical-note-tn681-nutritional-management-artificially-reared-calves/

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Post-Calving Checks

Early detection of health issues post-calving is critical for treatment to aid quick recovery and minimise the impact it could have on milk production and fertility. Freshly calved cows should be monitored to assess their demeanour, willingness to get up and feed and milk yield for the first five days. After calving, quarters should also be examined carefully for signs of mastitis. If there is any cause for concern, a vaginal examination and rectal temperature should be taken. The normal temperature of a cow is between 38.3 and 39.5˚C (101-103˚F). A temperature over 39.5˚C could indicate an infection or inflammatory problem. Respiration rate should be between 24 to 48 breaths per minute but can increase with heat stress and illness.

If the placenta has not come away within 24 hours, it is classed as an RFM (retained foetal membranes) case and appropriate treatment is required asap to reduce the risk of the cow developing metritis. Metritis means inflammation of the uterus and usually occurs within the first 10 days after calving. Cows are more at risk of uterine infection if they have experienced, milk fever, RFM or had an assisted calving (including stillbirth, twins, slips and inductions). It is often accompanied by signs of sickness and can lead onto endometritis, a chronic condition of inflammation of the endometrium only (the mucous membrane that lines the uterus).

Endometritis is also known as “whites” or “dirty cows” and tends to be seen from around three weeks after calving until three months. Although cows with this condition show no signs of systemic illness, it does greatly impact on fertility with affected cows showing no behavioural signs of heat, longer intervals from calving to ovulation and poorer conception rates. The target incidence for endometritis is less than 10% in cows calved for more than 21 days.

Checking for uterine infection is important as just over one third of cows may have an infection but not show obvious discharge. This is the main cause of poor reproductive performance, with infected cows taking four weeks longer to conceive than clean cows. The earlier infection can be detected and treated, the better the outcome.

Vet checks at routine fertility visits will also help detect any problems for getting cows back in calf. All cows should be checked at one-month post-calving for uterine infection and to see whether they have ovulated. Ideally all cows should have ovulated within one month of calving, as indicated by the presence of a corpus luteum on an ovary.

First lactation heifers, cows with a bad calving or had twins may be more prone to ketosis. Ketone testing is beneficial to detect subclinical cases before they become clinical and can help evaluate how well cows are transitioning. Cowside milk and urine dipstick tests are available, as well as blood ketone meters. Cows should be tested for ketones within the first two weeks of calving. Another sign of cows struggling with their energy balance is a low milk protein test.

All health issues/transition diseases should be recorded with the appropriate treatment so that incidence levels can be reviewed regularly and changes to nutrition and/or management can be implemented when incidence is above target levels (see table below). After any treatment, continue to monitor cows closely as these are the ones that are more at risk of having a displaced abomasum.

Target incidence for transition diseases

Transition disease	Target level
Milk fever	< 5%
Retained foetal membranes	< 5%
Metritis	< 10%
Endometritis	< 10% in cows over 3 weeks calved
Mastitis (of dry period origin)	< 1 in 12 cases in first 30 days of calving
Ketosis in first 3 weeks (clinical)	< 5%
Ketosis in first 3 weeks (sub-clinical)	< 15%
Displaced abomasum	< 3%

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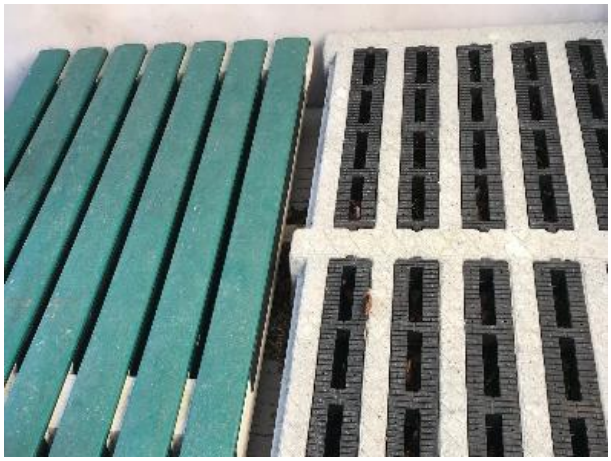
Reducing Emissions from Slurry

The FAS South West Dairy Focus Group travelled to Northern Ireland in February 2020 to visit CAFRE Greenmount and AFBI Hillsborough to learn from research and practical measures adopted on both farms, how they can improve the sustainability of their businesses.

Martin Mullholland, Senior Dairy Researcher gave us a tour of the dairy complex at Greenmount. The complex was built in 2013 and the building was designed to ensure that minimal ammonia emissions were released throughout the slurry production, collection and spreading process. The slatted flooring in the sheds has been designed to separate liquid and solids in the slurry before it falls into the tank below, reducing ammonia emissions by as much as 25%. The pictures below show the various flooring types used.

Examples of slatted flooring to reduce ammonia emissions



Photos courtesy of Alison Clark, SAC Consulting

The grooved slats are designed to separate faeces and urine as they fall on the surface, reducing the production of ammonia. The green comfort slat mats and the black slat inserts help to trap ammonia gas in the tank and reduce the losses from it rising into the shed space. The slatted passages, shown in the last photo, are scraped up to 10 times a day in winter, further reducing emission levels by keeping the floors clean. These flooring types also have the added benefit of providing good grip, allowing cows to display natural heat behaviours and reduce risk of injury.

Slurry storage has also been planned to reduce ammonia loss with covered outside stores, which also reduce the capacity requirement as no rainwater is collected. To reduce methane and hydrogen sulphide emissions in storage, continuous flow aeration systems are used in the stores so that the slurry is constantly in a mixed state. This technology is also reducing the health and safety risk to livestock and staff from mixing slurry.

Spreading is done with a trailing shoe or band spreader, reducing emissions on average by 36% (research by Teagasc, 2011). Applying slurry in spring when weather conditions are cool and dull, and with low emission slurry spreading equipment, increases the N availability for growing grass, allowing for potential savings in bagged fertiliser. Policy at Greenmount is not to spread slurry on long- term grazing swards as P & K levels in these fields have been deemed to be optimal through regular soil sampling and so these nutrients are targeted to silage fields.

For more information on the work being carried out at Greenmount, please visit their website www.cafre.ac.uk. If you would like more information on reducing ammonia emissions or nutrient budgeting on your farm, please phone the FAS Helpline on 0300 323 0161 or email advice@fas.scot

Reference: Teagasc, 2011. An evaluation of strategies to control ammonia emissions from the land - spreading of cattle slurry and cattle wintering facilities. Website address: https://www.teagasc.ie/media/website/publications/2009/Ammonia-emissions-5508.pdf

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Is Soyabean Meal Really Better than Rapeseed Meal as a Protein Source for Dairy Cows?

Introduction

It is not difficult to find news items linking soya farming with deforestation and castigating the livestock industry for its dependence on this crop. It is also not difficult to find articles that imply that soya is somehow a necessary part of dairy farming. For example, a 2019 article in 'Farmers Guardian' begins: *'Soya has long been the 'go-to' product to supply rumen-bypass protein in dairy cow diets…'*, while a recent piece in 'Farmers Weekly' opens with

'*Soya bean meal has been favoured by dairy nutritionists…*'

While soyabean meal is highly nutritious and can help to support high rates of milk production, it is certainly not essential, and alternatives are available. This note explores evidence that we have been underestimating the nutritional value of one important - and relatively local - feed resource: rapeseed meal.

First, some definitions. 'Soyabean meal' refers to solvent-extracted soyabean meal (abbreviated to SBM), while 'rapeseed meal' (RSM) is solvent-extracted meal from low glucosinolate, low erucic acid varieties of oilseed rape.

A comparison of typical published nutritional profiles of SBM and RSM shows lower protein, higher protein degradability, higher NDF and lower ME in the latter – all pointing to apparently poorer nutritional value. However, these simple numbers by no means tell the whole story.

Meta-analyses

Conducted properly, meta-analyses provide a quantitative review of available data - a high standard of evidence when answering technical questions.

Martineau et al. (2013) analysed results from 88 diets across 27 experiments, comparing diets containing more than 5% RSM on a dry matter basis, with diets providing the same amount of protein, but using no RSM. Overall, diets averaged 16.5% crude protein and the average intake of RSM was 2.3kg/d. In most of the experiments RSM replaced SBM, while in some it replaced various mixes of SBM, distiller's grains, maize gluten meal and cottonseed meal.

Across all studies, cows given RSM at 10% of diet dry matter ate more (+0.24kg DM/d) and gave more milk (+0.62kg/d, from an average of around 29kg/d). Milk composition (protein and fat %) was largely unaffected and the key environmental indicator of nitrogen use efficiency (=milk N output / dietary N intake) was improved.

In a related paper (Martineau et al., 2014), the same authors showed that RSM improved the concentration and profile of plasma amino acids and reduced the concentration of urea in both blood and milk, confirming the high value of RSM as a protein source.

So why have we been getting it wrong?

The protein in RSM is usually thought to be more rumen-degradable than protein in SBM. NRC (2001), for example, has the degradability of SBM at 57.4% and that of RSM at 64.3%. This implies that it is more difficult to meet requirements for Metabolisable Protein (the sum of microbial protein and dietary undegradable protein) when using RSM than when using SBM. However, it is also not difficult to find studies that report lower degradability of RSM (e.g. Maxin et al., 2013). These differences of opinion probably reflect both limitations of the methods used to evaluate dietary protein sources and genuine variations in the quality of RSM on the market. There is some evidence that, compared with SBM, RSM provides more DUP from soluble protein – something that is not picked-up in conventional feed analysis (Hedqvist and Uden, 2006).

Importantly, compared with the protein in SBM, the protein in RSM contains more of the amino acid methionine, often considered limiting to the production of milk protein. Unless rations are evaluated carefully for their amino acid profile, deficiencies of key amino acids such as methionine may be missed, and the role of RSM in helping to supply methionine may be underappreciated. An improved balance of amino acids delivered to the cow by RSM may also explain the small, but real, increase in feed intake reported by Martineau et al. (2013).

Protected rapeseed products

The small seeds of rapeseed are not dehulled before processing and are generally subjected to mechanical expelling before solvent extraction. This implies that RSM has been subjected to a greater degree of heat than SBM, produced by solvent extraction alone. Heat treatment can lower protein degradability (i.e. increase protein bypass) but if taken too far it can easily damage the protein and reduce its digestibility. Rather than rely on heat alone, various proprietary processes have been developed to increase the content of bypass protein without damaging its digestibility, thus increasing further the supply of balanced amino acids to the cow. For example, Wright et al. (2005) reported that heat treatment increased milk protein yield by 2.5%, but a proprietary treatment boosted milk protein yield by 7%.

When considering protected rapeseed products, nutritionists should look for data on both protein degradability and, importantly, the digestibility of undegraded protein. These values should be specific to the product in question and not generic 'book values'.

Summary
Cows have a nutritional requirement for amino acids – they do not have a requirement for soya. Do not undervalue RSM: it is an excellent source of both rumen degradable protein and bypass essential amino acids for dairy cows.

References available upon request.

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Up-Coming Webinars

- 13th July - **React, Respond, Recover - When Things don't go to Plan**. Time 19.00. For further information and to register visit: https://ahdb.org.uk/events/react-respond-recover-when-things-don-t-go-to-plan

- 14th July – **Safe Use of Vet Meds** (online, by Embryonics). If interested, please contact Stuart Martin at the Scottish Dairy Hub on 07500 766083.

- 21st July - **Brand Building – Where Do I Start?** Time 20.00. For further information and to register visit: https://www.fas.scot/events/event/brand-building-where-do-i-start/

- 23rd July - **Brand Building – What Comes Next?** Time 20.00. For further information and to register visit: https://www.fas.scot/events/event/brand-building-what-comes-next/

- 28th July - **Protein Nutrition of Dairy Cows Webinar**. Time 14.00-16.00. To register visit: https://www.eventbrite.co.uk/e/protein-nutrition-of-dairy-cows-tickets-111593298560

- 29th July - **Climate Change - Cows vs Cars.** Time 20.00-21.00. To book visit: https://www.fas.scot/events/event/climate-change-cows-vs-cars/

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