

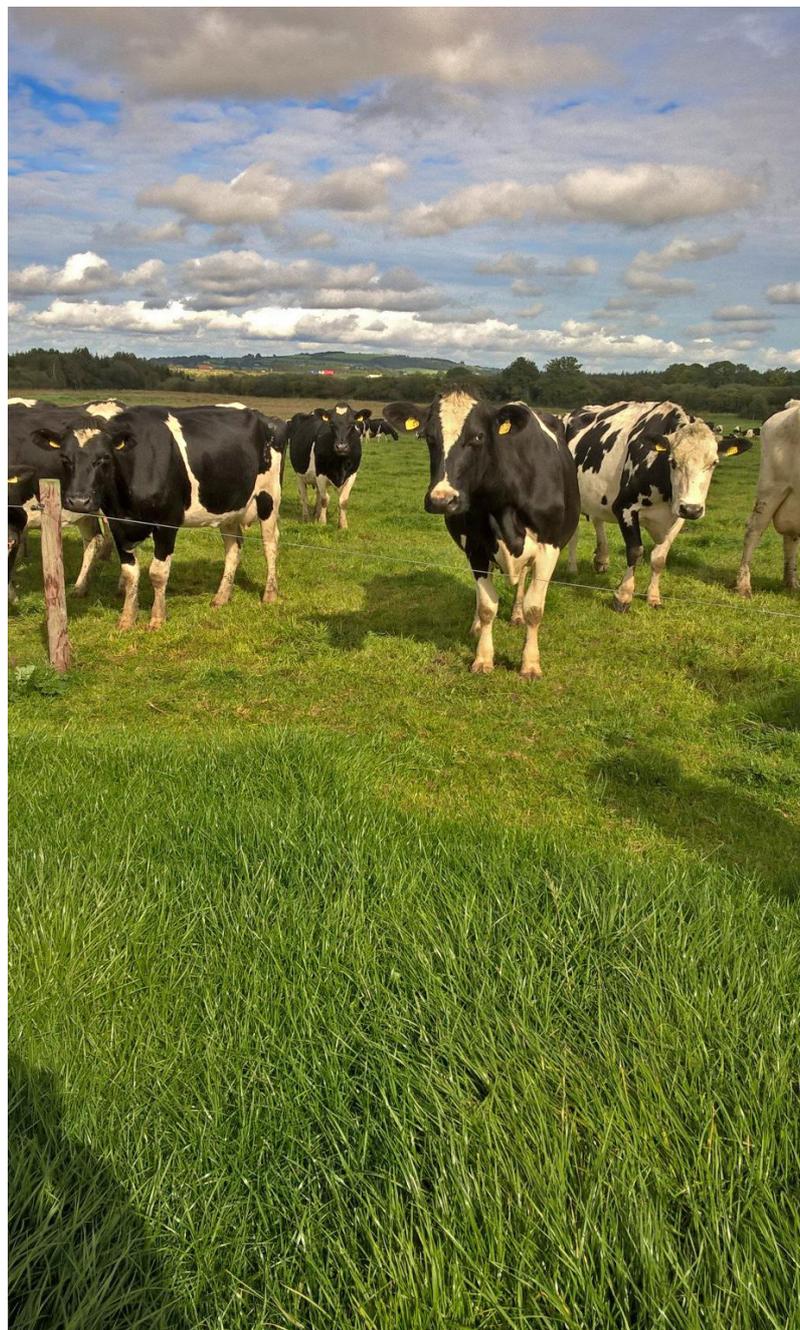
Issue 26 | September 2018

Milk Manager NEWS

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Lorna MacPherson	



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Market Update

UK Wholesale Dairy Commodity Market

- Fonterra's latest on-line GDT auction (4th September) resulted in a 0.7% decrease in the weighted average price across all products, reaching US \$2,980/t. This is the 6th drop out of the last 7 auctions and the index is now at its lowest point since October 2016. The biggest fall was in butter (-2.8% to \$4,271/t) and the biggest increase was in cheddar (+4.2% to \$3,631/t).
- At the end of August, the EU Commission sold 31,493t of skim milk powder (SMP) out of intervention at a minimum price of €1,230/t. This is higher than the fixed minimum price from the July sale of only 2,408t which was €1,125/t. It is also encouraging that during August, there was no more stock bought into store.
- In the UK, the increase in dairy commodity prices was largely driven by weather, with greater demand from the EU where the hot dry weather has impacted on some of the key milk producing countries. Strong demand from the EU for cream has bolstered UK prices, with cream being used in the fresh market, rather than for butter production. Cream income to a liquid processor is now worth 13.09ppl.

Commodity	Aug 2018 £/T	Jul 2018 £/T	% Difference Monthly	Aug 2017 £/T	% Diff 2018- 2017
Bulk Cream	£2,230	£2,150	4	£2,850	-22
Butter	£5,080	£4,880	4	£6,150	-17
SMP	£1,380	£1,340	3	£1,550	-11
Mild Cheddar	£3,050	£3,050	0	£3,425	-11

Source: AHDB Dairy - based on trade agreed from 1st to 24th Aug 2018. Note these prices are indicative of values achieved over the reporting period for spot trade (excludes contracted prices)

- Although milk production has surprisingly held up quite well in the UK, due to farmers already well into feeding this year's forages, traders are concerned about future milk supplies as feed prices are predicted to rise for the coming winter and the possibility of less milk as farmers reduce stock numbers to conserve forage. It is therefore anticipated that milk production will decline this winter.
- From July, AMPE has increased by 4.3% on the back of rises in butter, butter milk powder and skim milk powder. There was a much smaller

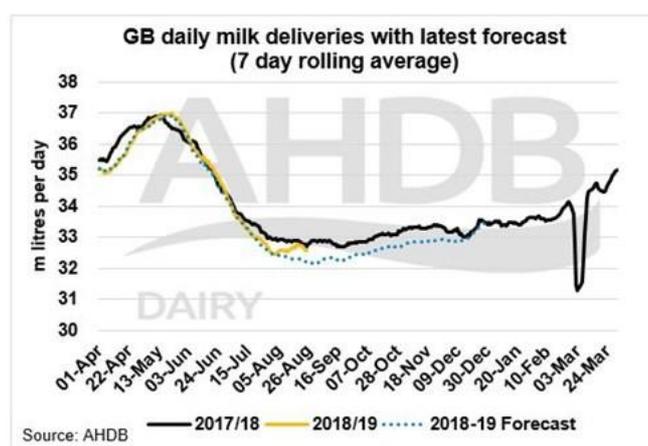
increase in MCVE from July, of 0.7% with the contribution from cheddar remaining the same at 29.33ppl and increases in both whey powder and whey butter.

	Aug 2018	Jul 2018	12 months previously	Net Amount less 2ppl Haulage – AUG 18
AMPE	33.18ppl	31.80ppl	40.12ppl	31.18ppl
MCVE	33.62ppl	33.37ppl	38.70ppl	31.62ppl

Source: AHDB Dairy

UK Milk Deliveries and Global Production

- Given the dry summer, milk production has fallen below daily deliveries for 2017/18 but not as much as perhaps expected. Deliveries for the week ending 25th August were only 0.6% back on the previous week and only 0.4% down on the same week last year, the equivalent of 100,000 litres.



- According to AHDB Dairy, milk deliveries from the EU 28 for June 2018 were up 1.5% compared to June 2017 and up 2.2% on the year to date.
- Global milk production was up in June by 0.8% compared to June 2017, equating to an extra 6 million litres/day.
- The extremely dry conditions in some of Australia's dairying areas has contributed to the country's 4.2% drop in production in July 2018, compared to the same month last year. It is likely that the forecasted growth of 1% for the current season will not be achieved. Even in areas not affected by the drought, forage has been difficult to source and become increasingly expensive. However, in New Zealand, total milk production is expected to be

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above current expectations on the back of calving being later than normal in some areas.

Monthly Price Movements for September 2018

Commodity Produced	Company Contract	Price Change from Aug 2018	Standard Litre Price Sept 2018
Liquid & Cheese	Arla Farmers UK	<i>No change</i>	30.16ppl liquid 31.38ppl manufacture
Liquid & Cheese	Arla Direct	<i>No change</i>	28.0ppl liquid 29.19ppl manufacture
Liquid & Brokered Milk	First Milk Mainland Scotland	<i>+0.5ppl</i>	28.5ppl liquid 29.47ppl manufacture
Cheese	Fresh Milk Company (Lactalis)	<i>No change</i>	29.0ppl liquid 30.03ppl manufacture
Liquid & Manufacture	Grahams	<i>+1.5ppl</i>	29.50ppl
Liquid & Manufacture	Müller Direct	<i>+1.5ppl</i>	29.50ppl
Liquid & Manufacture	Müller (Co-op)	<i>No change</i>	28.88ppl
Liquid & Manufacture	Müller (Tesco)	<i>No change</i>	30.17ppl
Liquid, Powder & Brokered	Yew Tree Dairies	<i>+1.0ppl</i>	29.50ppl Standard A litre price

- Despite a number of processors lifting their September price, Arla have stood on their August price for September, blaming limited impact so far of the drought on milk production in Europe. Their organic price is also held at 42.45ppl for manufacturing and 40.80ppl for liquid standard litres. This is due to current stability within both the conventional and organic markets although concerns are growing over future milk volumes and volatility in the markets. Unfortunately for some organic farmers that have had no choice but to apply for a derogation to use non-organic forages, their milk will go for conventional use and they will receive a 2.67ppl deduction from their organic on-account price.
- However, on a more positive note, the board of Arla Foods has put forward a proposition to pay out their entire 2018 net profit to their farmer suppliers, in light of the tough financial situation faced this summer with the drought. Arla believe that it is in the firm's best interests to support their farmers and their strong balance

sheet and predicted annual profit, thought to be in the region of £257.6m to £280.2m, makes this proposal possible. The decision will be finalised by the board in February 2019. A very rough estimate of what this payment is worth is £11,000 to a 1 million litre supplier (based on a manufacturing standard litre). In addition to the 13th payment of around £9,000, brings the potential supplementary payment to around £20,000.

- The UK has reached a 5-year agreement to export UK dairy products to China, made with milk from third-party countries. Dairy is one of China's fastest growing sectors with demand for most dairy products increasing by more than 20% each year. This deal is worth around £240 million to the UK, which is significantly more than the £96million of dairy products exported to China in 2017.
- The total cost of production calculated by Promar's annual cost tracker for Oct 2017 - Sept 2018 comes in at 30.1ppl. This is broken down into variable costs of 16.63ppl, overhead costs at 11.34ppl and depreciation at 2.13ppl.

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Straights Update

Relative Feed Values

Calculating the relative feed value is a simple way of seeing whether a particular feed is value for money, based on the price of reference feeds (such as barley and rapemeal). The relative feed values are calculated based on the protein and energy content of the feeds to be assessed.

The relative value of a feed is the maximum price at which it is value for money, so if the actual purchased cost of the feed is less than the calculated relative value, it is a good buy.

Relative feed values can be calculated using the following link from AHDB Dairy:

http://dairy.ahdb.org.uk/resources-library/technical-information/feeding/relative-feed-value-calculator/#.V4N_4ab2aM8

Based on a price of bruised barley at £178/t and rapemeal at £265/t, this makes the relative value of 1MJ of ME £12.36 and 1g of CP £0.37. Relative

feed values of several feeds are listed in the following table.

Relative Feed Values

Feed	Dry Matter %	Metabolisable Energy MJ/kg DM	Crude Protein g/kg DM	Relative Value FW £/T	Relative DM Value £/T
Biscuit meal	90	15	130	209.59	232.88
Bread waste	65	14	140	145.71	224.17
Trafford gold	50	13.4	200	115.03	244.75
Draff	23	11.1	20	48.36	210.25
Pot ale syrup	45	14	370	138.69	308.20
Potatoes	21	13.3	90	41.42	197.25
Fodder beet	18	12	60	30.64	170.23
Wheat distillers	90	13.5	340	261.96	291.06
Maize distillers	90	14	310	257.65	286.28
Hipro soya	89	13.8	560	333.88	375.15
Rolled maize	86	14	100	180.22	209.56

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

£/T for 29t loads delivery + £8/t haulage to central belt	Sep 18	Oct 18	Nov 18 - Apr 19	May 19 - Sep 19
Proteins				
Hipro Soya	320	320	322	314
Rapeseed Meal	271	252	252	May-Jul 254
Wheat Distillers Pellets	POA	Asa 264	264	-
Starch				
Wheat	186	187	190	May-Jul 194 Aug-Sep 173
Barley	176	178	181	May-Jul 185 Aug-Sep 158
Maize	204	203	195	200
Fibre				
Sugar Beet Pulp (10mm)	234	234	Nov 234 Dec-Apr 213	217
Soya Hulls	Asa 216	216	218	-

Source: Straights Direct and Cefetra on 6th September. 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

- Soyabean meal prices have been dropping, haven fallen around £30/t over the last month. The North American crop has benefited from favourable growing conditions and it is estimated that the crop will surpass the 2017 harvest by about 6.15mT. Also, the uncertainty of Chinese requirements with reports of swine fever outbreaks in the country, have contributed to the lower price.
- There has been a sharp fall in the global production of rapeseed compared to this time last year and expectation is that volumes will fall further, with crops in Australia and Canada (the key global suppliers) under pressure. Last week Statistics Canada reduced their rapeseed crop prediction to 19.1mT, 1mT below trade estimates and 2mT below USDA statistics. This means that EU price should be supported going forward into the winter. However, with currency fluctuations and the bumper US soyabean crop imminent, the market is difficult to predict.
- With most of the EU wheat and barley harvest lower in yield, in northern Europe yields were generally no worse than expected. In addition, prospects for the very large US maize crop continue to improve and are now 14mT higher at 370.5mT. EU maize crop estimates have weakened slightly to 59.8mT (down from 61.5mT) but remain well above last year (56.5mT). Strong demand is expected for feed grains and world maize stocks are still set for a sharp decline to below the critical 15% stocks to use ratio (18% last year), so world and UK grain prices are likely to remain well supported this season.

UK and Scottish News

- Grain prices remain close to the highest level in 5 years, although prices have come off around £5/t since their recent highs in August. In the UK the harvest in England is almost finished and in Scotland is now progressing well following a couple of wet weeks. The large variability in crop yields between fields, farms and regions makes it hard to get a firm handle on national yields. While there have been some very poor crops others have fared remarkably well with some excellent yields reported; those established early, into good soils or where occasional showers were seen in May and June. Overall according to ADAS the UK

seems on track for average yields for winter cereals and slightly below for spring barley. A key influence on domestic cereal prices is imports; particularly of maize which is currently cost competitive into several regions of the UK and Scotland and with rising global maize crop estimates this pressure may increase.

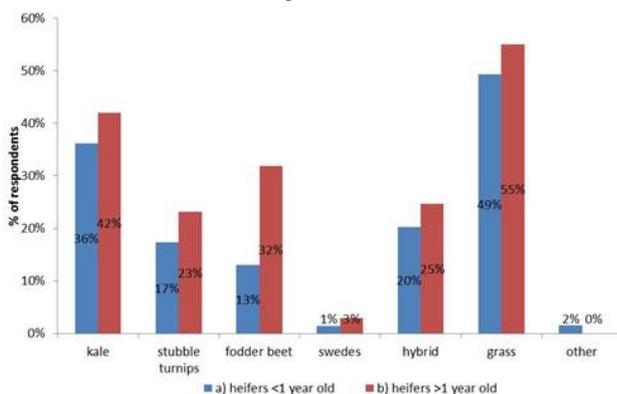
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Outwintering of Dairy Heifers

With forage shortages this winter and the high price of straw, outwintering dairy heifers can make considerable financial savings without affecting growth or subsequent milking performance. This will help save quality forage for the milking herd and reduce straw requirements for bedding.

Most commonly heifers are outwintered on deferred grazing (autumn saved grazing) or a fodder crop such as kale, fodder beet, forage rape or stubble turnips (see graph below). Supplementation with grass silage or other long forage bales are also usually fed, as well as concentrates, depending on forage quality and desired growth rates.

Crops Most Commonly used for Outwintering Dairy Heifers



Source: DairyCo.

The following considerations should be made:

- Use the driest fields possible to minimise poaching damage and run-off. Free-draining soils are best but avoid steep slopes. Graze wetter parts of the field during dry spells of weather.

- If possible use fields which provide some shelter (or provide a stack of straw bales for shelter).
- Good access to clean drinking water is very important (portable water troughs are a good investment).
- Any damaged/poached areas should be fenced off to prevent further compaction.
- If possible, provide a dry lying area (grass run-back area, a well-drained stand-off pad or roll out straw bales in an area).
- Know the quality of the forage and crop being grazed so that the required concentrate can be provided to meet target weight gains.
- Weigh heifers at least once a month to monitor growth rates. If targets are not being met, provide or increase concentrate intake. If animals are losing weight, they will have to be taken inside and fed accordingly. Aim for 0.7-0.8kg/day for Holstein heifers and 0.5-0.6kg for Friesians.
- Use a back fence and a low stocking rate to prevent poaching damage and allow better sward regrowth. Consider feeding along the longest fence line or with two fences from opposite sides of the field to reduce density in a small area.
- Assess body condition score before transitioning cattle onto crop – feeding from two fences would allow different feed allocations.
- Set out bales in the field early on to avoid tracking the field in winter.
- Dry matter intake should be based on 2% of liveweight/day. For example, a 500kg heifer will eat 10kg of dry matter/day.
- Account for the weather and increase feed requirements in prolonged wet and windy weather.

Research by both AHDB Dairy and Harper Adams University has shown that outwintering dairy heifers is not detrimental to growth performance or subsequent milking performance and that growth targets can be achieved with close attention to detail. If using deferred grazing, knowing the dry matter of the grass is crucial to make sure energy intake is not underestimated, as plate meters can often overestimate grass covers when the dry matter of the grass is low.

Aim to turn heifers out onto grass covers of around 3250kgDM/ha. Grazing down to a 1500kgDM/ha residual is not always easy to achieve and so higher residuals (up to 2300kgDM/ha) will reduce

poaching damage and not significantly affect regrowth.

With forage crops, measuring the weight of harvested crop from a small area (1m²) will help calculate forage yields, to allow correct allocation for the number of stock and target supplementary feeding accordingly. Take multiple samples from across the field using either a quadrant or make a m² area with a 3.54m length of alkathene. Assume a utilisation rate of about 85%.

Kale and fodder beet contain high levels of sugars and therefore supplementary long forage and a gradual transition onto the crop is important to prevent rumen upsets. This should be done over a number of days gradually reducing the ratio of silage:crop. It is good practice for cattle to have filled up on forage before being first introduced to these types of crops to prevent gorging and acidosis risk. The forage crop should not account for more than 70% of the diet. It can take up to two weeks for cattle to transition completely from a grass diet to brassica diet and be achieving maximum voluntary intake.

Fodder beet is best suited to older heifers as younger animals may not be so efficient at grazing tough root crops. It is low in protein so additional protein supplementation will be required to help grow frame. Generally higher protein crops are better suited to growing heifers whereas high energy crops are more appropriate for milking animals.

Mineral supplementation is important for all stock and brassicas are typically low in iodine so make sure a suitable mineral supplement is provided depending on the crop.

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Problems with High Dry Matter Silages

Given the very dry summer and high dry matter forages, winter rations for dairy cows will likely be on the dry side, especially for those not feeding moist feeds such as distillery by-products, potatoes or fodder beet. Dry silages have several problems in terms of financial losses and dairy cow health and performance. When combined with other feeds in a TMR, the dry ration can lead to

reduced intakes, ration sorting and poorer health and performance.

Firstly in the pit, high dry matter forages are more susceptible to heating and spoilage and are more likely to contain mycotoxins. If the pH is higher than 4.4, the risk of spoilage is much greater and can occur quickly. Remember mycotoxins can be present despite no visible mould growth.

Using a shear grab is important to keep a clean face and reduce heating, spoilage and losses at feed out. Moving across the pit as fast as possible will help reduce exposure of silage to the air and in warm, dry conditions, crossing the pit every 2-3 days is recommended. Half grabs may have to be taken to achieve this.

Many farmers are already adding water to TMR's in order to improve intakes and reduce ration sorting. Research shows that by sorting the ration, cows eat finer forage and concentrates almost exclusively during the first 12 hours, setting themselves up for acidosis. During the last 6 hours the cows were forced to eat more of the longer particles that had been sorted out earlier. This is why sorting can affect dung consistency and butterfat percentage due to inconsistent feed and conditions in the rumen.

A more effective way to reduce sorting and improve performance is to practice compact feeding, a feeding system from Denmark which requires long soaking of concentrates with high levels of water, before mixing in forages to create a wet, heavy mix between 36-39% dry matter which the cows cannot sort. The general rule of thumb is to use the same amount of water as kg of concentrate in the TMR and leave to soak for 8-12 hours. Note this feeding system works well with high dry matter forages (>35%) and is less effective when moist feeds are included in the mix. It is not suitable for wet silages.

The aim of soaking is to break down pelleted ingredients and other straights so that they cannot be distinguished, and stick to the fibres of the mix. Soaking also helps improve digestion by breaking the protein bonds within the feeds. The aim is to eliminate sorting behaviour and the refusals should look exactly the same as freshly fed out TMR.

As cows cannot sort the mix they spend less time at the feed fence eating and more time is available for lying down. General improvements in performance from Danish studies report a 5% improvement in milk yield with greater lying times and less lameness observed. There is also less of a rush for cows to get to the feed fence when feed is freshly fed out or pushed up, resulting in less stress and bullying at the feed fence.

One of the benefits of reducing sorting is an improvement in rumination time. Results from a trial on compact feeding at Llysfasi College, showed that cows on a compact feeding TMR spent more time ruminating each day and there was less variation in rumination time compared to cows fed a standard TMR (see table below). As well as improvements in rumination, milk yield increased by 1.6 litres/cow and dung consistency was more uniform in the compact feeding group.

Effect of Compact Feeding on Rumination (based on 11 cows in each group)

Rumination mins/day	Minimum	Average	Maximum	Range
Compact TMR	598	657	747	149
Standard TMR	434	550	680	246

Source: Farming Connect

If working with very dry forages this winter, accurate assessment of dry matter intakes is important to determine whether there is room for improvement, which in turn may help boost health, production and fertility. Speak to your nutritionist to ensure ration presentation is optimal and intakes are maximised. Consider compact feeding to help improve performance and reduce sorting behaviour if this is an issue on your farm.

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Identifying Mastitis Pathogens

Mastitis is one of the most important health and welfare concerns in UK dairy herds and costs individual farms in terms of production loss, culling, labour and veterinary costs.

Evolving knowledge and understanding has led to mastitis being categorised in many ways. This is

reflective of the multifactorial, complex disease process that it is now understood to be. Factors such as the milking system and routine, cow nutrition, bedding, environment, cow flow, standing times, dry cow and calving cow management all influence the incidence of mammary infections in a herd. A comprehensive mastitis investigation should involve analysis of all of these areas. Pathogen isolation to identify those likely to have come from the environment and those that are known to be contagious in nature is useful to narrow down the area to focus on.

Escherichia coli and *Streptococcus uberis* are habitually environmental pathogens although *Streptococcus uberis* can also be involved in contagious outbreaks along with other *Streptococcus sp*, *Staphylococcus sp* and *Mycoplasma bovis*. Traditional bacterial cultures and advancing PCR technology are the two common ways to identify the pathogens involved.

Bacteriology

A milk sample is inoculated onto various growth media and incubated for a set period of time. Any bacterial growth identified could be a possible cause of mastitis, although this requires skilled interpretation. Milk samples can become contaminated by milker's hands, teats and splashing in the parlour. The quality of the results given therefore depends on the quality of the sample submitted and it is very important that the sample taken is sterile.

Sterile milk sampling technique:

- Wear a clean pair of gloves per sample.
- Clean visible dirt from the teat and dry.
- Apply predip or use rapid action disinfectant and wipe dry after 30 seconds.
- Wipe teat end with cotton wool soaked in surgical spirit.
- Strip the teat 5 times and reapply surgical spirit to teat end.
- Strip the teat 4 times into a sterile pot, do not allow the teat to touch the sides of the pot and replace lid immediately after sample collection.
- Label with cow, date and quarter ID.

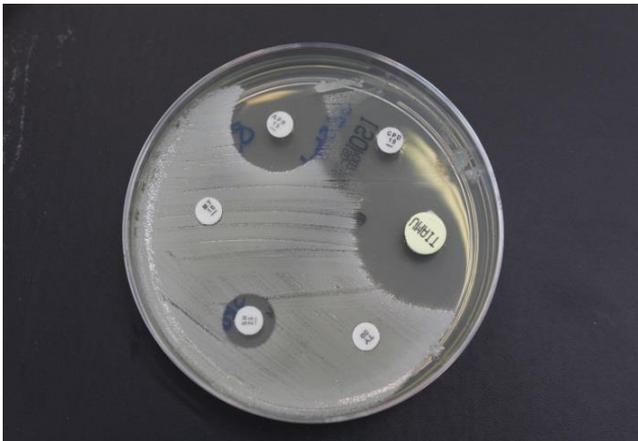
Samples should get to the lab on the same day or be refrigerated overnight if this is not possible. Milk can also be taken before treatment and frozen to be submitted at a later date should treatment prove unsuccessful. Milk samples from animals that have already been treated with antibiotics may

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not give true or useful results. Turnaround times from bacteriology are 2-5 days. Any samples that do not show bacterial growth are usually screened for *Mycoplasma bovis*. Some bacteria (*Staphylococcus aureus*) are intermittently shed into the milk and so although can cause disease, they may not always be detected in milk samples by this method. A major advantage of bacterial culture over other methods of bacterial identification is that antibiotic sensitivity can be carried out.

Inoculation of antibiotics commonly incorporated into lactating cow tubes onto the culture plates allows identification of resistant bacteria and of the most appropriate antibiotic choice (see following picture).

Antibiotic Sensitivity Testing



PCR

Polymerase chain reaction (PCR) is a laboratory technique which has recently been applied to milk samples to allow identification of mastitis pathogens. This technique looks for the bacterial DNA and does not rely on growth of bacteria for identification. Using pre-programmed kits, certain bacteria that are known to cause mastitis are screened for. Milk samples do not have to be sterile but they do have to be clean. Turn around time is 24-48 hours although antibiotic sensitivity testing cannot be done on these samples. PCR can be carried out on samples where treatment has already taken place. Although the pre-programmed kits will contain the majority of common bacteria that cause mastitis, less common causes of mastitis may be missed.

Advantages

Bacterial culture	PCR
Antibiotic sensitivity testing can be performed	Quicker turnaround time
All bacteria will be identified	Common causes of mastitis will be identified
Less expensive	Can use post treatment sample

Disadvantages

Bacterial culture	PCR
Sample contamination can affect results	More expensive
Post treatment samples unreliable	Some pathogens may be missed
Longer turnaround time	Antibiotic sensitivity not possible

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Assessing Rumen Fill

Assessing rumen fill is a useful management tool to evaluate dry matter intake and how well the cow has eaten over the last 2 to 6 hours. Often referred to as the hunger groove, the danger triangle or warning triangle, it sits below the transverse processes or short ribs on the cow's left flank, between the hook bone and the last rib (see photo below). This area is often referred to as the rumen fossa or paralumbar fossa.

Rumen fill scoring is of particular use for herds that are grazing cows late in the season to save on forage stocks. Unless you measure grass growth and practice rotational grazing it is difficult to know how much dry matter intake from grass cows are achieving and whether intake is being maximised.

Area to Assess for Scoring Rumen Fill



Source: <http://grazingguide.net/research/nepc201306.html>

Rumen fill is scored on a scale of 1-5 and indicates not only fullness or feed intake, it can also give an indication about the rate of feed passage through the digestive tract. A cow with a score of 1 has a very hollow triangular area, where as a score of 5 indicates maximal feed intake with a full, distended rumen. If the score is 2 or less, the cow has not eaten enough. Note that a score of 2 is common in the first week of lactation. However, later in lactation a score of 2 or less indicates either poor feed intake or a high rate of passage or both.

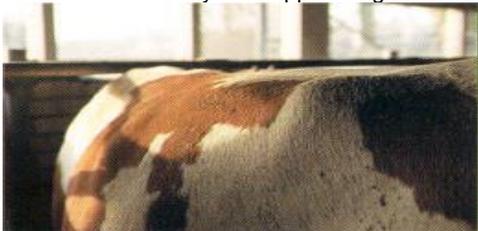
Lush forage such as fresh grass or silage from a multi-cut system may have a high rate of passage. If the forage is very wet, it will be even harder to achieve good rumen fill scores. The ideal score for cows on a high concentrate diet with a faster rate of passage will be slightly lower than for cows on a ration with a high fibre content and a slower passage rate. Ideally variation in rumen fill scores throughout the day should not deviate more than 0.5 score from the target.

Heifers and low ranking cows, particularly in systems where stocking density is high and feed space is limiting, are most at risk of low scores. Scores of 3, 4 and 5 are not a concern (unless there are many dry cows with a score of 3 and then dry matter intake is perhaps questionable).

The timing of scoring is important as rumen fill tends to be lower in the morning than in the evening. Therefore it is recommended that scoring is performed at different times of the day to get a representative assessment of rumen fill.

Rumen Fill Scores

Rumen Fill Score	Visual Appearance and Description
1	<ul style="list-style-type: none"> Empty rumen and cow has eaten very little over the last few hours and could be due to illness. The skin curves inwards below the short ribs and there is more than 1 hand width of indent both underneath the short ribs and in the rumen fossa behind the last rib. The fold of skin from the hook bone runs vertically downwards. This area of the flank is more rectangular in appearance. 

2	<ul style="list-style-type: none"> Common in first week of lactation, after which, would indicate an empty rumen and poor feed intake. This area of the flank is triangular in shape. The skin curves inwards beneath the short ribs, with just less than a hand's width underneath. However, there is still a hand's width of indent behind the last rib. The skin fold from the hook bone curves diagonally towards the last rib. 
3	<ul style="list-style-type: none"> Ideal score for milking cows with good intakes and indicates that feed is spending adequate time in the rumen. The skin beneath the short ribs goes vertically downwards for one hand-width then curves outwards. There is less than 1 hand's width of cavity behind the last rib. Behind the last rib, the rumen fossa is only just seen. 
4	<ul style="list-style-type: none"> Suitable for cows in late lactation and dry cows. Note rumen may appear more "full" due to increasing size of uterus. The skin under the short ribs curves outwards immediately. <p>The rumen fossa behind the last rib is not visible.</p> 
5	<ul style="list-style-type: none"> Normal in heavily pregnant cows. The short ribs and the last rib are not visible due to the rumen being very full. It is difficult to differentiate between the flank and the ribs. The skin over the belly area appears tight. 

Source: D. Zaaijer, W.D.J.Kremer, J.P.T.M. Noordhuizen (2001), in J. Hulsen, Cow Signals

Animals with low rumen fill scores should be closely monitored and if there is a large variation of scores within the herd or a high proportion of consistently low scores, further investigation is required and action taken to correct problems associated with ration formulation and feed intake.

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Reducing Dietary Phosphorus in Dairy Cows

Reducing dietary phosphorus in dairy cow rations is important to both the economics of farm businesses and the environment. Whilst phosphorus is a very important mineral element, having a role in nearly all metabolic reactions within the body, supplying over the recommended levels has no additional benefit on herd productivity. Excess phosphorus not utilised by the cow is excreted via the faeces and therefore wasted. Slurry or manure spread to land will contribute phosphorus to farm soils. However, poor application technique or over application of phosphorus could lead to nutrient loss and increase the risk of eutrophication in surrounding waters.

Eutrophication is where the fertility status of natural water is improved, increasing the growth of algae or aquatic plants. This accelerated growth of algae, greatly reduces the water's ability to support life by lowering oxygen levels. In Scotland, it is estimated that over 28,000t of phosphorus is excreted by livestock annually and dairy cattle account for 16% of this (Crew Report 2016). Therefore, there is considerable scope to reduce the environmental impact through dietary manipulation.

The phosphorus intake of a milking cow is recommended at 0.35-0.38% in the dry matter (NRC 2001). With an average herd dry matter intake of 22kg, this equates to 77-84g/cow/day. However, dairy rations typically contain in excess of requirements, with an AHBD Dairy funded study carried out by Harper Adams University (2012) finding that UK dairy diets can contain up to 20% more phosphorus than required. The NRC 2001 recommendations already include a safety margin and so no additional benefit is gained by exceeding this. However, beware not to go below 0.3% as this is considered borderline deficient.

It is difficult to assess how much phosphorus is being fed without forage analysis and ration software to calculate the contribution from other feeds in the total diet. Phosphorus levels in grass silage can vary greatly so testing the forage for mineral levels is important. Alternatively, phosphorus intake can be determined by analysing the complete TMR or the partial TMR and taking into account phosphorus levels in parlour cake.

If the phosphorus level in the overall diet is greater than 0.38%, then steps should be taken to reduce this. The biggest scope for reduction is through the mineral supplement or reviewing raw materials used in dairy rations. High levels can be found in distillery by-products with draff and brewer's grains typically containing about 0.5% phosphorus on a dry matter basis.

When buying mineral supplements do question your supplier as to the phosphorus inclusion and whether it is necessary. Perhaps savings can be made having a custom mineral produced based on the mineral analysis of the forage. This gives peace of mind that minerals are not being overfed, nor are you paying for something that is not required. If concerned about meeting phosphorus requirements for the herd, a metabolic profile test will not only assess nutritional status and health of dry and milking cows, it will also report on mineral levels including phosphorus in the blood.

Phosphorus currently costs around £20 per percent in a milking cow mineral. Inclusion levels of 10-12% have been common in the past but this has been reduced in recent years as it is now widely accepted and proven that feeding above requirements has no beneficial effect on fertility, health and performance. Typically dairy supplements will contain about 4-8% phosphorus, saving in the region of up to £120/t. A reduction of £120/t on a mineral supplement fed at 150g/cow/day for a 200 cow herd is a saving of £1,314/year.

Altering the feed is a short-term measure. Longer-term, soil sampling is recommended to determine the phosphorus status of the ground so that the appropriate fertiliser can be applied and at the correct rate to avoid excesses in both soil and forage. It is also worth doing an analysis of the slurry or farm yard manure. Not only will this help identify if high levels are being fed and excreted, it can save money on bought in fertiliser.

Milk Manager NEWS

Currently there is no legislation in place on the maximum amount of phosphorus that can be applied to land although there is a regulatory requirement in Scotland not to apply phosphorus beyond the crop requirements. However, with increasing environmental concerns, managing phosphorus excretion in the dairy herd will likely come under closer scrutiny with time.

Reference: Gooday, R., Gittins, J., Moorhouse, D., Wheeler, K., & Wright, E. (2016) To what extent could water quality be improved by reducing the phosphorus content in animal feed? Final Report CRW2015/03.

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Dates for your Diary

- 12th September - **UK Dairy Day**. The International Centre, Telford, Shropshire, TF3 4JH. Time: 08.00-17.30.
- 18th September - **Pull The Udder One! – Mastitis and Pneumonia, the Hidden Costs of Disease**. Ormsay Farm, Southend, Campbeltown, PA28 6RN. Time 11.00. Event Organiser: SAC Consulting, Campbeltown t: 01586 552502.
- 19th September - **Women in Dairy Annual Conference**. Worcester Sixways Stadium, Warriors Way, Worcester WR3 8ZE. Time: 10.00-15.30.
- 30th September - **Scottish HYB Calf Club Show**. Ayr Agricultural Market, Whitefordhall Farm, Ayr, KA6 5JW. Time: 9.00-17.00.
- 30th September - **Border and Lakeland HYB Club Calf Show**. Borderway Mart, Rosehill, Carlisle, CA1 2RS.
- 3rd October - **Borderway Monthly Dairy Sale Day**. Borderway Mart, Rosehill, Carlisle CA1 2RS.
- 12th October - **Choose Life: SafeTALK – A D&G Dairy Women Network Event**. Castle Douglas Town Hall, Castle Douglas, DG7 1DE. Time 10.00. Event Organiser: Teresa Dougall teresa.dougall@nfus.org.uk
- 17th-18th October - **Cattle Foot Trimming Course**. SRUC Barony Campus, Parkgate, Dumfries, DG1 3NE. Event Organiser: SRUC, Rachel Fraser t: 01387 242918 email: rachel.fraser@sruc.ac.uk
- 21st October - **Stirling Bull Sales**. Stirling Agriculture Centre, A84, Stirling, FK9 4RN.
- 23rd October - **Maximising Efficiencies in Dairy Farming**. Mackies Ltd, Westertown, Rothienorman, Inverurie, AB51 8US. Time: 10.30-14.00. To book your place contact Lorna MacPherson on 07760 990901 or email lorna.macpherson@sac.co.uk
- 25th October - **Northern Dairy Expo**. Borderway Mart, Rosehill, Carlisle, CA1 2RS.
- 31st October - **Dairy Cow Health and Lameness: Research into Practice**. Robert T Sloan & Sons, Darnlaw Farm, New Cumnock, Ayrshire. Time 10.30-14.30. To book your place contact Janis Forrest on 0131 607 7525 or email janis.forrest@sac.co.uk
- 7 - 8th November - **Dairy Leader Forum 2018**. Novotel Edinburgh Park Hotel, 15 Lochside Avenue, Edinburgh, EH12 9DJ. Organiser: Jenna Porch, jenna.porch@ahdb.org.uk
- 21st November - **AgriScot**. The Royal Highland Centre, Ingliston, Edinburgh, EH28 8NB.

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



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