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Milk Manager NEWS

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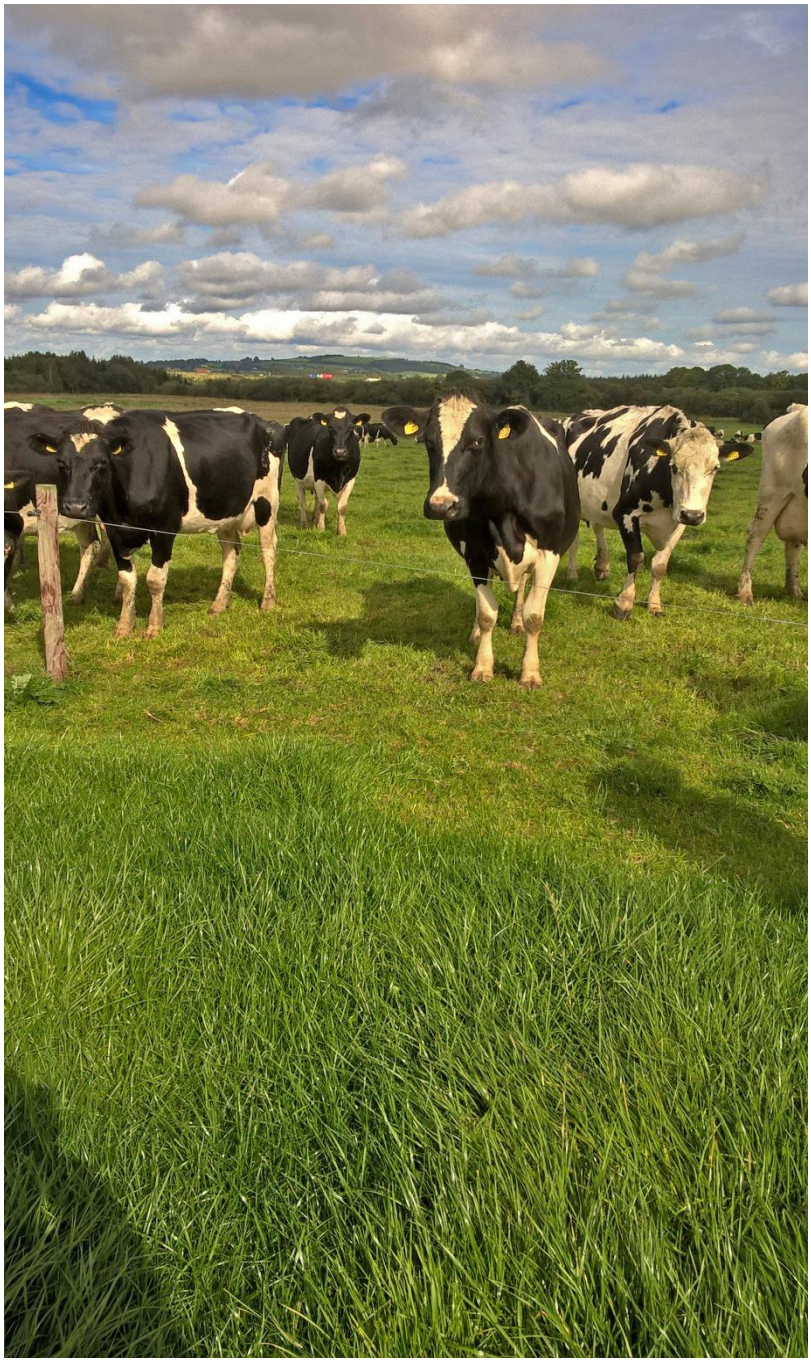

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Market Update

UK Wholesale Dairy Commodity Market

- Fonterra's latest on-line GDT auction (1st September) resulted in a very small decrease of 1% in the weighted average price across all products, reaching US $2,955/t. This is the 4th consecutive drop since 7th July. Whole milk powder (WMP) and butter saw the biggest drops, down 2.0% (to $2,884/t) and 1.2% (to $3,334/t) respectively. The biggest price rises were in butter milk powder (+3.9%) and skim milk powder, SMP (+1.8%). Full results are available at https://www.globaldairytrade.info/en/product-results/

- Trade in dairy commodities has been fairly quiet in August due to the holiday period. Sales into the food service sector have been boosted with increased demand due to the government's "eat out to help out" scheme. As a result, the cream price rose slightly in August (£50/t), which was also helped by a cream shortage in some EU countries and less milk production in the UK earlier in the month due to hot weather. As of the week ending 21st August, cream was trading at £1.55 to £1.57/kg ex works, and spot milk was ranging from 29 to 32ppl delivered. With cream at £1.55kg, this is thought to be worth 8.8ppl to a liquid processor (based on a UK average butterfat level of 4.14%). This is significantly higher than the April cream price of 90p/kg (and worth only 5.5ppl to a liquid processor).

Commodity	Aug 2020 £/T	Jul 2020 £/T	% Difference Monthly	Aug 2019 £/T	% Diff 2020-2019
Bulk Cream	£1,480	£1,430	3	£1,400	6
Butter	£3,080	£3,070	0	£3,030	2
SMP	£1,860	£1,920	-3	£1,850	1
Mild Cheddar	£2,920	£2,920	0	£2,830	3

Source: AHDB Dairy - based on trade agreed from 1st to 27th August 2020. Note these prices are indicative of values achieved over the reporting period for spot trade (excludes contracted prices)

- There has been little change in the butter price (up £10/t in August from July), which is holding up due to continued retail demand and support from the cream price.

- Mild cheddar prices have also remained very stable, with little change throughout the whole of 2020, with supply and demand well in balance. Much of the milk going into cheese production is currently being used to help build stocks of mature cheddar.

- There was little difference in both AMPE and MCVE from July into August, with both these indicators falling slightly. There was a bigger drop in AMPE (-0.52ppl) compared to MCVE (-0.1ppl), mainly on the back of the fall in SMP.

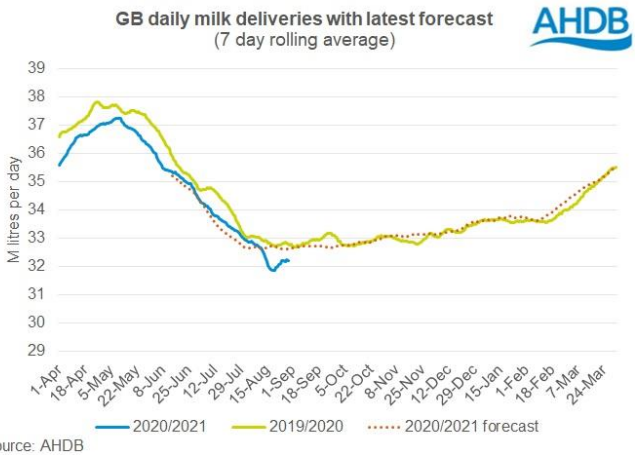
	Aug 2020	Jul 2020	12 months previously	Net amount less 2.4ppl average haulage – Aug 2020
AMPE	28.24ppl	28.76ppl	28.15ppl	*25.84ppl*
MCVE	31.54ppl	31.64ppl	30.53ppl	*29.14ppl*

Source: AHDB Dairy

- The indicators AMPE (Actual Milk Price Equivalent) and MCVE (Milk for Cheese Value Equivalent) provide a guide to market returns. AMPE is the estimated factory gate value of a litre of milk used for butter and SMP production. MCVE is based on the estimated returns from mild cheddar and whey powder/butter. As of the 27th August, AHDB Dairy have updated these calculations, taking into account higher milk composition quality, increased costs of production and the price of lactose powder.

UK Milk Deliveries and Global Production

- GB milk deliveries are now well below forecasted levels, although are 0.7% up on the previous week and 1.7% below the same week last year (w/ending 29.8.20), equivalent to 570,000 litres.



Source: AHDB

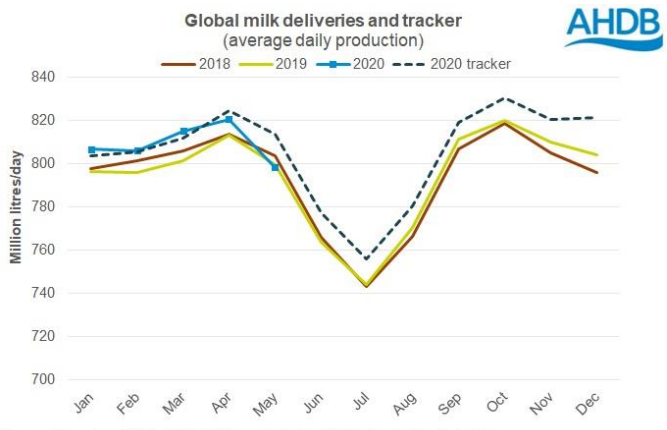
- Current levels of production are not surprising given that cow numbers have dropped on the back of processor demands to lower production

during COVID-19 lockdown. According to AHDB Dairy, GB dairy cow numbers were back 2.9% or 51,000 cows as of 1st July 2020, compared to numbers recorded on 1st July 2019. It is thought that around 25% of dairy farmers were asked to reduce milk output by their milk buyer and the most effective way to comply was to cull cows. Despite this, milk supply and demand remain well balanced with no shortage of milk.

- Based on AHDB Dairy's June GB milk production forecast, production is expected to be back 0.7% for the 2020/21 milk year, reaching 12.44 billion litres. It is likely that production will be in excess of demand, although the extent of this will very much depend on demand in the food service industry and whether that returns to normal/pre-COVID levels.

- EU milk deliveries (excluding the UK) were up by 1% in June, compared to the same month last year, with June deliveries of 12,103 million litres. EU deliveries are 1.4% up on the year to date (until the end of June).

- Global production has declined recently as a result of the Coronavirus pandemic. Production was back 0.2% in May compared to the same month last year, resulting in a daily production of 799 million litres from the five key producing regions. Production in the EU (excluding the UK) was back 0.4% in May, much of which was down to a 2% drop in output from France.



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

Monthly Price Movements for September 2020

Commodity Produced	Company Contract	Price Change from Aug 2020	Standard Litre Price Sept 2020
Liquid & Cheese	**Arla Farmers UK**	*-no change*	28.17ppl liquid 29.26ppl manufacture
Cheese, Liquid & Brokered Milk	**First Milk**	*+0.5ppl liquid and +0.52ppl manufacture*	27.25ppl liquid 28.15ppl manufacture
Cheese	**Fresh Milk Company (Lactalis)**	*+0.25ppl liquid and +0.26ppl manufacture*	27.00ppl liquid 28.13ppl manufacture
Liquid & Manufacture	**Grahams**	*No change*	25.50ppl
Liquid & Manufacture	**Müller Direct**	*No change*	26.25ppl (includes 1ppl direct premium)
Liquid & Manufacture	**Müller (Co-op)**	*No change*	29.53ppl
Liquid & Manufacture	**Müller (Tesco)**	*No change*	31.43pl
Liquid, Powder & Brokered	**Yew Tree Dairies**	*No change*	26.1ppl Standard A litre price (to be paid on only 63% deliveries)

Other News

- For the 2019/2020 milk year, AHDB Dairy calculated that 18% of Scottish milk was transported to England for processing. This amounted to 269 million litres or 9439 loads/year or 26 loads every day. Müller hauled just over 70% of milk south of the border while the remainder was transported by Yew Tree and First Milk. This is a huge financial cost (estimated at £4.7 million per year), as well as an environmental cost.

- As milk production has dropped and supply and demand remain more in balance, if further lockdown restrictions are not applied, the best outlook for milk prices is for them to remain stable or improve slightly. However, farmers should still be encouraged to look at cost management within their business and be prepared for volatility in the markets and milk prices over the next two years, due to Brexit and potential future lockdowns.

- All dairy farmers in Scotland are being strongly encouraged by NFUS to respond to the

government's consultation on milk contracts to help address unfairness in the supply chain. Farmers have until 15th September to make their voices heard and the consultation can be accessed at https://consult.defra.gov.uk/agri-food-chain-directorate/contractual-relationships-in-the-uk-dairy-industry/

- Dairy farmers are being encouraged to take part in a study being carried out by SRUC to measure the prevalence of Mycoplasma bovis, as well as understand what farms may be at risk of the disease and why. Farmers taking part will need to provide four quarterly bulk tank milk samples over a 12-month period, which will be tested for M. bovis and antibodies. They will also have to complete a questionnaire on herd management practices. If you are interested in participating, please text 07785 382371 or email: mycoplasmabovis@sruc.ac.uk

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Straights Update

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 20	Oct 20	Nov 20 - Apr 21	May 21 - Sep 21
Proteins				
Hipro Soya	328	329	329	314
Rapeseed Meal	232	227	Nov-Jan 227 Feb-Apr 229	May-Jul 232
Wheat Distillers Pellets	231	231	231	-
Starch				
Wheat	179	180	184	May-Jun 189 Jul-Sep 166
Barley	133	134	139	May-Jun 144 Jul-Sep 138
Maize	187	186	179	179
Fibre				
Imported Sugar Beet Pulp	184	184	182	-
Soya Hulls	168	168	168	-

Source: Straights Direct and Cefetra on 9th 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.

- Note - home produced sugar beet pulp will be in the region of the mid £190's/t delivered in central Scotland this winter. Yield is back due to a virus in the English sugar beet crop called "Virus Yellows". This disease is spread by aphids, making the plant leaves yellow, inhibits photosynthesis and reduces yield. This is a resurgent problem that had been controlled by neonicotinoids until they were banned two years ago. Soya hulls would be a good replacement if additional fibre is required although they are slightly lower in energy, slightly higher in protein and have zero sugar. However, the fibre level is much higher, although not quite as digestible compared to beet pulp.

Global News

- Global markets have rallied in recent weeks due to crop problems in the US spring wheat and maize crops, and in Argentina and Ukraine. This has led to strong export demand for US grains from major importers including China, boosting prices. In August, 747,000T of maize was sold to China with further demand anticipated. US wheat futures rose 10% in August on the back of increasing demand and export sales greater than expected.

- World wheat and maize crop production estimates are up, according to the International Grains Council. The maize crop forecast has been predicted at 1.166 billion tonnes (increased by two million tonnes) and world wheat production is up one billion tonnes to 763 million tonnes, with wheat output from Russia and Australia largely responsible for the increase. The US maize crop this harvest is expected to reach 384.2 million tonnes.

UK and Scottish News

- The UK wheat harvest is very likely to be the lowest in nearly 40 years at less than 10 million tonnes in size. This leaves the UK very much as an importer of wheat and maize to fill the gap. As a result, wheat and maize prices will be driven very closely by global markets and currencies.

- Barley on the other hand is in surplus across the UK as a whole and is exceptional feeding value at a £40 to £45/t discount to wheat. The cereal harvest in Scotland is looking down on last year but yields are not generally as badly affected as those across much of England.

- The third harvest report from AHDB covers up to the 18th August, at which point 52% of the GB cereal and oilseed crops were harvested (a total of 1.7 million hectares). The GB winter barley harvest yield was slightly down on the 5-year average, estimated at 6.3 to 6.6t/ha. At this point, only 19% of the spring barley harvest was complete, with yields estimated at 5.7 to 6.2t/ha.

- The quality of malting barley in the UK is said to be mixed, with some crops failing due to high nitrogen (0.15 to 0.2% higher than normal) and pre-germination and germination issues in later cuts. Many buyers have relaxed their nitrogen specification from 1.85% to 1.90%. There is a surplus of good quality malting barley and demand is back by around 10%. As of 3rd September, there was still about 40% of the spring barley crop to harvest in Scotland.

- Yields of oilseed rape in both the UK and France are reported to be disappointing although has been partially offset by better yields in the Baltics and Scandinavia. Winter oilseed rape crops in the UK have yielded an estimated 2.6 to 3t/ha.

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Insight into the Irish Dairy Industry

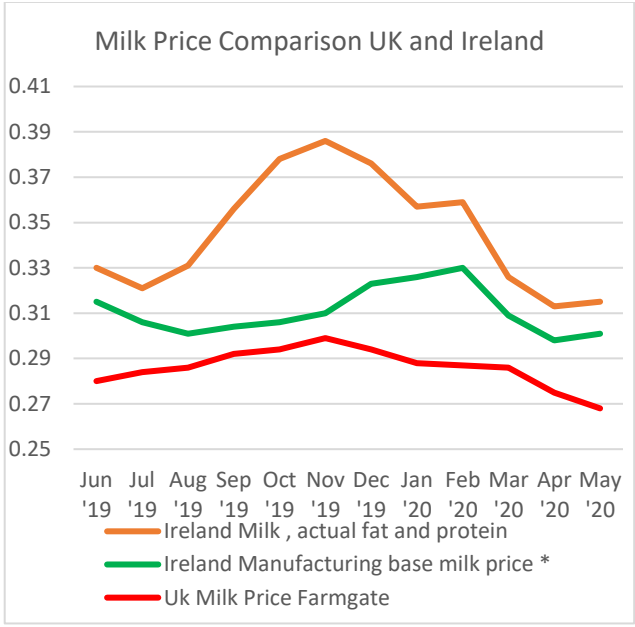
The Republic of Ireland's dairy industry has seen a lot of growth over the last few years due to the abolition of milk quotas in 2015. With over 18,000 dairy farms and a total of 1.5 million cows, the annual national production reached eight billion litres in 2019. Ireland is a relatively small player within the EU, ranked 7th for production. However, it is still a global player when it comes to dairy exports, with 90% of milk produced exported around the world.

With recent expansion, the industry has 400,000 more cows than five years ago. The average herd size has increased from 64 cows in 2010 to 80 cows in 2019. This contrasts with the average Scottish dairy herd size of 206 cows.

The average dairy farm size is just 59ha, with an average stocking rate of 2.09LU/ha. With grassland accounting for 60% of the land use in Ireland, with only 10% cropland, it important to have a system that utilises this resource efficiently.

Most of the milk contracts in Ireland are for manufacturing for the export market. Therefore, milk quality is very important to achieve a high milk price. A comparison of Ireland and UK milk price is shown in the graph below. The top five markets are the UK, the Netherlands, China, the US, and Germany.

Milk market price in the UK (ppl) and in Ireland (cpl)



**Base price for standard litre of 3.7% BF & 3.3% P.*
Source AHBD & CSO

Improvement in genetic and technical performance has allowed cows to produce 400 to 550kg of milk solids from less than one tonne of concentrates. More milk solids, has resulted in more output and value per litre at processing level, thus boosting export value. The use of EBI (Economic Breeding Index) and genomics has led Irish farmers to breed the right cows for their grass-based system. The average yield per cow is 5300 litres, low compared to the UK average of 8500 litres, and an average composition of 4.2% butterfat and 3.4% protein. This extensive, low-cost grass-based system without excessive concentrates or bought in forages, allows greater resilience in times of low milk price.

This production system is based on making high quality milk from grazed grass and Spring block calving is an essential part of the process. Attaining

the target of 85% of cows calved in the first six weeks and a mean calving date coinciding with Magic Day, where grass growth = demand, allows cows to hit peak milk production when grass growth is at its highest in mid-May. Early turnout in spring is essential to allow as much grass in the diet as possible. This can be achieved by on/off grazing, use of cow tracks and back fencing to achieve good residual covers. Good grassland management is key to both grass quality and quantity.

What's Going Well

There has been huge investment in farm infrastructure (buildings, grazing and milking equipment) and in processing capacity to cope with the peak milk supply. This has been done through capital grant schemes and financial investment by farmers. The average investment on dairy farms is approximately €33,000 over the last few years.

A long growing season and suitable climate can grow lots of grass. Irish dairy farms average 230 to 280+ days at grass depending on soil type, climate and altitude. Better grassland management through improved infrastructure, soil fertility and reseeding has allowed greater utilisation of grass. This has led to making this farming system more profitable. The average annual grass production for Irish farms is between 12 to 14 tonnes DM/ha while the top preforming farms are achieving 16 to 18 tonnes DM/ha.

Research and knowledge transfer from Teagasc have informed and educated farmers on how to make farms more profitable and sustainable. This includes research in animal health, breeding, grassland management and production recording. Many farmers are involved in discussion groups and there are a lot of young, trained farmers allowing the industry to move forward sustainably.

Some Challenges

As the dairy industry expands, the demand on resources, like land and labour, become a challenge. With farms being small and fragmented, land prices rising to €9,300 per acre creates a barrier to entry or expansion for some farms. However, long-term leasing is becoming more popular for expanding dairy units, due to enhanced income tax relief incentives like stamp duty and tax exemption. Benefits like long-term planning and greater economy of scale can be achieved through leasing.

Climate change is the biggest challenge that the industry faces in the future. Increased scrutiny of greenhouse gas and carbon emissions has led farmers to become more aware of the impact they have on the environment. This has led to the use of more environmentally sustainable practices like using protected urea fertiliser, low emission slurry spreading and ensuring that soil fertility is optimal.

The calf boom in the spring has put pressure on the whole industry in terms of animal health and welfare, with limited resources to cope with the calf numbers. The use of contract rearing units is becoming more popular and some beef farmers are implementing a calf to beef system to substitute a poor margin for beef cows presently. Live export to mainland Europe is important to the industry with 189,068 calves exported in 2019. The beef market would collapse if this were to stop.

Brexit is a huge concern, with 34% of the Irish dairy export going to the UK in 2016, with the risk of cross border checks affecting the whole island's agri-food economy. There is a need for frictionless trade for both countries as 800m litres are imported from Northern Ireland to be processed in the Republic for the liquid milk and processing market. Also, Ireland would need access to the UK as it is a vital outlet for Irish butter, cheese and skim milk powder.

The Future

The outlook for the Irish dairy industry looks positive with further expansion and improvements in efficiency. In 2025 Teagasc forecast that the cow numbers will be 1.7million and herd size will increase to 100 with approximately 16,000 farms, with 11% of these new entrants. The export sector would be the main driving force to produce high-quality dairy products. The focus must be on sustainable dairy production and improve Ireland's comparative advantage of growing lots of grass to produce high quality milk.

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Amino Acid Nutrition for Transition Cows

There is increasing awareness of the importance of amino acid nutrition for transition cows in the close-up dry period and in early lactation. Lysine and methionine are the first two limiting amino acids for dairy cows. In the majority of UK diets, lysine requirements tend to be met from background

levels of forage and feed ingredients. However, methionine is often deficient, both in milking and dry cow rations.

Methionine is well known to have benefits in boosting milk yield, milk protein percentage and hence milk protein yield. However, one of its key functions is acting as a methyl donor, helping in the production and export of VLDL (very low density lipoprotein) out of the liver. Essentially methionine prevents the build-up of fat in the liver, reducing the risk of fatty liver and subsequently ketosis in early lactation. It also has benefits in immunity, increasing the activity of phagocytic white blood cells and improving antioxidant status with higher levels of glutathione after calving. Fertility may also be improved, with methionine supplemented cows shown to have larger embryos with a higher lipid content, a likely energy source for the developing embryo, leading to increased chance of survival.

Current published recommendations on amino acids for dairy cows from the National Research Council (NRC) in 2001, only give recommendations for milking cows. There has been increasing interest in amino acid levels in the diet for cows in the close-up dry period and first few weeks of lactation, due to the role of methionine during this time. It has also been questioned whether the published requirements for milking cows should be the same as for transition cows.

For milking cows, NRC suggests lysine at 7.2% of metabolisable protein (MP) supply and methionine at 2.4% of MP. At this desired ratio of 3 lysine:1 methionine milk yield and milk protein yield are thought to be maximised. Research at the University of Illinois between 2014 and 2017 looked at feeding a lower ratio (2.8:1) and compared transition performance to cows fed a ratio of 3:1 for the last three weeks of the dry period and the first 30 days in milk. The cows fed the lower ratio had a higher dry matter intake in early lactation (+1.4kg), +4kg of energy corrected milk, higher milk fat and protein yields and were also shown to be more immune competent with a higher antioxidant status.

Other nutritionists have supported this lower ratio and industry recommendations for close up dry cows are 30 to 35g/day methionine (at 2.3 to 2.7% MP) and 90 to 95g/day of lysine (at 6.9 to 7.3% MP). This is based on an MP supply of 1300g for close up dry cows. In practice, 1300g of MP is hard to achieve and includes a safety factor which takes into account that dry matter intakes in close up dry cow groups can be highly variable. By aiming for 1300g of MP, this will ensure that the majority of cows will consume the minimum target of 1100g of MP.

When rationing close up dry cows, it has been common practice to aim for 14% crude protein on a dry matter basis. However, cows do not have a requirement for crude protein and the focus must be on providing the minimum 1100g of MP and ensuring a lysine to methionine ratio of ideally 2.8: 1 and 3:1 maximum. Supplementary methionine may be required to achieve this ratio depending on feeds included in the ration and may be a benefit in herds experiencing fatty liver/ketosis, low milk protein post-calving and where there is room for improvement in milk output in early lactation.

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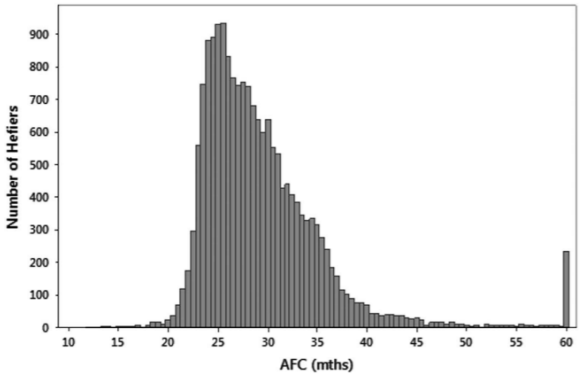
Are you Calving your Heifers too Late?

Feed is the largest expense on dairy farms with heifer rearing costs being the second largest expense. The age at first calving can have a large impact on the productivity and profitability of dairy farms. In the UK the average age at first calving is nearly 28 months according to the Cattle Information Service for Holstein-Friesian herds. Calving down age of heifers on UK dairy farms varies significantly (see following graph), although the recommended target age at first calving is between 22 to 24 months. Heifers calving down after 24 months are associated with increased rearing costs with each extra month of rearing costing approximately £150 to £200. Therefore, a heifer calving down at the UK average of 28 months could be costing up to £800 extra in rearing costs.

Management during early life of a heifer will have an influence on the age at first calving with growth rates, health and nutrition having a large impact. Increases in age at first calving are often associated with poor growth rates, poor health or inadequate nutrition.

Distribution of age at first calving of heifers (n = 18, 406) from 437 UK dairy herds



Source: Sherwin *et al*., 2016.

There are certain factors that should be considered when deciding if a heifer is ready for her first insemination, which should occur around 13 to 15 months of age. Body weight is a good indicator if the heifer has reached the target weight for serving, the target is 380 to 400 kg or 55 to 60% of mature body weight (650 to 700 kg) and a wither height of 125 cm for Holstein-Friesians. To achieve these targets, growth rate should be between 0.8 to 0.9 kg per day to ensure the heifer reaches target weight for insemination by 13 to 15 months old. At pre-calving, heifers should be 85 to 90% of mature body weight and will continue to grow during their first lactation. Regular weighing of heifers throughout the rearing period and post-calving is a valuable way of monitoring the growth rates.

Calving difficulties, or dystocia, are affected by several factors, with dam's age and pelvic width being particularly important to consider when calving heifers. If heifers are calved too early, there are increased chances of dystocia which can impact milk production and future reproductive performance. Similarly, calving heifers down too late can lead to reduced longevity, lower lifetime milk production and the cost of rearing is significantly increased. Heifers which are older at first calving tend to have more dystocia problems as these heifers are more likely to be over conditioned at calving.

Production of milk by a heifer is influenced by her mammary gland development and milk yields can be reduced if heifers calve down too early due to underdevelopment of the mammary gland. Similarly, older heifers have the risk of excessive fat developing which can restrict mammary gland development and reduce milk production during the first lactation. Milk yields in the first lactation have been correlated with milk yields in subsequent lactations, with heifers having increased milk yields when calved down at 24 months compared to older heifers.

In the management of heifers, it is important to reduce the age that heifers calve down to the optimum age to allow for better economic return. Age at first calving influences lifetime milk production and longevity, which helps contribute towards the profitability of a dairy farm. Due to the earlier age at first calving, less heifers will be required to be kept as replacements. For UK dairy farms to be more profitable in the future, a focus on heifer management is key to reduce age at first calving from 28 months to 22 to 24 months. Ideally, heifers should not be calving down any less than 22 months old as these heifers tend to have lower milk yields and higher chances of calving difficulties.

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The Five Steps of Effective Cleaning and Disinfection

With summer drawing to a close and autumn on the horizon it is important that all housing is clean and prepared for livestock coming in for the winter. Having an effective cleanout is crucial to reducing disease pressure on the cattle and in particular to youngstock, over the housing period. This article is based on AHDB's guide to cleaning and disinfecting pig housing. The five basic steps of cleaning and disinfection are:

1. **Remove Organic Matter**

- Remove all organic waste, for example waste feed, bedding, and manure.
- Do not keep back any 'clean' straw for reuse – once in contact with livestock or waste it will contain pathogens.
- If in a slatted shed, the slatted tank should be emptied before, if possible. If this is not possible ensure that the slurry level remains 30cm below the floor surface.
- Feeders, gates etc should be cleaned and disinfected separately.

2. **Use a Detergent**

- Many farmers miss this stage out. However, a wide range of common pathogens show poor

response to disinfectants under a high organic load, as the organic waste reduces the efficacy of the disinfectant.
- Some bacteria are protected from disinfectants by an oily biofilm. Detergent is the only product that can break this down, increasing the efficacy of subsequent disinfection.
- The efficiency of washing/cleaning can be improved with detergent use, reducing the time required for pressure washing.
- Saturate all surfaces (ceilings if possible, walls, floors and any fixed equipment) with cold water and apply the detergent under low pressure. A foam or gel cleaner could also be used.
- Soak for a minimum of 30 minutes, but the longer, the better.

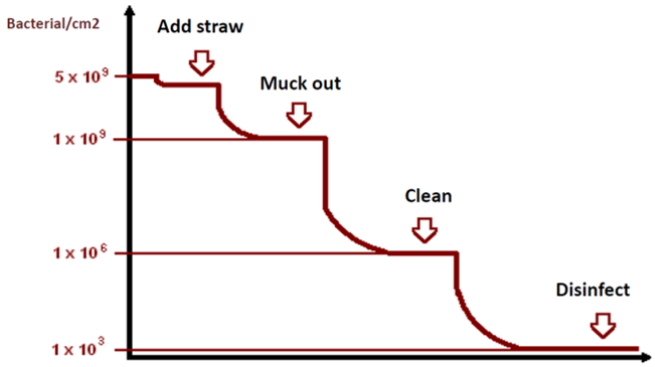
3. Clean
- Work from top to bottom (ceiling to walls to floors). This minimises contamination of previously cleaned areas with dirty water.
- Pay close attention to out-of-sight and hard-to-reach spots.
- Pressure wash with hot (70ºC or above), clean water. If your pressure washer does not have a hot water option, consider buying or hiring one that does. Cryptosporidium can survive temperatures of up to 60°C.
- Ensure all surfaces are visibly clean.
- Make sure dirty water drains away or is washed away.
- Corroded fixtures, surfaces and flooring should either be repaired or replaced, as these can harbour germs. This can include repainting surfaces after they have dried.
- Any equipment that cannot be pressure washed, must be cleaned by hand.

4. Dry
- Allow all cleaned areas to dry thoroughly before disinfecting.
- A significant advantage that cattle farmers have over pig and poultry producers is the length of time that the sheds will sit empty for. The level of pathogens in a shed that has been cleaned out decreases over time. Exposure to sunlight also helps kill pathogens.

5. Disinfect
- Some disinfectants are more effective on certain pathogens so choose a disinfectant that is suitable for the range of diseases present on your farm. DEFRA has a list of approved disinfectants available at http://disinfectants.defra.gov.uk/DisinfectantsExternal/Default.aspx?Module=ApprovalsList_SI
- Make sure you and your staff understand how to use disinfectant safety, including wearing the correct PPE.
- Disinfectant should be prepared on the day it will used at the correct dilution rate. Be aware that dilution rates can vary depending on pathogens present and the ambient temperature.
- Make sure the disinfectant is effective against the microorganisms you are targeting, as well as being compatible with the detergent.
- Apply the disinfectant evenly and under low pressure until all surfaces are saturated. A knapsack sprayer can be used for this.
- Move methodically through the room/building, paying attention to corners, out-of-sight and hard-to-reach areas, again working from top to bottom.

The importance of efficient cleaning is shown by the research by Kaske and Kunz (2003) where they measured the bacterial levels present after different levels of cleaning.

The effect of different scales of "cleaning" on bacterial load



The results showed that after a full clean and disinfection only 1000 bacteria were present per cm^2, whereas after only cleaning, 1 million bacteria were present per cm^2. If we look at cryptosporidium as an example, an infected calf can shed over a billion infective oocysts over the course of an infection, and only 10 oocysts are required to cause an infection in a calf. Cryptosporidium can survive for years in cool moist environments and can survive exposure to temperatures ranging from -20°C to 60°C. Therefore, to minimise the pathogen

level and the risk of infection, following the five basic steps of effective cleaning and disinfection is crucial.

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Opportunity for Grazing with Robotic Milking Systems in Scotland

Dairy farms are under increasing scrutiny regarding the housing of cows 365 days of the year, with the concern that cows are not able to express normal behaviour like grazing and herding. It is becoming more of a topical issue relating to consumer perception of dairy farms and the products that they produce. Robotic milking herds in Scotland are predominately housed all year-round and only a few let cows out to graze during the summer months.

There is a great opportunity to use grass as a source of feed for robotic dairy farms in Scotland. It is one of the cheapest sources of homegrown forage on the farm. Only costing 5.5p/kg DM, and if utilised and managed correctly over the grazing season, it can produce a high quality feed with an ME of 11.5 to 12.5MJ/kg DM with a crude protein content of over 20% and yield between 10 to 15 tonne DM/ha/year. An additional 1 tonne/ha of grass utilisation is worth £334 per year, helping improve profitability. Maximising use of this resource allows for a reduction in bought in concentrates during the grazing season. By managing to allocate the correct amount of high-quality grass and use of a selection or "grazeway gate" allows the cows to move freely through the robotic system efficiently and satisfy their energy demands with fresh grass. It also allows the farm to become more profitable by increasing litres produced from grass which is cheaper than silage.

Having good farm infrastructure, with grazing fields located close to the buildings where the robots are situated, and good cow track construction are very important to make a grazing robotic system work well. This will enable good cow flow and minimise walking distances, benefit milking performance, reduce the labour requirement for collecting cows and minimise lameness, with less digital dermatitis in grazed herds versus housed herds.

When setting up grazing infrastructure, an ABC system is typically used, which is designed to encourage cows to walk through the robot collection and sorting area at least three times a day. The grazing platform is split into three sections (A, B and C) which may be subdivided into different paddocks, with access times set for the three sections. One important feature for a robotic grazing system is a grazeway gate, which is situated at the exit point of the shed. The grazeway gate will determine if the cow is eligible to go out to pasture, depending on the time she was last milked. If she is due to be milked the cow is returned to the shed for milking and cannot exit to pasture until she does so. The gate can also be used to segregate cows out to another area for treatment.

Grazeway gate infrastructure in place

As with any milking system, measuring grass with a plate meter on a weekly basis during the growing season allows the farmer to look at how much grass is on farm currently, what the growth rates are like and what area to allocate to the cows in each grazing interval. It will also allow the management of surpluses and deficits on farm. Grass allocation is important, as given too much, cows may be less likely to visit the robot. Given too little, cows may be forced to graze paddocks below the target residual of 1500kg DM/ha. This would compromise subsequent grass growth and could also lead to cows being underfed and less driven to go out to graze.

Success Story in Lanark

On Auchnotroch farm run by the Baird family, just outside Lanark, the decision was made in November 2019 to install four Fullwood M^{2}erlin robots for their 170-cow herd, which is mainly autumn calving. With the robots, they wanted to be

able to graze during the spring and summer months, so they altered their grazing infrastructure slightly and put in a grazeway gate for cows to access their 32ha grazing platform. Cows are given a fresh allocation of grass every 12 hours and are moved with a fence every morning and evening. The cows are performing very well at grass and it is very rare that any cows need to be collected and taken in to be milked. The farm is achieving 3.6 milkings per day and annual yields have increased by over 1000 litres (from 6500 to 7600 litres) over the last year with no extra concentrate feeding. At grass, the cows are fed on average 3kg of concentrate per day through the robot, with no buffer feed at grass. With the majority of the ration coming from grass, this is seen as the most profitable way of producing milk. The Baird's are very happy with this system, having taken the opportunity to increase milk output and maximise milk from forage while grazing cows with a robotic milking system.

Andrew and Kirstie Baird from Auchnotroch farm with one of their Fullwood robots

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Dates for your Diary

- 14th-16th September - **Herdsman Foot Trimming Course,** South West Scotland. For more information and to register interest please contact Stuart Martin at the Scottish Dairy Hub on 07500 766083.

- 17th September - **Webinar: Futureproofing Farm Infrastructure**. Time 12.00. To book your place visit https://ahdb.org.uk/events/futureproofing-farm-infrastructure

- 21st September - **Webinar: Stranraer Sustainable Dairy Group - Lameness Prevention**. Time 20.00. To book your place visit: https://www.fas.scot/events/event/stranraer-sustainable-dairy-group-lameness-prevention/

- 30th September - **Women in Dairy Annual Conference 2020**. Time: 10.30. Virtual event via Zoom. For more information and to book your place visit: https://www.womenindairy.co.uk/conference

- 15th October - **The Future of British Farming Online Conference**. Time: 9.30-14.45. Book your place at: https://environment-insight.com/booking/3455/DLYYZO-3338168

- 19th-21st October - **Herdsman Foot Trimming Course,** Aberdeen. For more information and to register interest please contact Stuart Martin at the Scottish Dairy Hub on 07500 766083.

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

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