

Sheep & Beef News



December 2020

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*Wishing you a Merry Christmas & A
Prosperous New Year*

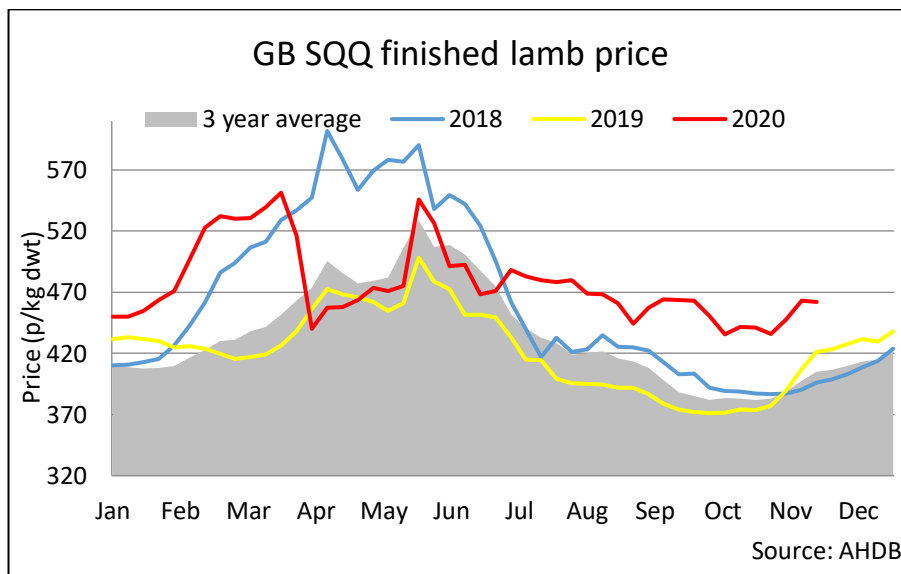
Sheep Market Commentary

Week ending	GB deadweight (p/kg)			Scottish auction			Scottish	E&W
	16.5 – 21.5kg			(p/kg)			Ewes (£/hd)	Ewes (£/hd)
	R2	R3L	R3H	Stan.	Med.	Heavy	All	All
07-Nov-20	452.5	448.7	449.0	206.70	211.30	199.60	64.05	67.79
14-Nov-20	468.1	464.0	464.3	204.20	204.50	191.40	60.76	63.41
21-Nov-20	466.5	463.5	463.4	209.30	210.70	198.00	63.75	66.35

Deadweight prices may be provisional. Auction price reporting week is slightly different to the deadweight week.
Source: AHDB and IAAS

Sheep Continue At A Premium

The trade for prime and store sheep has continued to be at a premium, as we have seen for the majority of the year. England returned to lockdown on the 8th November, when these restrictions ease (possibly 2nd December), we may see further demand for our product as restaurants open and the festive season approaches.



The current depressed pound (1euro: £0.89 – 25/11/20) certainly makes our lamb very attractive for trading with Europe.

NZ Store Sales Start

As our sales of lamb rocket, it is interesting to look at what is happening with other lamb producing countries. New Zealand has just started selling some early spring prime lambs and store sales are in the early stages. These store sales are reported to be slow, due to various factors including, old season lambs remaining on holdings struggling to finish, current lack of forage and the finished farm gate price being low for the time of year (\$2/kg below November 2019).

It has been forecast that there are significantly less lambs available this year, due to the summer drought. Beef and Lamb NZ have estimated this to be a decrease of 1 million lambs on last year. This reduced lamb crop will inevitably raise the price of store lambs when the larger sales commence. But, it will decrease the amount of lamb for export, Beef and Lamb NZ estimate this to drop from 19million head in 2019 to 17.4 million head this year.

This low lamb crop does offer the UK an opportunity while Brexit is bubbling, as the EU will still require lamb, which we can supply. This drought will no doubt have an effect on decisions for New Zealand farmers on, if they sell females as stores, or retain them when forage is scares to build the flock.

American Lamb Sales Increase

The American meat trade has had to deal with huge consequences of COVID-19, as close working conditions have caused outbreaks in their major abattoirs and food processing sites. But, the latest monthly impact report (210 analytics and IRI) has shown that through the pandemic meat has seen great growth with dollar sales being 11.8% higher than 2019, with consumers investing in food. Lamb has been the leader being 30% higher in dollar sales and beef has increased 14.8%.

Kirsten Williams, SAC Consulting Beef & Sheep Consultant

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Liver Fluke Update

November is the most common month for sheep to die from acute liver fluke. Spring and early summer were dry in many areas this year and this can delay problems with liver fluke to later in the year. Similar conditions were seen in 2019 and very few cases of acute fluke were diagnosed by SRUC Veterinary Services –not until December. At the time of writing one outbreak of acute liver fluke has been reported in the north east. It is important to investigate deaths in a timely manner whether or not sheep have already been treated for liver fluke.

Blood samples from cattle or sheep can be tested for antibodies to liver fluke. The test is normally only useful in animals in their first grazing season. Following infection with liver fluke it takes between 2 and 4 weeks for antibodies to be produced. This test can be used a few weeks after housing to find out if treatment is required. It could also be used to avoid unnecessary treatments and long meat withdrawals in groups of animals that are approaching slaughter weight.

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Ewe Pregnancy; From Day 50 To Scanning

Relative to early- and late- pregnancy, the ewe's nutritional requirements in mid pregnancy are low. They can be kept on a maintenance diet, which is roughly 2% of their body weight in kg dry matter per day. It is a balancing act however; underfeeding will be detrimental to foetus and lamb survival so check what is going on to get the balance right.

Feed Budget

In mid-pregnancy, feed to their requirements. With knowledge of what they need, conserved forage, rotational grazing or forage crops can be rationed to eke out winter feed supplies. Feed budgeting is your friend – calculating the flock requirements and balancing against feed supplies can help ensure you optimise their daily feed allocation for cost-effective wintering. There are a lot of tools to help, see www.feedsmart.co.nz for a quick easy starter.

Manage Body Condition

Where in the past, we may have advocated allowing condition loss in mid-pregnancy for those on condition score 3.5 and above, the AHDB Challenge Ewe findings suggest that this is not the best approach. Maintaining or gaining condition is better, although we don't want them going too high and risk lambing issues later. If there are any ewes that fall short of condition score targets, address those ewes now. Attempting to correct condition in late pregnancy is challenging and will risk big lambs.

Rest Pasture

If worried about grass supplies in the spring, feeding silage or hay in mid-pregnancy to rest pastures for spring is more efficient than eating into grass supplies. Pasture grows better after a rest and the feed demands of a lactating ewe is over twice that of a ewe in mid-pregnancy.

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Management Of Ewe Lambs Post Topping

Breeding from ewe lambs, allows for higher productivity of the flock compared to breeding from gimmers. But this statement is only true if the ewe lambs are selected properly for topping and are managed well throughout pregnancy and lactation. Increasing the flock's efficiency in this manner could increase profit, and also reduce greenhouse gas emissions on your unit.

After topping the ewe lamb still has a requirement to grow and mature throughout the winter. Work done by AHDB shows that during early and mid-pregnancy, ewe lambs need 20% more feed than mature ewes, to allow for this growth throughout the winter period, but the condition of these ewe lambs must be monitored. With a growth rate of 150g/day being the aim, ensuring that no nutrition or managements procedures are changed until the embryo is deemed "safe" some 30-40 days after topping.

These topped ewe lambs should be scanned at ~70 days (10 weeks) of pregnancy, allowing the option to sell barren animals and identify the number of lambs carried for the others. The late lambing nutrition should be decided on the condition of the animals, and the numbers of lambs carried, bearing in mind that increased nutrition at this late stage can result in large lambs.

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Breeding For An Increased Rearing Percentage

The number of lambs reared per ewe is a key driver of profitability in sheep flocks. The heritability of fertility/prolificacy is low but genetic gain is cumulative. Select stock using Litter size born and Litter size reared EBVs and favour ewe lambs from the twin group when selecting replacements. Commercial flocks can achieve substantial gains through utilising cross-breeding. It is, however, inefficient to achieve increases in scanning/rearing if it is accompanied by significantly higher lamb mortality. Increasing prolificacy must be accompanied by an increased focus on lamb survival, both in management and genetic selection.

SRUC research has found the repeatability of barren rate to be very low, such that it does not justify culling barren ewes on the first offence, although there are feed resource and management justifications for doing so. If not culling on the first offence, then consider putting these ewes to the B (terminal) flock. It is essential to make a list of barren ewes so that any twice-barren ewes can be culled.

There is a genetic component to lamb survival ($h^2 = 5-9\%$). A direct lamb survival EBV is now available for several Signet recorded breeds which will allow breeders and ram purchasers to select animals with improved lamb survival, and breeders to identify families with poor survival rates.

Australian research by Dr Brien and colleagues found lambing ease ($h^2 = 3\%$), maternal behaviour ($h^2 = 25\%$) and lamb vigour ($h^2 = 11\%$) to be genetically correlated to lamb survival by 37%, 23% and 35% respectively. Selection for these traits increased potential genetic gains in lamb survival. These are all lambing traits that a breeder, scoring systems, or commercial flocks can select for. The latter may simply look to record incidence of issue or mark/ear notch problem ewes and lambs for either culling (severity threshold) or put to B flock. EBVs are available for lambing ease (direct); select positive scores. Also, select against extremes, heavy/light, in lamb birth weight (EBVs available).

Where lambs are tagged at birth, this presents the opportunity to identify ewes that consistently rear twins and not just scan twins. Select their female offspring as replacements and cull or B mob ewes that repeatedly scan or rear singles and do not retain their offspring.

On farms where replacement females are bought-in, recording of lambing traits and performance should be focussed on identifying source flocks of best performance for future purchase. We can't afford to pay high prices for poor performers or animals that require excessive labour inputs.

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Sheep That Withstand The Storm



As some predict the world will be 2.4°C warmer by the end of the century if we continue this current climate change trajectory, it is worth asking what impact this might have on our flock performance. Resilience – the ability of animals to produce according to capacity regardless of weather variation – is something our research colleagues have been investigating for Scottish Blackface sheep. Looking back at data collected in the breed over the years, they have been able to investigate lamb performance in relation to temperature and have estimated that resilience is heritable.

By simulating breeding strategies for different selection criteria, without incorporation of resilience, direct lamb growth potential reduced 3-4% with every 1°C increase in air temperature. Weather volatility associated with 2.6°C temperature change, led to losses in growth potential of 8-10%. In relation to ewes, their lamb growth rates were 5% lower for every 1°C increase in air temperature and weather volatility associated with 2.6°C temperature increase resulted in 13% poorer lamb performance.

Incorporating resilience into the breeding goals reduced these production losses by more than half. This could be incorporated into terminal and maternal EBVs for direct and indirect lamb growth traits. It would still need to be looked at alongside other EBVs however, as there is some indication of a negative correlation between resilience and production.

Full article: [Sánchez-Molano, E., et al. \(2020\). Breeding strategies for animal resilience to weather variation in meat sheep. *BMC genetics*, 21\(1\), 1-11.](#)

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9 t Of Lamb Reared Per Tup Per Year?

In a recent Sheep & Beef News we had an article titled “Remember The 5 Tonne Tup” based on an AHDB campaign in 2013. The objective was to make your tup sire 5 t of lamb liveweight sold per year.

This made me wonder what the weight of finished lamb would be for a tup in a flock lambing 3 times a year. For my calculation I assumed –

- The ram would successfully serve 50 ewes, 3 times a year.
- The lambs reared per ewe would be 150%.
- This gave 9 t of lamb per tup per year!

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Bring Lambs Indoors?

Keeping finishing lambs outside	Bringing finishing lambs indoors
+ less labour	+ can speed up finishing phase
+ cheaper	+ rests grass
+ lower infection risk	+ shelter
- longer finishing phase	+ more consistent finish specification
? lamb price uncertainty post-December	+ good lamb outlook short term
- soil/pasture damage risk	- transition period of lower growth rates over a week to 10 days as rumen adapts
- reduce pasture available to other stock/later on	- take up shed space
? mineral deficiencies risk	- cost (particularly straw bedding)
- exposed to the wet weather	- labour
- lambs get dirty	- infection risk
	- dietary issue risks (e.g. urinary calculi, acidosis)

Some of you might be weighing up whether it is worth bringing finishing lambs indoors. The best answer to this will depend on your pasture supplies, soil conditions and how well they are currently doing at pasture.

Looking at the pros and cons of each above, a key area is the uncertainty in lamb price next year given the nature of certain political events.

If, even with bringing them indoors, it is unlikely they will hit market before the turn of the year, keeping them outdoors may be more economical on paper. However, the cost of eating into pasture supplies and not giving grass a rest may be borne later as spring pasture production would be impacted. Whatever you decide, consider how to minimise the negatives (-'s) to maximise the positives (+'s).

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Getting To Know Your Roots

Primarily, plant roots anchor the plant to the ground and channel minerals and water between the soil and the plant, but they do so much more as well. They are pathways to carbon sequestration, communicators with soil life, natural aerators, facilitators of improved soil biology and more. We continue to be surprised as new roles come to light. Encouraging root growth will favour the plant directly but will bring about many more benefits for the land and wider environment. This article is to understand a little bit more about these structures.

Mycorrhizae – Fungus Surrounding The Root

Derived from *mýkēs*, "fungus" and *rhiza*, "root". This serves as the main interface between the plant and the soil. The plant provides sugars to feed the fungus and the fungus supplies the plant with water and nutrients. Most plants have these relationships, interestingly brassica species do not. Often the fungi penetrate the plant cell walls for more efficient nutrient transfer and end up producing a type of protein (glomalin) which could be one of the major stores of carbon in the soil. Without mycorrhizae, some forms of nutrients would not be accessible to the plant. The fungi also improve disease resistance, drought tolerance, insect defence whilst improving the surrounding soil conditions for other organisms and water retention.

Lifespan

This depends on the species and the soil conditions. The average lifespan of perennial ryegrass is around 14 weeks whereas *Molina* (purple moor grass) and *Nardus* species have roots that last over 50 weeks. There is a link with soil fertility; greater soil fertility is associated with shorter root lifespans. The exceptions are defined taproots found in plants such as chicory and red clover which will last as long as the plant itself – this can be several years.

Dimensions

The table below is copied from a book: 'Grassland Management for Organic Farmers' by David Younie and presents data collected in the 70's in New Zealand. Excluding the tap root in red clover, it is noteworthy to see the potential of grass roots to reach deeper soil horizons and access more nutrients via the root hairs. Therefore, we often advocate higher soil fertility to favour clover.

Some Root Measurements Of Different Pasture Species

	Perennial Ryegrass	Timothy	White Clover	Red Clover
Mean length of root hairs (mm)	0.55	0.77	0.23	0.20
Percentage of roots with root hairs	95	97	68	58
Area of root hair cylinder (m ² /mg)	1,230	1,980	490	420
Root length (cm/kg) in top 20cm	14,490		3,310	
Root length (cm/kg) in 20-40cm horizon	2,180		630	

I am sure I could go on, perhaps in future articles, but I hope you agree, there is a lot more to roots than meets the eye!

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Vacuum Packs To Replace Bale Wrap?



In recent articles we presented the silage analysis for grass conserved in a vacuum pack compared with traditional baled and wrapped silage. Although it was not a controlled experiment the results suggested preserving grass in vacuum packs significantly improves the energy content of the silage and its fermentation quality.

With increasing concern over the use of plastic and with silage wrap perhaps being one of the most visible to the general public, we need to develop practical alternatives to replace bale wrap and hopefully, in the process improve the eventual feed value and minimise losses in the ensiling process.

For some reason I had kept a Scottish Farmer from 1975 and when flicking through it I came across the following photo and explanation. Evidently at that time US beef prices were at rock bottom (13c/lb liveweight). As a result, ranchers started feeding maize stalks, left after the maize grain had been harvested as belly fill to overwinter dry cows. A flail pick up forage harvester was used to throw the stalks into a trailer, the roof of which lowered hydraulically to pack the load.

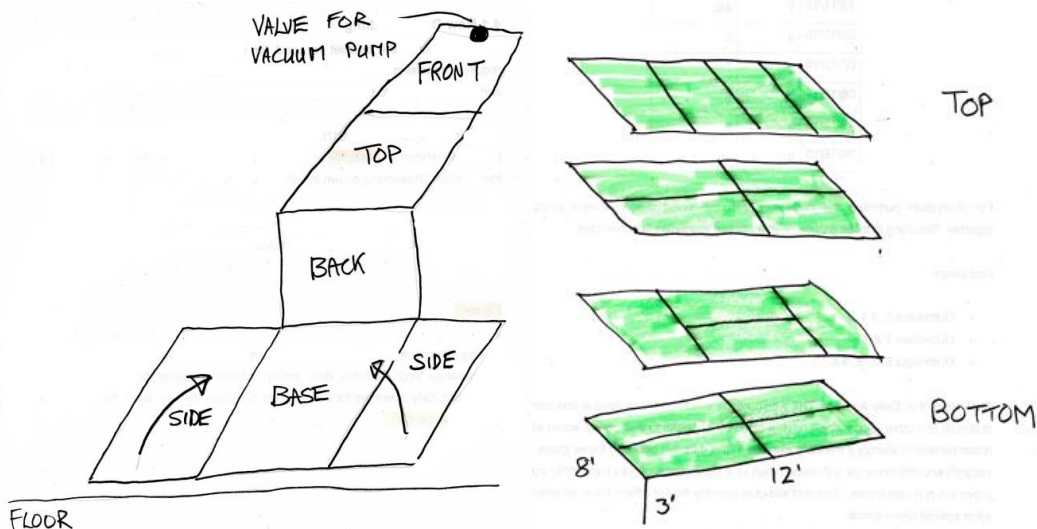


The load was then driven to the cow wintering area and unloaded directly onto the ground by a moving floor chain. This resulted in a 3 tonne (loaf) of chopped maize stalks which was left uncovered and "loaf grazed" over the winter.

It is unlikely that such a trailer would be able to develop enough pressure to sufficiently compact chopped grass, even if it was then ensiled in a vacuum pack and the air sucked out.

Our idea is to try and develop a similar "loaf" system based on large rectangular bales i.e. a "sliced loaf" system! The idea would be to develop long lasting "wrappers" onto which the bales could be stacked, the sides drawn up and zipped together with an opening at the bottom to initially suck out any air as soon as the stack is made and, if necessary, later on to drain off the effluent so it can be used as an animal feed.

STACKING FOR A 4 LAYER LOAF



We are thinking of 15 tonne packs made up of 4 layers of 4 x 3 x 6-foot rectangular bales. (The bales would have to be 6-foot-long so the 4 layers could be tied to make the stack as stable as possible.)

Any comments, suggestions, etc. would be very gratefully received. We are hoping to find some funding to build at least one stack this spring, using every other bale for the stack with the other alternate bales being conventionally wrapped and stacked. This would then allow us to measure the difference in nutritive value between the 2 systems when the silage is fed out.

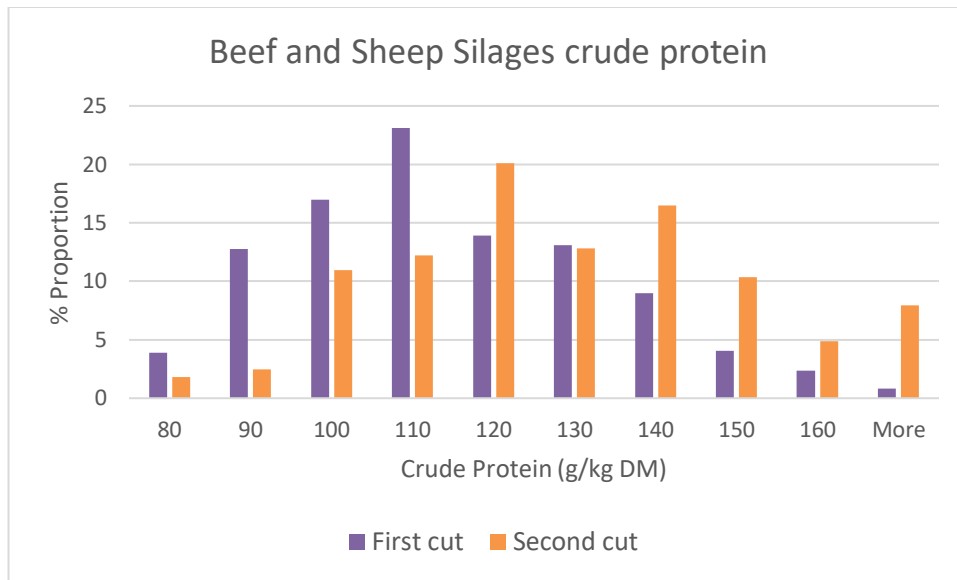
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Silage Update

In July's sheep and beef news I provided an update on silages (mainly first cuts) that had been analysed by the SRUC lab. Now we are in December there have been more samples through the lab and I have split the results of first and second cut to see how they compare.

From the beef and sheep silages first cuts have a high dry matter both in the pit and bales, energy is good and similar in both first and second cuts. Protein stands out in the beef and sheep silages between first and second cuts as the protein increases in the second cuts compared to first cuts (both in pit and bales). Looking at the spread (see graph) of the crude protein results between 1st and 2nd cuts in beef and sheep silages there is a massive range in both but the highest proportion of first cuts (23%) analysed at 110 g/kg DM compared to the highest proportion of second cuts (20%) analysed at 120 g/kg DM.

Beef and sheep silages	1st cut pit ave	2nd cut pit ave	1st cut bales	2nd cut bales
DM g/kg	301	283	374	341
D Value (%)	67	68	66	67
ME MJ/kg DM	10.7	10.8	10.5	10.7
CP g/kg DM	110	126	110	125
Ash g/kg DM	71	80	69	77
PAL	837	858	787	801
NDF g/kg DM	510	481	513	484
Sugar g/kg DM	69	65	83	83
SIP	98	96	104	102
pH	4.3	4.2	4.4	4.4



This shows why it's important to have your silage analysed when moving between different cuts, this allows you to prioritise silage to different stock and identify where savings can potentially be made in supplementation. With drier silage this year it is important that silage is managed well at feed out, as aerobic spoilage is more of a risk. Good clamp management and not leaving bales longer than 3 days to be cleared up. And never feed visibly mouldy silage or to sensitive stock (your pregnant and lactating animals).

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Wet v Dry – SRUC Silage Analysis

We have had a few queries recently on the preparation of silage analysis used by different labs. Originally all silage for analysis would have been dried and milled. This has the advantage of using a bigger sample of silage which is dried and ground and thoroughly mixed before being subsampled for NIR, so it is a more representative sample of the bulk. This can be carried out but adds a cost and time to the turnaround of results. Due to the cost effectiveness and assured accuracy from testing our results against wet chemistry every month as part of the FAA scheme we continue to offer wet NIR as standard.

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Nutritional Terms – Dry Matter

There are a lot of nutritional terms and often acronyms used in rationing for cattle/sheep. Each month I will explain a bit about each of these terms, what they mean and their importance. This month the term is dry matter (often shortened to DM).

- DM is the feed content minus water.
- All the nutrients in feeds required for maintenance, growth, pregnancy and lactation are part of the DM portion of the feed.
- The dry matter content of feeds is incredibly variable from around 6% - 90% if you compare root crops to concentrates.
- Feeds are always compared on a dry matter basis.
- Silage DM will vary considerably depending on length of wilting period and the weather.

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The Wonderful World Of Vitamins

Vitamin D is the focus for this month's vitamin article. Ruminants have a limited store of vitamin D. As a fat soluble vitamin the principal stores occur in the blood and liver but it is also found in the lungs, kidneys and elsewhere in the body. The two primary forms of vitamin D are: vitamin D₂ and vitamin D₃ both of which are biologically active in cattle and sheep. A precursor for vitamin D₃ is present on the skin of many herbivores and omnivores, including humans, sheep and cattle. The precursor is then transformed under UV radiation (sunlight) to produce the vitamin D₃ in the skin which can be absorbed and transported in the blood where it can then undergo further metabolism.

Vitamin D₂ is derived from green plants. The precursor for vitamin D₂ is converted when the plant is harvested and cured in sunlight. Commercial products containing vitamin D are provided through synthetic additives in the feed concentrates usually in regulated quantities.

Function:

Vitamin D is critical for normal development and growth of cattle. The primary function of vitamin D is to increase blood plasma calcium and phosphorous to a level which will support normal mineralisation of bone. It also has an important role in preventing hypocalcaemia (milk fever) due to its role in the regulation of calcium. More recently it has also been found to have multiple physiological roles such as cell proliferation and activation of innate immune defences (Nelson et al. 2016).

Signs of Deficiency:

In young animals a deficiency of vitamin D can cause rickets and in older animals causes osteomalacia (softening of the bones that can lead to fractures). Early signs in calves of a deficiency are poor appetite, decreased growth, stiff gait, weakness and laboured breathing. Later signs include swollen joints, bowed legs and bent knees.

Sources and Requirement:

The vitamin D requirement of beef cattle can often get ignored as it often assumed that cattle raised outside on pasture receive adequate vitamin D either from the sun or ingestion of vitamin D₂ from forages. Roughly 2-3 hours of sunlight a day should meet a beef animals requirement and appreciable amounts are consumed through sun-cured forage. However the synthesis of vitamin D₃ reduces. During the winter when cattle tend to be housed they are solely reliant on vitamin D obtained through grass stores (hay, silage or haylage) or concentrates. Although forages are a good source of vitamin D₂ it is extremely variable for example alfalfa hay varies between 160 – 2,500 IU/kg DM so it cannot be relied on as a consistent source of vitamin D.

The EU legislation only permits vitamin D₃ as the authorised source of vitamin D for all animal species, with a maximum permitted level for cattle and sheep of 4,000 IU/kg of feed (at moisture content 12%). The requirements from NRC (2016) for beef cattle is 275 IU/kg DM and the requirements for a pregnant ewe is 215 IU/kg DM (NRC, 2007).

References: Nelson et.al. (2016). *Journal of animal science*. Assessment of serum 25-hydroxyvitamin D concentrations of beef cows and calves across seasons and geographical locations. Issue 94, pages: 3958 - 3965

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Feed Value Of Bean Straw

With straw being scarce this year some people have been considering using other sources in rations such as bean straw. Figures from DEFRA show that this year's crop area was up 38%. However it was a very poor year and yields are down. Practically baling bean straw can be an issue as baling bean straw when combined dry tends to shatter. Information from the PGRO suggested that there are an increasing

number of growers making wholecrop silage with beans or harvesting at around 30% dry matter and crimping the grains. Straw taken at this stage would be more easily baled however would need preserving. Figures for bean straw (Feedipedia, 2013) show that crude protein can but from 48 – 107 g/kg DM with an average of 71 g/kg DM so book values aren't reliable.

Value Of Bean Straw Compared To Barley Straw

	Dry Matter (g/kg)	Metabolisable Energy (MJ/kg DM)	Crude Protein (g/kgDM)
Bean Straw	880	7.4	71
Barley Straw	860	6.3	35

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Feed Update

Protein, energy and fibre feeds are all on the rise quite drastically, and in a year like this it really does highlight the importance of forward buying. Those not booked forward facing increases of £40-60/t on a typical mix of products compared to those who did lock in early on. You will see a range of prices from suppliers and areas of the country. Barley is still really the only good value energy, wheat and maize are both very high to be economical in rations. UK sugar beet pulp has poor availability and the lower end of the price scale reflects harder, imported 10 mm product. Pot ale is cheap only if you can get it and is scarce usually, snapped up by regular buyers in full loads. Bread waste sold out to regular buyers earlier in the year. Draff a good buy, but again harder to get hold of especially around this time of year when distilleries shut down for holidays.

Proteins are all following the upward trajectory of soya in which the USDA report out mid-November lowered US soya and corn stocks even more than expected. Add that to dry South American weather it has a big price effect. The pound being stronger is not making much of a dent in prices. Silage is trading around £15/bale ex farm, hay £20/bale ex farm (£100/t) and straw £100/t ex farm.

With high feed prices even more reason to feed accurately and get rations planned.

Please note the feed prices in the table are intended as a guide only at the time of writing (mid-November) and will vary across the country daily. The relative feed value gives a guide to the monetary value of a feed in terms of its energy and protein content compared to barley (energy) and rapemeal (protein) as the standards.

Feed	£/tonne full loads (approx.)	Relative feed value (using barley at £148/t and rapemeal at £285/t)
Barley	146-149	-
Wheat	185-197	151
Oats	145	130
Maize	218-225	145
SBP	200-215	137
Bread waste	n/a	126
Biscuit meal	195	187
Soya hulls	195	141
wheatfeed	174-200	168
PAS	87	144
Draff	25-36	45
Peas	-	224
Maize gluten	228-240	199
Beans	-	229
WDGs	265	270
MDGs	254	258

Hi pro soya	410-415	350
Rapemeal	280-295	-
Potatoes	25	33
Carrots	20	20
Turnips	20	13

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Aluminium On Forage Analysis Results

If you test your silage for minerals you may have noticed that aluminium has been added to the SAC silage reports. Aluminium is not an essential mineral for livestock but is a contaminant and can cause toxicity in ruminants if levels exceed 1000 mg/kg DM. Ideally levels in forages should not exceed 300mg/kg DM. High levels of aluminium causes antagonism (lock up) of other important minerals needed by the animal including calcium, phosphorous and magnesium. High aluminium coupled with high iron would suggest soil contamination so checking if there is a high ash level (above 100 g/kg DM) is another useful indicator whether the high levels are due to contamination or if it has been taken up by the plant which can occur on acidic soil.

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Herbal Leys?

Top 10 claims why you should incorporate Herbal Leys into your grazing system.

1. Increases daily live weight gain (up to 360g/day) with minimum 2 weeks earlier to slaughter in finishing systems of spring born lambs.
2. Delivers higher intakes with higher ME and protein content alongside less fibre. Results in higher intakes in all stock compared to ryegrass.
3. Enhances your soil in its: structure, organic matter, moisture retention, carbon sequestration, and in feeding the soil food web.
4. Improves farm forage resilience with better drought tolerance due to deeper rooting and increased water holding capacity.
5. Reduces Greenhouse emissions. Methane output is reduced as feed is faster digested and nitrous oxide is reduced from less reliance on N due to N fixing rhizobia.
6. Increases stocking rate potential in spring and summer over pure ryegrass swards.
7. More consistent weights of lambs and ewes tend to be found and lambs have a lower BCS loss at weaning.
8. More milk production in ewes and hogs. Some farm studies show increased rearing percentage to weaning.
9. Extends the grazing season & reduce reliance on supplements, as well as providing ecological benefits such as habitats for pollinators.
10. Reduces flock nutrient deficiency and anthelmintic use due to the various plant's antimicrobial properties. Research has shown the condensed tannins (e.g. in chicory) and legume tannins found (e.g. birds foot trefoil) provide internal resistance to parasites and their larval development. The deeper rooting system allows for more access to micronutrients to better support general health of animals.

Next month I will look at tips for establishing and managing herbal leys

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1 Ha = A Very Big Area!

In a report on some of SRUC's grass plot trials the first table showed the dry matter percentage of the samples when they were harvested. This intrigued me as it allowed me to calculate how much water this was in the grass per hectare. For example with first cut yields of around 9 t DM/ha with dry matters at around 26% gave a total water content in the fresh grass of 35 t/ha! Evidently 1 mm of rainfall is 1 litre per m² so 35 t of water per hectare is only 3.5 mm of rainfall – just a light shower!

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Approaches To Reducing Global Warming?



We hear a lot about reducing global warming and will certainly hear a lot more as global temperatures continue to rise. All of us are going to have to continue to modify our systems to help prevent this. Researchers have been investigating several options and recommendations are continually filtering into the press and government discussions on future support schemes! One of the problems with all this scientific effort is that each research group rightly follows its own area of expertise, rather like the 30+ labs currently trying to develop a vaccine for Covid. This is resulting in agriculture being bombarded with recommendations on how they could best tackle the problem.

In very simple terms the overall objective of reducing greenhouse gas production is to avoid the insulation effect it has on heat escaping from the earth's atmosphere i.e. we are increasingly wrapping earth in more and more blankets by producing more greenhouse gases.

In simple terms there are several approaches to the problem all of which fortunately will have an additive effect –

1. Reduced CO_{2e} output per kg of human food produced. Effectively this is being more efficient i.e. reducing inputs (costs) and increasing output (income). This is the area which has received most attention so far. The majority of these systems present the results in change in CO_{2e} production per kg of human food. Unfortunately the units for the kg vary, the majority being based on a kg fresh weight while others present figures in terms of kg DM or even per unit of energy or protein. Obviously on a fresh weight basis there is a big difference between milk and grain with meat being intermediate.
2. Researchers have investigated in much more detail, very specific components of the system. Examples would be the variation in the genetics of rumen microbes and hence the production of methane, the impact of rations on methane production, etc.
3. Capturing greenhouse gases and other waste products from livestock and utilising them to replace inputs in other systems. A brilliant example of this is a project just started by a Nottingham company, Deep Branch Biotechnology to capture the carbon dioxide from the Drax power station to produce animal feed!
4. Sympathetic intensification or high yield farming is an intermediate area between 1 and 2 looking at the impact of efficiently maximising production from a limited area to release more land for carbon storage e.g. woodland, rewilding etc.
5. Food miles. This is one of the original measures of the carbon footprint of foods and probably had the biggest impact on consumer decisions as everyone knows how expensive cars are to run, especially if they are chauffeur driven! Because it was only monitoring a small section of the production chain, it rapidly became replaced with CO_{2e} per kg of human food calculations. Nevertheless food miles probably still has the biggest impact on consumer buying habits because of its simplicity. With the changing buying/eating habits following the Covid pandemic, is probably a message we should be again using to support and hopefully even expand demand from our home market?

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Intensification Is Not New

On surprisingly high and steep slopes of many hills there are clear signs of ridge and furrow where they have in the past been cultivated but nowadays are otherwise indistinguishable from the open hill ground. This is a clear example of how improvements in efficiency and output, year on year on the better ground allowed these poorer areas to revert back to nature. This clearly shows why a key component of tackling climate change on a world basis will involve continued increases in intensity and efficiency of food production.

Responding by reducing output per hectare will simply result in increasing areas of wildland and forests having to be cultivated with a simultaneous huge release of the carbon stores currently locked up in them.

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Deep Learning In Livestock Industry



Deep learning is a relatively new tool in data science, but is already implemented in many areas of our daily lives, without us even knowing it. Our smart phones can convert speech into text, process and understand them and even return information to us.

Autocomplete on the internet can predict what you will type next and suggest appropriate phrases. And more commonly, facial recognition allows you to securely log into online banking and authorise financial transactions, tag yourself and friends in social media photos and even lets you securely navigate through an airport without the need for a passport and ticket when boarding. This extraordinary technology is already implemented in every sector of industry and can be used effectively in many agriculture and livestock farming sectors.

Deep learning is part of a larger group of statistical methods called machine learning. Both are a scientific study of algorithms. It does not involve any specific instructions about the data it is analysing. The key difference is that deep learning involves feeding a computer system a lot of data in order to make decision about other data.

We used deep learning to solve complex problems that we do not know how to model accurately. The process is similar to how we learn new skills and how we interpret data – even if we do not consciously realise our own thought process.

Research in deep learning started about 2 years ago at SRUC and resulted in 3 projects that can be deployed in the agricultural industry. 2 projects involve binary classifications from milk mid-infrared (MIR) spectroscopy data routinely collected for national milk recording.

Project 1 – predicting pregnancy status from milk MIR spectra.

Project 2 – predicting TB status from milk MIR spectra.

Project 3 – predicting udder furrow score in dairy goat udders from digital images.

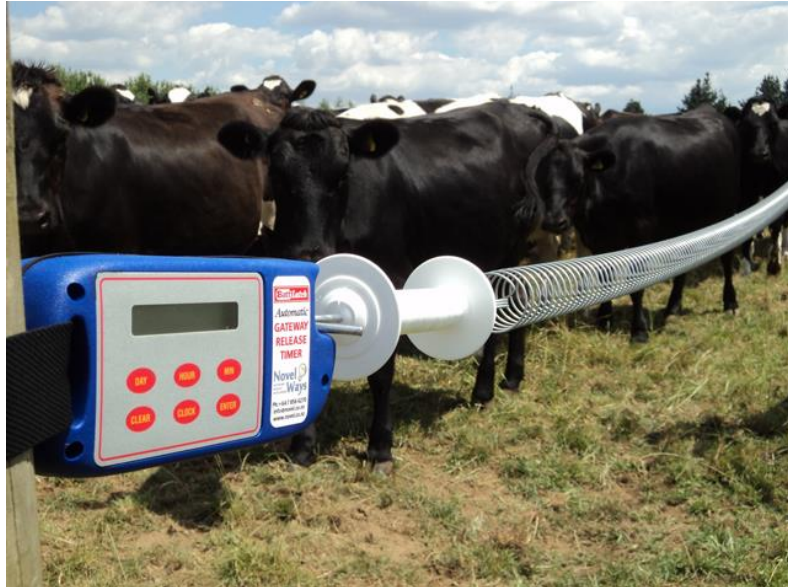
The first 2 projects are being field trialled at present!

Werner Brand, former SRUC Geneticist

The Device That Allows Stock To Move Themselves



The Batt-Latch is an electronic gate opening device manufactured in New Zealand. Portable and battery operated with its own integrated solar panel, it allows the farmer to programme any gate to open by releasing an electrified spring gate (or tape or wire) at a set time of day, on any day and can be pre-programmed up to 14 days in advance. The gate release times are programmed using a keypad and up to 4 actions per day can be pre-set. The Batt Latch comes with a self-closing gate spring and can be adapted for all gate systems. It uses very little power, with no maintenance costs and will operate under low sunlight conditions.



Source: <https://www.novel.co.nz/>

This system is a great benefit to farmers who want to operate a paddock system and control grazing without having to be present to open gates. In medium to large farming systems this device can help save labour on staff having to move between fields or even farms, as well as save time on having to shift livestock. Animals can therefore be moved onto fresh grazing, access feeding areas or be allowed entry towards farm buildings for milking or other management activities remotely, without human intervention. The system can also benefit smaller farms, especially if the farmer works off farm or is away for a few days, as stock can be moved onto new pastures over several days with the use of two or more units.

Livestock adapt well to the system, quickly learning to move themselves to the desired paddock or area of the farm within 2 to 3 weeks or less. A number of daily moves can be set up with a series of Batt-Latch units. Not only is this device labour saving but other benefits include:

- Better grazing management with increased forage efficiency and animal performance.
- Less hoof damage/lameness as cattle can move at their own pace, without human pressure which may disrupt natural cow flow behaviour. As stock move in their own time there is less potential for bullying by dominant animals, leading to less foot issues, quieter stock and better production.
- Less wear and tear on quad bikes/vehicles and lower running costs.
- Reduced poaching damage to pasture and gateways.

One possible application could be to control access to feed for the housed suckler herd pre-calving. For example, feeding cows late in the evening is thought to help reduce the risk of cows calving through the night. Fresh feed could be put out late in the afternoon, with the cows shut into their bedding area away from feed. The Batt-Latch device could be pre-programmed to allow access to feed later in the evening, without the stockperson having to prepare and feed out so late in the day.

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Virtual Fencing - First Impressions Of No Fence Collars



Many of you are undoubtedly already aware of virtual fencing technology. A brief summary is that is that is based around the idea of using a GPS collar to track the cows and then applying negative stimuli, initially a sound and then eventually an electric pulse, when they approach the boundary of the virtual field.

Having heard about this technology for a number of years but not hearing of much becoming available I set up/pulled together a group of famers and crofters who I knew were interested and applied for RISS funding to investigate it.

The group got underway in late 2019 and we started to assess what options are available/on the market. The only full virtual fencing option which was close to becoming commercially available was No Fence. No Fence are Norwegian company which was just finishing pre-commercial trials with cattle collars at that point in Norway.

Through the RISS group we managed to secure access to the collars ahead of the full commercial UK release in 2021. Over the last 6 weeks collars have now arrived on farm. This was a little later than hoped and has meant that we have not been able to use the collars for summer grazing as hoped. However a number of the group have started to use the collars. First impressions on the whole are good and the collars are performing as expected and as sold. Care has to be taken when fitting the collars, making sure the collars are tight enough and are not swinging too much and irritating the cow is important. Taking time with a training paddock where the cow is only exposed to 'virtual fence line' on side is also important. The No Fence collars are run over the 2G mobile phone network. In some areas there has been a lack of coverage. Interestingly in some areas where 4G reception is good the 2G has not been. The collars do function fine when out of reception because the GPS runs independently, you just do not get updates until they come back in to reception.

Those are the first impressions of the collars, between the different group members there is a range of application. From use out on extensive hill areas to paddock grazing on improved grass. Once the collars can be used in the grazing season we hope to be able to try out this technology and really test what it is capable off.

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Beef Market Commentary

Prime cattle prices (p/kg dwt) (Source: drawn from AHDB and IAAS data)

Week Ending	E&W			Scotland			E&W		Scotland
	South R4L	North R4L	North -U3L	R4L	R4L	-U3L	South -U4L	North -U4L	All -U4L
	Steers	Steers	Y. Bull	Steers	Heifer	Y. Bull	Steers	Steers	Steers
7-Nov-20	369.5	382.3	370.4	390.1	388.5	378.7	377.1	373.5	387.1
14-Nov-20	376.5	385.4	373.9	392.7	391.8	379.4	378.1	379.1	392.1
21-Nov-20	378.7	385.8	372.3	392.6	392.7	378.5	382.9	383.6	390.1

Beef producers will sit down to their Christmas dinner this year with mixed emotions, Covid has obviously brought some major challenges to our social and personal lives but it has to be said the beef sector has performed pretty well throughout the crisis. While other industries have been furloughed, the beef sector has ploughed on fulfilling its vital role in feeding the country.

Beef prices remain strong at around 385-390p/kgDW, as we have become used to over the last few months, Aberdeen Angus cattle are tracking around 20p/kg ahead of the rest at just over £4/kgDW. This is pretty favourable return, at least 50p/kg more than producers were receiving in the run to Christmas last year. However, as cost structures have changed, it is important to note that although producers are getting better returns for their wares, this is far from a bonanza, particularly when we consider that prices have been reasonable for 6 months, after 18 months in the doldrums. Sheep farmers should keep this in mind before diversifying into beef production as they were advised to do by George Eustace on the Andrew Marr show a few weeks ago.

Cull cow prices have slipped a little in recent weeks, as supply increased, due to seasonality, and demand reduced with processors focussing on prime cattle for their Christmas kill. There is still strong demand for cows, and this is likely to be carried into the new year. After Christmas as consumers tighten their belts, we usually see increased demand for cheaper cuts (mince and burger), so cull cows are usually a good trade. Indications are that this will be the case this year and producers with plenty of feed and straw may look to hold onto cows for a few more weeks hoping for a better trade. If, however, you are tight for feed, bedding or space, those cull animals are your lowest value group and show go at the soonest opportunity.

It's beginning to look a lot like Christmas!

It looks like we will have to celebrate Christmas very differently this year. With extended support bubbles but significant restrictions in place, the traditional period of excess may well be tempered a little this year. However, as the first lockdown clearly showed us, when people are under restrictions and have limited opportunities to spend, they will spend more time and money on home cooked meals, reverting back to whole products and focus a bit more on provenance. All good news for beef producers, and particularly small independent butcher's shops.

With recent positive news about an imminent roll out of a national vaccine programme, we can now see a way out of this particularly long and boring tunnel. Although the light at the end of the tunnel is still dim and distant, we can be more confident than ever that we will get to the end of this and that a new normal will emerge, hopefully sometime in 2021. However, if we assume that the Christmas period will be a little subdued, we can also be confident that once restrictions begin to ease, people will be keen to make up for lost time, normally the first few months of the year are sluggish for beef sales. If restrictions start to decline, it may be that the demand for beef increases again in the early part of 2021, similar to what we saw due to the eat out to help out scheme.

Brexit uncertainty is still with us and it looks as though any deal will be finalised very close to the wire. However, there are plenty of signals that point to a deal being done, allowing the status quo for at least a couple of years, something I think most producers will be glad of in this uncertain time. There are plenty of reasons to remain positive, so relax and enjoy the festivities.

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Redgut

'Redgut' is another name for a twisted gut. The guts are intensely red (hence the name), and death occurs within a few hours from shock. In our experience, it usually causes 'one-off' deaths, or affects a small number at a time.

It is mainly seen in sheep and cattle grazing readily fermentable feeds such as legumes, Brassica crops and concentrate feeds. These highly digestible feeds move quickly through the rumen into the guts where they continue to ferment and produce gas. It is thought that a reduction in size of the rumen, increase in gut motility, and an increase in size of the guts due to gas production makes the guts physically unstable, increasing the chance of a twist occurring.

Access to roughage is the most important preventative strategy as this will slow the passage of digesta through the guts, and increase the size of the rumen, helping to prevent displacement. Roughage can be supplied in the form of ad lib hay, or by allowing access to a grass run off.

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New Information on Liver Fluke Risk from Silage

"Can cattle/sheep be infected with liver fluke from silage?" has been a frequently asked question at farmer meetings over the last few years. The answer has always been that the risk is likely to be low based on the facts that:

- Silage fields will usually have been lightly grazed earlier in the year.
- The grass is usually cut before metacercariae (the infectious stage of liver fluke) numbers peak in autumn.

- The wettest areas of the field (where metacercariae numbers are likely to be highest) are not suitable for cutting.

Researchers at Liverpool University have carried out experiments to determine whether or not *Fasciola hepatica* metacercariae are capable of surviving in silage.

The researchers concluded that:

- There is no risk of *F. hepatica* transmission from anaerobically fermented silage fed from 2 weeks post sealing.
- Metacercariae can survive for a period of time under aerobic conditions and therefore spoiled forages may represent a risk particularly if the dry matter is low.
- Ensuring adequate wilting to increase dry matter and achieving a good seal to create anaerobic conditions remain key in the silage making process.

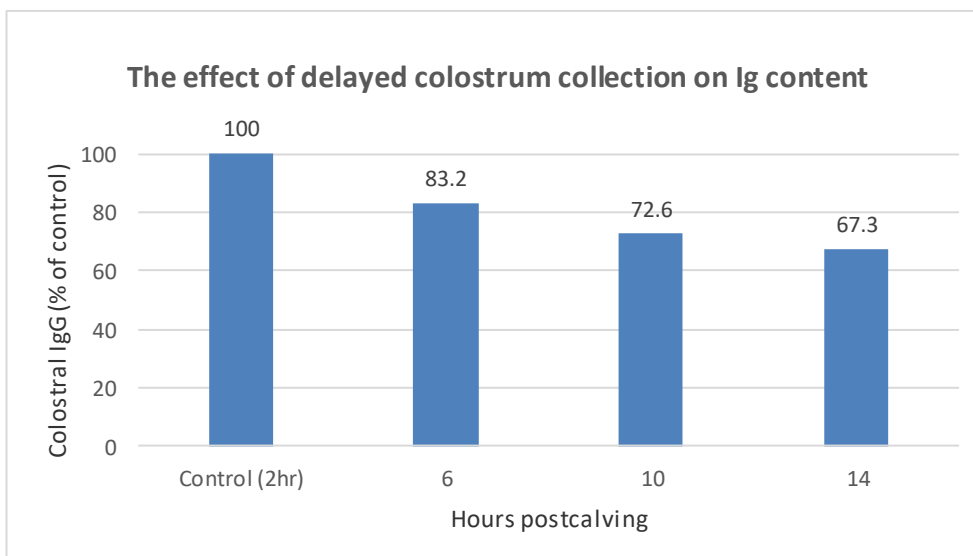
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Immunoglobulins In Colostrum

Immunoglobulins (Ig's or antibodies) contained in colostrum are the calf's only source of immunity to infection until its own immune system develops. There are several types of Ig's in colostrum including IgG, IgA and IgM, of which IgG is the most common and accounts for 85-90% of total Ig's. The calf's ability to absorb Ig's declines over time and by 24 hours after birth, absorption ceases and "gut closure" is complete. Even by 12 hours after birth, absorption can fall by 50-75%.

While localised protection in the gut provided by IgA can still occur after 24 hours, IgG and IgM protect against pathogens in the blood stream and other areas of the body. Therefore, without their absorption from the gut, calves will not have sufficient immunity and their risk of infection and mortality is significantly higher. For example, research by the U.S. National Animal Health Monitoring System showed that dairy heifer calves with low blood Ig levels two days after birth were at least twice as likely to die over the next eight weeks compared to calves with sufficient blood Ig levels.

The other reason that early ingestion of colostrum immediately after birth is so important is that the content of Ig's within the mammary gland rapidly declines over time, falling by over a third by 14 hours after calving.



Colostrum production begins four to five weeks before calving and so it is logical to assume that nutrition of the dam has an influence on both the yield and quality of colostrum. However, there is little evidence that prepartum nutrition has a significant effect on yield or quality of colostrum produced. There have

been varying responses to increasing dietary protein level pre-calving, with some studies showing increased colostrum yield and others, no effect. If deficient supplementation with selenium and vitamin E will increase IgG content, and so cows should be fed to address deficiencies to maximise the value of this important first feed for the calf.

It is recommended that calves receive 10% of their bodyweight as colostrum within the first 6 hours of life, so a 40kg calf required 4 litres of colostrum. Ideally calves should receive colostrum as soon as possible after birth (within the first 20 minutes) equivalent to 5% of their body weight, with the further 5% within 6 hours post-calving. Note that it takes at least 20 minutes of suckling the dam for a calf to ingest 2 litres of colostrum. If the calf is weak and struggles to suck, colostrum should be provided either by a bottle and teat or stomach tube.

Reference: Moore, M., et al. 2005. [J. Am. Vet. Med. Ass.](#), 226: 1375-1377.

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Heat Production Of Milk Fed Calves?

It is well known that cows produce a lot of heat; a dry beef cow produces around 1 kW of heat, 24 hours a day. A significant proportion of that heat is produced by the fermentation of the food in her rumen. However, in newborn calves the rumen is very small and only begins to start functioning once the calf starts eating solid feed and in particular concentrates. Hence young calves are initially entirely dependent on the heat they produce as a “by-product” from using the energy in the milk they drink e.g. for maintenance and growth. (This is exactly the same process we use throughout our life to keep ourselves warm.)

To calculate now much this would be we looked at 3 weights of calf growing at 3 different rates of liveweight gain. In the table the heat output per hour is given in kW, 1 kW being equivalent to 1 bar of an electric fire, and 0.1 kW equivalent to a 100 watt light bulb.

Heat Output From Young Calves On Milk

Calf wt (kg)	40	50	60
Maintenance (kg milk)	2.9	3.4	3.8
DLWG (kg/day)	Heat produced kW/hr		
0.4	0.11	0.12	0.13
0.8	0.12	0.13	0.14
1.2	0.13	0.15	0.17

(Thanks to Colin Morgan for the calculations)

If we take a newborn calf at around 40 kg it will need to drink 2.9 kg of milk per day simply to maintain itself. To achieve a daily liveweight gain of 0.4 kg the milk intake will need to increase to 4 kg per day, generally split in 2 feeds per day. This would be a common feeding level for many bucket reared calves who would then be producing 0.11 kW of heat. With 9 calves in a group this would be equivalent to 1 bar of an electric fire on all the time!

If however it was a suckled calf getting 7.2 kg of milk a day from its mother its growth rate would be 1.2 kg per day. The higher milk yield would increase its heat output to an equivalent of a 130 watt bulb. Combined with the extra heat produced by its dam this would give a combined heat output of around 2 kW/hour!

A fortnight later the calf would be weighing about 60 kg and require 8.5 kg of milk per day to maintain its growth rate. (Many cows, in particular cross dairy cows, will have a peak milk yield of at least 10 kg per day supporting calf growth rates of nearer 1.5 kg per day.) The heat output of the calf would then be 0.17 kW equivalent to two 80 watt bulbs permanently on.

These heat production figures, coupled with the hair coat, hide and the shelter provided by their mothers (or for artificially reared calves by a building), show how nature has “designed” calves to thrive in a wide range of environments.

The weak link in this design is moisture in the form of rain, high humidity etc., which destroys the insulation of their coat. Equally importantly wet ground conditions/bedding force calves to stand, exposing all of their body surface area to cooling. While housing protects artificially reared calves against rain, poor ventilation, over enthusiastic washing of passageways etc. leads to high levels of relative humidity and similar problems i.e. wet coats and bedding. In addition high levels of humidity greatly increase the risk of infectious diseases such as pneumonia, scour etc. as the causal organisms survive for considerably longer in a damp environment.

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Impact Of Calving Difficulties On Cow Performance?

A recent paper by Eaglen et al J. Dairy Sci. 94 5413-5423 analysed calving records and their subsequent performance for over 32,000 first calving dairy heifers. Calvings were grouped on a 4 point scale – 1 non assisted, 2 moderate farmer assistance, 3 difficult farmer assistance, 4 – very difficult vet assistance including caesareans.

Effect Of Calving Difficulty In Heifers On Subsequent Fertility v Heifer Calving Unassisted

Calving Difficulty Score	2	3	4	Sig.
Increased days to 1 st AI	+1.7	+3.5	+7.8	**
Extra services/conception	+0.1	+0.2	+0.7	**
Increase in calving interval (days)	+4	+7	+28	**

The first aspect they investigated was the subsequent fertility of the heifers in terms of days to first service, services per conception and eventual calving interval. Interestingly even just slight farmer assistance reduced fertility, compared with cows calving unassisted, with a 4 day increase in calving interval. This however increased to 28 days for vet assisted calvings.

The second area they examined was first lactation milk yield. Interestingly the biggest impact was during the first 90 days of lactation with cows requiring vet assistance producing 2 kg of milk per day less resulting in 2% lower total lactation yields.

This large scale analysis clearly shows that calving difficulties, even where just light assistance is needed, is part of the reason for low fertility and percentage of calves weaned in suckler herds.

Impact On Heifer Replacements Requiring Assistance When They Were Born

The unique part of the paper was that the researchers were able to follow just over 8,000 of the female calves born which were subsequently used as replacements. Interestingly there was no significant effect on their subsequent fertility possibly due to them being mated 15+ months after birth allowing them sufficient time to fully recover from even a vet assisted birth. However they did suffer a significantly greater reduction in their first lactation milk yield with heifers born following vet assistance or by caesarean producing 700 kg less milk equivalent to a 9% reduction in first lactation yield compared with heifer replacements born without assistance.

The measurable negative effect of calving difficulties on the subsequent fertility of the heifers, even after just slight assistance, clearly shows the importance of avoiding them to maintain high herd fertility and numbers of calves weaned per year.

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Update On 6 Week Mating Periods

When speaking to Stuart Mitchell at Whitriggs about his 6 week mating period and how he had got on this year, he dropped the bombshell that this is his fourth year of mating the herd for just 6 weeks! Interestingly in that period we have had one of the earliest and driest and one of the coldest and latest springs, yet barren cow rates have only averaged 11% per year.

When discussing this with an Irish colleague in Teagasc I got the following reply.

“We are starting to push more on a 6 week calving rate here because currently the 6 week calving rate for spring and autumn in beef cows is 53% & 60% respectively but the top 10% of herds are running at 94%. Spring calving dairy herds average 65% with the top 10% achieving 86% but you are dealing with much bigger herds.” (Aidan Murray, Teagasc)

While the 6 week calving rate is not necessarily a 6 week mating period, the values for the top 10% of Irish herds would suggest it is possible to achieve the necessary conception rates for a significant number of Irish suckler herds.

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Conception Rates For Short Mating Periods

The most common comment we had on the article discussing short 6 week mating periods was it would require very high conception rates. This is true as can be seen from the following table.

Table 1 **Number Of Cows Pregnant After 6 Weeks**

Conception Rate %	Pregnant %	Barren %	% Barren After A 9 Week Mating
60	84	16	6
65	88	12	4
70	91	9	3
75	93	7	2
80	96	4	1

To have just a 4% barren cow rate would require conception rates of 80%. This seems very high but is just 8 out of every 10 cows served becoming pregnant. There is no reason why this should not be achieved considering –

- Cows would be routinely culled on age as well as for problems and not mated.
- All cows would have a long rest between calving and the start of mating, the shortest being just over 5 weeks.
- This means all cows would have been in season at least once before mating started.
- With such a tight calving period body condition score would be much easier to control resulting in more cows being at the target condition score at calving.
- This would help reduce calving difficulties which could be further ensured by only using bulls with the highest Calving Ease Direct EBV values.
- The same would apply to bulls selected to breed heifer replacements, targeting those with the highest possible values for both Calving Ease EBVs.

Because of the high conception rates needed with a 6 week mating period it was suggested to run the bull for an extra 3 weeks i.e. have a 9 week mating period. While the final column in table 1 suggests this will noticeably reduce the number of barren cows, table 2 shows this benefit will not be continued long term. While all cows calving in the first 6 weeks will have been in season at least once before mating starts the majority of those calving in the third cycle will only have their first heat after the bulls have been put in.

With conception rates at the first heat post calving being lower the cow numbers suggested in the table above will be much lower, with a higher proportion of cows calving in the third cycle ending up barren.

In addition the few extra calves born in the third cycle will be lighter at weaning and in herds finishing their stock, will also spend longer in the finishing unit, increasing costs, particularly for labour by having to check cows for an extra 3 weeks and having to spend extra time at the end of the finishing period.

Nebraska University Beef Herd

The University runs around 200 Angus cows on the Canadian plains. From 1997 to 2002 the spring calving herd was mated for 60 days at a bull to cow ratio of 1:25. However from 2003 onwards females were exposed to bulls for just 45 days at the same bull to cow ration. However admittedly as a routine all cows received a single injection of prostaglandin 4 ½ days after the bulls were turned out. How much of an impact this had on fertility I am not sure.

Table 2 Effect of Day Calved in Expected Date of 1st and 2nd Heat

	Day Calved	1 st Heat+	2 nd Heat
1 st 3 weeks		35	56
	21	56	77
2 nd 3 weeks			
	42	77	98
3 rd 3 weeks			
	63	98	119

+ Based on 35 days post calving

 Mating starts 80 days after calving starts

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Timing Feeding To Aid Heat Detection?

The system of feeding pregnant cows once a day, last thing in the evening to avoid night time calvings is well known and increasingly widely used. It is less well known that time of feeding, in a once a day feeding system has a similar effect on when cows/heifers come into season. In the 1980s researchers in Northern Ireland took 2 groups of Friesian x Holstein bulling heifers with around 40 in each group, and fed both groups the same, mainly silage, TMR ration. Both groups were continuously filmed to determine when they started coming into heat. Farm staff did their normal 3 times a day heat detection simply on observation with no aids such a tail paint etc.

Over the 3 weeks farm staff correctly recorded 56% of the heifers fed in the morning as being in season compared with 84% for those fed in the evening. Camera records showed the majority of the heifers were cycling and that the majority of those not identified in the morning fed group coming into season through the night and stopping any riding activity as soon as tractors etc. started up in the morning.

If you are thinking of Aling some cows/heifers this winter this would be a useful aid although personally I would also tail paint them all to try and get as close as possible to 100% detected.

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Sexed Semen For Synchronised AI?

When sexed semen first came on the market conception rates, particularly where cows were synchronised, were much lower compared with conventional unsexed semen, so there was little interest in sexed semen in commercial beef herds. However over the years as methods of sexing semen have significantly improved. American researchers started large scale trials with synchronisation and sexed semen in commercial beef herds.

In 2017 one group undertook a major project to test conception rates to modern sexed heifer semen compared with conventional unsexed semen. The trial involved 851 Angus heifers across 4 herds. Semen was collected from 2 Angus bulls and half of each collection processed to produce sexed heifer straws with the remainder processed conventionally. The results are shown in the following table.

Conception Rates For Sexed v Conventional Semen For Synchronised Beef Heifers

(Thomas *et al* 2017, Theriogenology)

	Bull A	Bull B	Overall
Conventional	62%	58%	60%
Sexed	54%	48%	52%
Overall	58%	53%	56%

Overall conception rates for heifers inseminated with conventional unsexed semen was 60% but 8% lower, at 52% for heifers inseminated with the sexed semen. Interestingly there was a similar difference in conception rates for the 2 bulls for both sexed and unsexed straws. Hence the difference in conception rates using conventional semen from bull B compared sexed semen from bull A was only 4%. This emphasises the big difference between bulls in the fertility of their semen i.e. the number of cows pregnant per 100 straws inseminated. This would suggest this is an important question we should be asking when selecting which semen to use.

This large trial suggest that when considering the benefits of using sexed semen e.g. to produce future heifer replacements then a drop in conception rates of 8% would be a reasonable estimate.

Warning – with small numbers the difference of 1 cow can have a big effect on pregnancy rates. For example the smallest herd in the above trial (still involving 118 heifers, achieved the highest conception rates at 66% to sexed semen from bull A and only 61% to conventional semen from bull B!)

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Ventilation In Handling Facilities

By now we are all aware of the high risk areas for catching Covid. One of the biggest risks is large numbers of people in poorly ventilated buildings (high stocking rates), particularly if they are exerting themselves, singing, shouting, etc. so they take large rapid breaths.

On farms the place where this is most likely to occur is in handling facilities, particularly those in a building. Unlike humans in pubs, stock in handling facilities have the additional factor of stress, reducing their resistance to disease.

Some points to consider before handling stock are –

- Try and avoid handling on damp, still days. The windier the day the lower the risk.
- Make sure handling pens are as well ventilated as possible e.g. check air inlets, outlets aren't blocked.
- Keep group sizes as small as possible.
- Move stock out as soon as they have been treated, don't use them as holding pens e.g. while we break for lunch.
- Wherever possible avoiding having different groups, classes of stock in the pens at the same time.

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The Real Cost Of Mortality In Finishing Units?

We generally cost the death in a finishing unit simply on its value when it died. Alternatively, if it dies soon after arrival we normally cost it just on its purchase price. To investigate how realistic these costs are we can take a 450 kg steer going into a finishing unit with an expected slaughter weight of 650 kg to produce a 370 kg carcass. In the first example the animal dies 3 weeks after entering the unit and in the second example 3 months after entering the unit. We can assume the value for the animal, if it was homebred to be identical to the price it would fetch in the ring. The costs incurred by the animal dying at 3 weeks would include –

	Costs?	Your Costs
Share of transport cost – mart to unit	15	
Management tag, clipping, etc.	10	
Preventive treatment e.g. wormer	15	
Disposal costs	10	
Lack of financial contribution to cover fixed costs of the group*	218	
Total	268	
Additional variable costs for mortality at 3 months on finishing unit*	87	
Veterinary treatment pre death	90	
Preventative vet treatment for remaining stock in group (£10/hd x 29 hd)	290	
Total	507	

* Data from QMS Enterprise Profitability 2019

For a steer who dies soon after arrival the extra costs are around £268 per head. By far the biggest proportion of this is the loss of the animal's contribution towards fixed costs of the enterprise. For animals who die 3 months or more after being purchased there is an additional cost of around £467 per head. A significant part of this cost is if death is caused by an infectious disease, requiring preventative veterinary treatment for the remaining animals in the pen. This gives a total cost of mortality of £735, equivalent to 70% of the animal's original purchase price at 235p/kg.

This gives a total loss of £1,792 for each mortality occurring several months after purchase.

It is important to remember that the majority of these costs will also be incurred with homebred stock.

Loss Of Contribution To Fixed Costs

The biggest cost of mortality is that the animal does not contribute to any fixed costs of the enterprise. The objective of every cattle system is to make a profit after paying the variable and fixed costs of the enterprise.

A good example would be the lockdown of pubs due to Covid. As the publicans rightly claim having to shut down their pub it still leaves them with bills for rates, fuel, wages, etc. The only way they can recuperate these continuing expenditures (fixed costs) is by using an increased proportion of future sales to cover those fixed costs incurred during lockdown and under normal tradition conditions when they reopen.

The same is true for a cattle enterprise e.g. 100 finishers where costs for labour, machinery, the building, etc. are the same whether the unit sells 100 head or 29 head!

I am sure most of you will disagree with my costings so the final column has been left blank so you can fill in your own values.

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