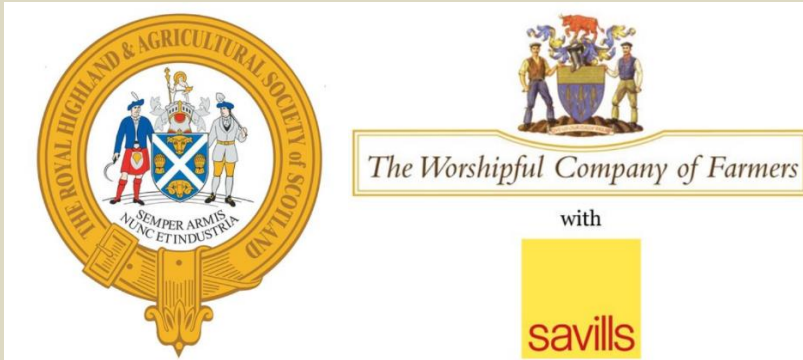




**A Nuffield Farming Scholarships Trust
Report**

Award sponsored by

**The Royal Highland & Agricultural
Society of Scotland
&
The Worshipful Company of Farmers
with Savills**



**Too fat? The role of body
condition in maternal livestock in
areas with extreme seasonal
variability**

Vic Ballantyne

February, 2024

NUFFIELD UK

NUFFIELD FARMING SCHOLARSHIPS TRUST (UK)

Awarding life changing Scholarships that unlock individual potential and broaden horizons through study and travel overseas, with a view to developing farming and agricultural industries.

"Leading positive change in agriculture"

"Nuffield Farming" study awards give a unique opportunity to stand back from your day-to-day occupation and to research a subject of interest to you. Academic qualifications are not essential, but you will need to persuade the Selection Committee that you have the qualities to make the best use of an opportunity that is given to only a few – approximately 20 each year.

Scholarships are open to those who work in farming, food, horticulture, rural and associated industries or are in a position to influence these industries. You must be a resident in the UK. Applicants must be aged between 22 and 45 years (the upper age limit is 45 on 31st July in the year of application). There is no requirement for academic qualifications, but applicants will already be well established in their career and demonstrate a passion for the industry they work in and be three years post tertiary education. Scholarships are not awarded to anyone in full-time education or to further research projects.

Full details of the Nuffield Farming Scholarships can be seen on the Trust's website: www.nuffieldscholar.org. Application forms can be downloaded and only online submission is accepted.

Closing date for completed applications is the 31st July each year.

Copyright @ Nuffield Farming Scholarships Trust

ISBN:

Published by The Nuffield Farming Scholarships Trust
Southill Farm, Staple Fitzpaine, Taunton, TA3 5SH
Tel: 01460 234012
Email: director@nuffieldscholar.org
www.nuffieldscholar.org

A Nuffield (UK) Farming Scholarships Trust Report

Date of report: December 2023



*"Leading positive change in agriculture.
Inspiring passion and potential in people."*

Title	Too fat? The role of body condition in maternal livestock in areas with extreme seasonal variability
Scholar	Vic Ballantyne
Sponsor	The Royal Highland and Agricultural Society of Scotland The Worshipful Company of Farmers with Savills
Objectives of Study Tour	<ol style="list-style-type: none"> 1. Understand the most significant benefits of higher body condition score (BCS) in maternal livestock systems 2. Understand how to identify and select for genetic body condition 3. Promote body condition as an easy selection tool for commercial farmers 4. Encourage breeders to identify livestock with good BCS, suitable for their commercial clients
Countries Visited	Canada, New Zealand, Australia, Iceland and the UK
Messages	<ol style="list-style-type: none"> 1. Body Condition is heritable and UK beef and sheep farms should prioritise selecting for it. 2. Animals with higher genetic BCS provide opportunities for: <ul style="list-style-type: none"> - improved fertility - improved health - improved productivity and profit 3. Robust and resilient animals will be needed in the future as livestock farming comes under pressure both politically and environmentally. Genetically higher BCS animals are part of the response to that pressure. 4. Genetic BCS is often masked by over-feeding. Breeders need to apply nutritional and environmental pressure to rams and bulls. 5. Commercial farmers should buy rams and bulls produced under commercial conditions.

EXECUTIVE SUMMARY

It's no secret that commercial UK sheep and beef farms are hampered by high external inputs and labour costs. Coupled with declining government financial support, increased cost of production and market unknowns, there has never been a better time to reassess our animals and systems.

Winter in the UK is the most costly time of the year due to high feed requirements. This couldn't be truer than in the Scottish Highlands and Islands. With our long, growthy summer days and longer, dark, wet winters, managing the extremes of our pasture growth curve is challenging. Having robust and resilient animals is key to meeting this challenge.

For decades we have known that good Body Condition Score (BCS) is essential in cows and ewes at key times in the year. Simplified, BCS is the physical and/or visual scoring of fat and muscle across the lower back of an animal. Recommendations exist for how to condition score and what score is desired at key times in the reproduction cycle.

Good BCS is directly linked with better animal health, increased fertility and reduced feed requirements. These three things alone are enough to merit more attention on the subject.

Not all animals are created equal and some are able to both put on and hold condition more easily than others – traditionally known as 'easy fleshing' animals. Significant worldwide research into the genetic component of BCS puts the trait at around 25% heritability. In practical terms this means genetic gain can be made relatively easily through recording and selection.

I visited commercial and pedigree cattle and sheep producers in Canada, Australia, New Zealand, Iceland and the UK. Those who had taken on board the message of actively selecting for body condition reported a number of productivity and animal welfare benefits.

BCS can be manipulated by environmental nutrition and it is therefore a trait that is easily masked by preferential or excessive feeding. It was, almost universally, acknowledged by those I visited that the pedigree industry have not done enough to provide commercial farmers with bulls and rams fit for commercial environments. Though, equally, commercial farmers don't do themselves any favours by supporting the status quo. It is essential that breeding stock are subjected to some nutritional and environmental pressure if we are to identify those with the genetic ability to put on and hold body condition.

Those I visited reported that higher BCS became most valuable during tough periods – in either difficult winters or droughts. As our climate becomes more unpredictable, the ability of an animal to ride out the extremes will become more important. Though even in a normal season the genetic propensity to hold condition still presents plenty of opportunities, including increasing stocking rates.

With this knowledge in mind and an eye on continuing research using new technology and information, it is apparent that there exists significant opportunity within the beef and sheep sectors to build herds and flocks fit for the future by prioritising body condition as part of the selection process.

CONTENTS

Contents

EXECUTIVE SUMMARY	ii
CONTENTS.....	iii
Chapter 1 - Personal introduction.....	1
Chapter 2 - Background to my study	2
Chapter 3 - My study tour.....	3
Chapter 4 - Back to basics	4
4.1 BCS 101	4
4.2 Current recommendations.....	5
4.3 Getting to grips with the research	6
Chapter 5 - Fat. Animals. Eat. Less.....	8
5.1 Making the most of the pasture growth curve	8
5.2 Let's talk energy	9
5.3 Case study: Jamie Leslie, Scholland Farm, Shetland, UK.....	10
Chapter 6 - Fertility, fertility, fertility.....	11
6.1 Selection Pressure.....	11
6.2 Maternal Traits – Finding the sweet spot	14
6.3 Case study – Chad and Louise Taylor, Mumblebone Merinos, NSW, Australia.....	15
Chapter 7 – Health is wealth.....	16
7.1 Resilient and robust animals.....	16
7.2 Worms and parasites	18
7.3 How fat is too fat?.....	19
7.4 Case study – Rhys Roberts, Align Farms, Canterbury, NZ.....	21
Chapter 8 - Opportunity Knocks	22
8.1 Other benefits.....	22
8.2 Farmability	23
8.3 Case study – The Harvey Family, Glen Orkney, Marlborough, New Zealand	24
Chapter 9 - The big fat bull club.....	25
9.1 The Breeders.....	25
9.2 The Buyers.....	26
9.3 Case study – Rennylea Angus.....	27
Conclusions	28

Recommendations	29
After my study tour.....	30
Couldn't have done it without... ..	31
Appendix	32

DISCLAIMER

The opinions expressed in this report are my own and not necessarily those of the Nuffield Farming Scholarships Trust, or of my sponsor, or of any other sponsoring body.

All photos are the authors own unless otherwise specified.

CONTACT DETAILS

Vic Ballantyne
Clynelish Farm
Brora
Sutherland
Scotland
KW9 6LR

Mob: +447979070211
vicballantyne@gmail.com
www.clynelishfarm.co.uk

Nuffield Farming Scholars are available to speak to NFU Branches, Agricultural Discussion Groups and similar organisations

*Published by The Nuffield Farming Scholarships Trust
Southill Farmhouse, Staple Fitzpaine, Taunton TA3 5SH
Tel : 01460 234012
email : director@nuffieldscholar.org
www.nuffieldscholar.org*



Chapter 1 - Personal introduction

I describe myself as an Aussie-Scot, rooted in two countries with an equal love for both.

My path to a Nuffield Farming Scholarship has not been a linear one – with more than 15 different jobs under my belt across a range of industries. Yet every experience left me with something useful and also the knowledge that agriculture is, and probably always has been, my true calling.

One of four daughters, I grew up on our steep merino and cattle farm in northern New South Wales, always helping out with mustering, shearing or yard work and joining Dad on his rounds as a rural vet. I benefitted from a good school agricultural program and spent a gap year on a two million acre cattle station.

However, a seemingly more glamorous life beckoned – I studied Sports Media and went on to work in professional rugby for two years. Whilst it was a fun and exciting industry, I realised that I belonged in the country.

In 2006, the decision to take a year out whilst I reassessed my future, changed the course of my life. Who knew that a round the world ticket, UK working visa, lambing job and hastily arranged marriage would find me 18 years later fully immersed in the Scottish Highlands and UK agriculture!

Alongside my husband Jason we have the tenancy of 125ha/300ac near the east Sutherland coastal village of Brora, 60 miles north of Inverness. We also contract farm a sheep stock cub up the road. Predominantly store cattle and lamb producers, our numbers vary depending on opportunities, prices, feed availability and other seasonal factors.

We aim to run a low input, forage based, rotational grazing system with high stocking rates being key to our profitability. During the summer months I also juggle a B&B, often greeting guests stinking of sheep and covered in muck – an authentic farm experience!

Over the years we have been involved in a number of groups and initiatives looking to improve farm and livestock performance, including the SRUC business improvement group, farming for a better climate programme, QMS grazing groups and we were a Scottish Monitor Farm from 2017-20.

Undertaking a Nuffield Farming Scholarship has very much expanded my learning opportunities and a given me a whole new network of people – a privilege I am very grateful for.



Figure 1: The author with her husband

Too fat? The role of body condition in maternal livestock in areas with extreme seasonal variability

A Nuffield Farming Scholarships Trust report by Vic Ballantyne generously sponsored by The Royal Highland & Agricultural Society of Scotland & The Worshipful Company of Farmers with Savills



Chapter 2 - Background to my study

‘Fat animals eat less.’

Four words that sparked my curiosity, led to a journey across several continents and culminated in this report.

Obsessing over Body Condition Score (BCS) – the combination of fat and muscle that we see and feel on sheep and cattle – may seem a bit niche. However, there are many good reasons academics and farmers from all over the world have spent hours poring over animals, numbers and data.

In livestock farming it always feels as though the time of year things can go most wrong, most quickly, is in the latter months of winter. We take our eye off the ball and suddenly notice a dip in cow or ewe body condition in the crucial months before calving or lambing. Compensating for this with extra feeding potentially leads to a myriad of metabolic and birthing problems.

As farmers, we are encouraged to condition score regularly, and yet there has been little focus on actively selecting stock for BCS, particularly when it comes to supplying commercial farmers with maternal rams and bulls.

We know some animals will put on and hold condition better than others. Traditionally these were known as ‘easy-fleshing’ animals, but perhaps somewhere along the way we lost sight of the ‘easy’ bit and replaced it with a feed bag.

I’d had a few lightbulb moments around BCS over the years. The most illuminating was at calf weaning in 2019, when the cows were on average about 25kg heavier. Initially disappointed, as we were trying to reduce mature cow size, I soon observed that this extra weight was in fact due to them being fatter rather than bigger. Next lightbulb moment came when I totted up winter feed intake the next spring, which came in about 20% less than the previous year.

Living in an area of seasonal extremes, the potential to select animals that can make the most of our pasture growth curve was very appealing. It also felt like something your average commercial farmer could improve with relative ease. Selecting for ‘genetic fat’ could be an easy win that delivers positive outcomes without putting extra pressure on resources.

Are current recommendations for BCS based on our current livestock and systems, and if so, are those livestock and systems fit for the future? Are we propping up UK livestock rather than selecting those with genetically better BCS? How fat is too fat? Can we take pressure off the system, the animals and the people by selecting fatter animals? What impact might selecting for BCS have on other important traits? How useful are EBVs for BCS?

There are not enough words in this report to cover every aspect and nuance of this topic. What I would like to bring together is the link between research, on farm data and anecdotal evidence through sharing the stories of the people I met on my travels.

Too fat? The role of body condition in maternal livestock in areas with extreme seasonal variability

A Nuffield Farming Scholarships Trust report by Vic Ballantyne generously sponsored by The Royal Highland & Agricultural Society of Scotland & The Worshipful Company of Farmers with Savills



Chapter 3 - My study tour

Whilst I had grand plans to travel the world and visit some more remote parts of the globe, the combination of inflation, COVID restrictions and the necessity to earn money were an unwelcome reality check. My geographic location in the UK also adds an extra layer of complication to any travel plans.

Unfortunately there was a high risk involved in attempting to travel before March 2022 as snap lockdowns and the need to provide clear Covid tests were still in place.

I am disappointed that I did not make it to South America, specifically Chile. Though I intend to visit more countries in the coming years on an extended agricultural learning journey.

Zoom meetings

Date	Person	Reason
January 2022	Niall O'Boyle	Dairy vet. Nottingham University. Cattle-eye development team.
	Nicola Lambe	Academic. SRUC. Conducted research on ewe BCS and lamb performance in Scottish blackface.
	Mark Ferguson	Owner. Next Gen Agri NZ & Australia. Academic & consultant. Head shepherd podcast.
	Janet Roden	Geneticist. Innovis. Has been gathering BCS data and will bring it in to EBVs soon.
September 2023	Matt Wolcott	Scientist - Animal Genetics and Breeding Unit (AGBU) Australia
	Jamie Leslie	'FW Mixed Farmer of the Year' 2022 & BCS advocate

Face to face visits

Date	Place	Days	Visited
March 2022	England & Wales	2	Dewi Jones & Janet Roden - Innovis HQ Tim White - Exlana Sheep
August/Sept 2022	Canada (BC, Alberta, Saskatchewan)	22	Canadian Beef Industry Conference (BC), visit farmers operating low input maternal herds and Saskatchewan University LFCE
Nov 2022	Scotland (Borders & SW)	3	Robert Parker, Andrew Elliott, Graham Lofthouse, James Baxter (poultry), Southfield Farm (Innovis)
Dec 2022	New Zealand (South Island)	10	Next Gen Agri HQ – Dr Mark Ferguson, Align Farms, Cleardale Station, Bluff Station, Glen Orkney, Melrose Station, DW Scanning
Dec 2022	Australia (Southern NSW)	8	A Rolfe, Lambpro, Rennylea Angus, Kennys Creek Angus, Mumblebone Merinos, Watson Agri
Jan 2023	Australia (SW Western Australia)	10	Hillcroft Farms, Clayton South, Ian Robertson, Lawson Angus, Dr John Young, Dr Andrew Thompson
March 2023	Scotland (Central)	1	SRUC Hill Research Centre – Dr Nicola Lambe & Anne McLaren
March 2023	Iceland	6	Unnsteinn Snorrason and other farmers

Too fat? The role of body condition in maternal livestock in areas with extreme seasonal variability

A Nuffield Farming Scholarships Trust report by Vic Ballantyne generously sponsored by The Royal Highland & Agricultural Society of Scotland & The Worshipful Company of Farmers with Savills



Chapter 4 - Back to basics

4.1 BCS 101

Body Condition Score (BCS) has been talked about and promoted to farmers since the 1960's.

The method for determining BCS in sheep and cattle differs slightly, though put simply it is a physical and/or visual assessment of the fat and muscle across the lower back of an animal.

In the UK a 'score' between 1 and 5 is given to animals, with 1 being very thin and 5 being very fat.

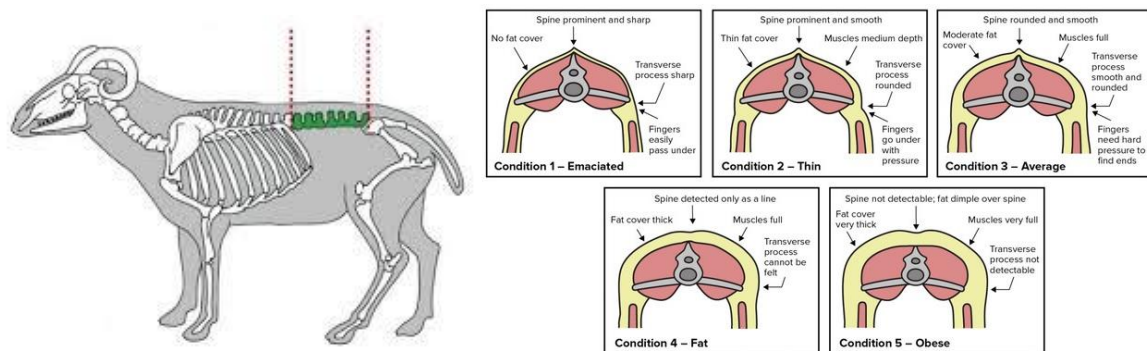


Figure 1: Assessing BCS. Credit: The Farm Advisory Service (Scotland)

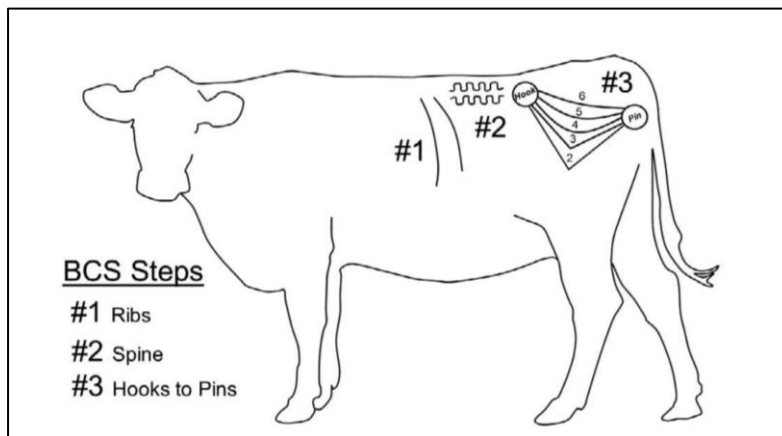


Figure 2: BCS points on a cow. Credit: <https://wyoextension.org>

Sheep are nearly always physically handled, which is particularly important as wool cover can be misleading. However many cattle farmers do a visual assessment as it isn't always practical to get hands on. The important thing is that it takes a bit of practice and consistency is key.

Scoring is not an exact science and is usually done fairly quickly during other handling procedures. There is some variation between countries, breeds, systems and people. In North America and Australia cattle are often scored 1-9, though sheep are nearly always scored 1-5.

For this report we will work on the 1-5 scale for both species.

Too fat? The role of body condition in maternal livestock in areas with extreme seasonal variability

A Nuffield Farming Scholarships Trust report by Vic Ballantyne generously sponsored by The Royal Highland & Agricultural Society of Scotland & The Worshipful Company of Farmers with Savills



4.2 Current recommendations

Current recommendations in the UK suggest breeding females be between 2.0-3.5 throughout the year. Anything over 3.5 is generally considered too fat and potentially problematic.

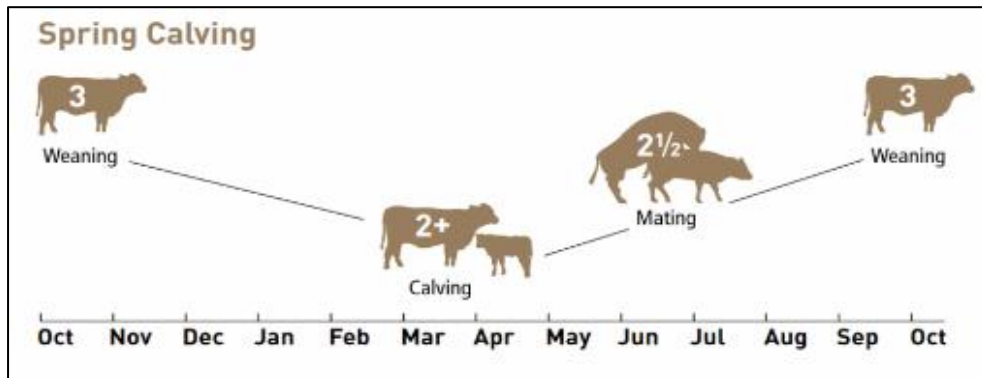


Figure 3: UK Recommendations for Spring Calving Cows. Credit QMS

Column1	Lowland	Upland	Hill
Weaning	2.5	2.0	2.0
Tupping	3.5	3.0	2.5
Scanning	3.0	2.5	2.0
Lambing	3.0	2.5	2.0

Figure 4: UK Recommendations for Ewes. Credit FAS (Scotland)

Although the timeline of each species is affected by the length of gestation and lactation I chose to investigate both cattle and sheep for this report as I felt the overriding principles applied to both. What does not change are the seasons and it is difficult and expensive to add condition to either species in the UK after October.

QMS (Quality Meat Scotland) have developed some useful posters for ewe and cow nutrition and BCS timelines. https://s3.eu-west-2.amazonaws.com/quality-meat-scotland/documents/Publications/ewe_nutrition_timeline_poster_0.pdf and https://s3.eu-west-2.amazonaws.com/quality-meat-scotland/documents/Publications/qms_cow_nutrition_timeline_poster_nov_2018.pdf

Question: Are current recommendations based on our current systems and genetics, and are they the right systems and genetics for the future?

Too fat? The role of body condition in maternal livestock in areas with extreme seasonal variability

A Nuffield Farming Scholarships Trust report by Vic Ballantyne generously sponsored by The Royal Highland & Agricultural Society of Scotland & The Worshipful Company of Farmers with Savills



4.3 Getting to grips with the research

This is not an academic report. I really wanted to speak to farmers on the ground who have made decisions around BCS and find out what impact that has had.

However, it was important that I did at least understand some of the research that has driven some of those on farm decisions. When I started pulling some stats together for this, my search engine returned an infinite number of academic papers.

I don't have the attention span or vocabulary to read long academic papers, but I do love a graph, so you'll find a number of these throughout this report.

I'm not going to pretend that I didn't get lost in some of the conversations I had with academics and geneticists. This stuff is way above my pay grade and as a commercial farmer I have only limited understanding of the various scientific testing methods.

What was clear? They all put BCS at around 20-25% heritability, making it a worthwhile trait to select for if we believe it can improve productivity.

In a perfect world there would be one single, easily isolated gene that identifies animals with the ability to put on and hold BCS. However, this is not a perfect world and Dr Mark Ferguson of NextGen Agri in New Zealand was quick to burst my bubble.

Dr Matt Wolcott from AGBU in NSW has worked on maternal efficiency for many years and says it is one of the most complex traits they have tackled. He is in the process of developing a maternal efficiency trait for the Australian Angus Society. The correlation with other traits is complex so phenotype (observable characteristics) will always be part of the assessment.

I was particularly impressed by the scale of some of the research data. I stood with Professor Andrew Thompson of Murdoch University under a gazebo on a 38c day as he and his team blood tested hundreds of ewes. Over several decades he has been at the forefront of improving sheep genetics in Australia and considers BCS one of the easiest gains farmers can make when it comes to sheep productivity and profitability.



Figure 5. Dr Andrew Thompson & student, blood testing at UWA farm, Pingelly Western Australia

The environmental component of extensive livestock systems often makes it difficult to separate phenotype from genotype. Dr Nicola Lambe at the SRUC Hill Research unit in Scotland has done significant work with Scottish Blackface ewes and will be adding rumination collars to help bring further understanding about the difference between environmental and genetic condition. Dr Lambe has also done important work on CT scanning of visceral fat in sheep – a more complex topic than I will cover here but another interesting piece in the puzzle. She makes the point that muscle is very much part of the BCS story also.

Within the UK the recorded sheep and cattle populations are significant and with genomic and parentage testing now more affordable several breeds are adding more and better data to their Signet EBVs (estimated breeding values).

I think Dr Janet Roden, geneticist for Innovis, probably sums it up best: *“We are very hopeful that using BCS as an EBV included in the index will help breed the sort of ewe we want, which is a ewe that is relatively cheap to keep, resilient and can produce twins year after year.”*

Too fat? The role of body condition in maternal livestock in areas with extreme seasonal variability

A Nuffield Farming Scholarships Trust report by Vic Ballantyne generously sponsored by The Royal Highland & Agricultural Society of Scotland & The Worshipful Company of Farmers with Savills



Chapter 5 - Fat. Animals. Eat. Less.

5.1 Making the most of the pasture growth curve

The biggest challenge when managing livestock in the UK and in north Scotland in particular, is the extremity of the pasture growth curve, which becomes steeper with each northern parallel. This is the amount of feed, in kg of dry matter per hectare, that grows each day. Temperature, day light and rainfall are the most influential factors.

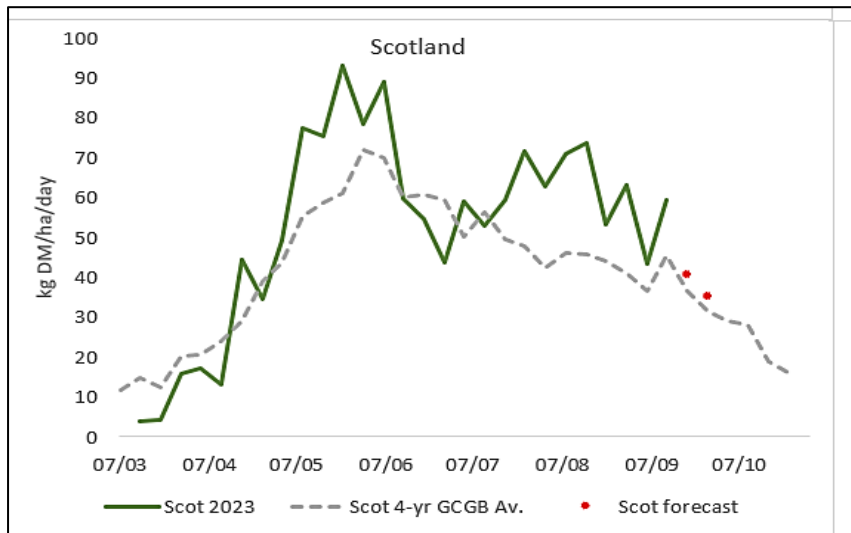


Figure 6: Scotland pasture growth curve. Credit: GrassCheckGB

In the north of Scotland this means very little grass growth from mid-November until mid-March. Conversely, we can grow well over 100kgDM/day in May, June and July if the weather is right (Figure 6).

It makes sense to have animals that can make the most of this growth curve by putting on weight when grass is cheap and plentiful.

There will be benefits to identifying those animals that can then hold that condition through the long, dark, wet, winter.

There is an argument that even if an animal isn't particularly feed efficient in the summer, the feed it is consuming is relatively cheap compared with baled grass, cereals or other feed sources. They are also feeding themselves at this time, so there is a labour benefit.

Dr Mark Ferguson has found through his research in New Zealand that it is in cold and wet environments in particular that animals with high genetic BCS were most valuable. The extra cover providing resilience in difficult conditions.

Providing females with adequate nutrition at key times in the year remains important and selecting for good genetic BCS does not override the need for this.

Too fat? The role of body condition in maternal livestock in areas with extreme seasonal variability

A Nuffield Farming Scholarships Trust report by Vic Ballantyne generously sponsored by The Royal Highland & Agricultural Society of Scotland & The Worshipful Company of Farmers with Savills



5.2 Let's talk energy

A few numbers to think about:

- One condition score is equal to approx. 12-13% of an animal's bodyweight
 - 65-75kg sheep = approx. **8-9kg**
 - 700kg cow = approx. **90kg**
- It takes **450kg of dry matter** to put 1 condition score on a cow over winter. This equates to around an extra two bales of decent silage. Multiply that by 50 cows and the cost of doing this soon becomes clear
- It is estimated 70% of dry matter in a sheep/beef system is consumed by the breeding females. This is why BCS is a major driver of profit.
- It takes 5x more energy to lay down fat than muscle (Professor John Young)
HOWEVER!
- Once on their back –
 - 1kg of lean meat (muscle) = 5.3mj of available energy
 - 1kg of fat = 35.9mj of available energy.
 - That is nearly 7x the amount of available energy
- Once there, fat requires very little maintenance and is available as energy when required
- Is this the best way to make the most of the pasture growth curve?



5.3 Case study: Jamie Leslie, Scholland Farm, Shetland, UK

Shetland farmer, 2022 UK mixed farmer of the year, and all-round good guy, Jamie Leslie, farms in what is no doubt the most extreme of the UK's climates, where his animals are out wintered.

Somewhat absurdly, considering my geographic proximity to Shetland, I haven't yet managed to visit Jamie, but I've known him and his system for a while and it was a story I wanted to share.

He began focussing on BCS around 2016 and considers it THE most important trait in ensuring his beef and sheep enterprises are manageable and profitable.

He isn't too worried if his cows are heavy, providing they are fat and not too tall and said: *"I can't outwinter cows without having fat cows."* Heading into the winter last year his cows averaged a BCS of 4.3 – substantially higher than the recommended 3.5. Despite this he had only one calving intervention.

This extra BCS allows him to feed cattle on low quality deferred grazing, allowing them to lose some, but not too much, condition in the second trimester.

Jamie talks about preferentially feeding cattle to keep them at an adequate BCS as 'repairing condition' and is something he tries to avoid by selecting breeding stock from his fattest and best performing females.

Significant to all this is that Jamie also finishes his own stock for a local butcher, so it is important the end product is fit for purpose. Getting compensatory growth from his cattle during the grass growing season is only possible with the right animals and he doesn't believe a lean animal can achieve this. Most recently his calves have been putting on up to an impressive average of 2kg a day at grass.

The other notable change since he began selecting for BCS is an uptick in fertility. Rams are out for just 19 days (down from 5 weeks) whilst bulls go out for only 7 weeks (down from 13 weeks).



Chapter 6 - Fertility, fertility, fertility

6.1 Selection Pressure

Definition: Prop Up

Provide support or assistance for a person or thing that would otherwise fail or decline

Good fertility is the building block of any maternal livestock system. The most productive and profitable herds and flocks have a tight calving or lambing period and high rates of pregnancy. Improved reproduction is the main reasons BCS is considered an important maternal trait.

Study after study has shown that the right BCS at important times of the year leads to higher conception rates, rearing success and weaning weights.

The below graph (Figure 7) from the lifetime wool project in Australia shows that the rate of twins continues to increase even as condition score climbs above 4.

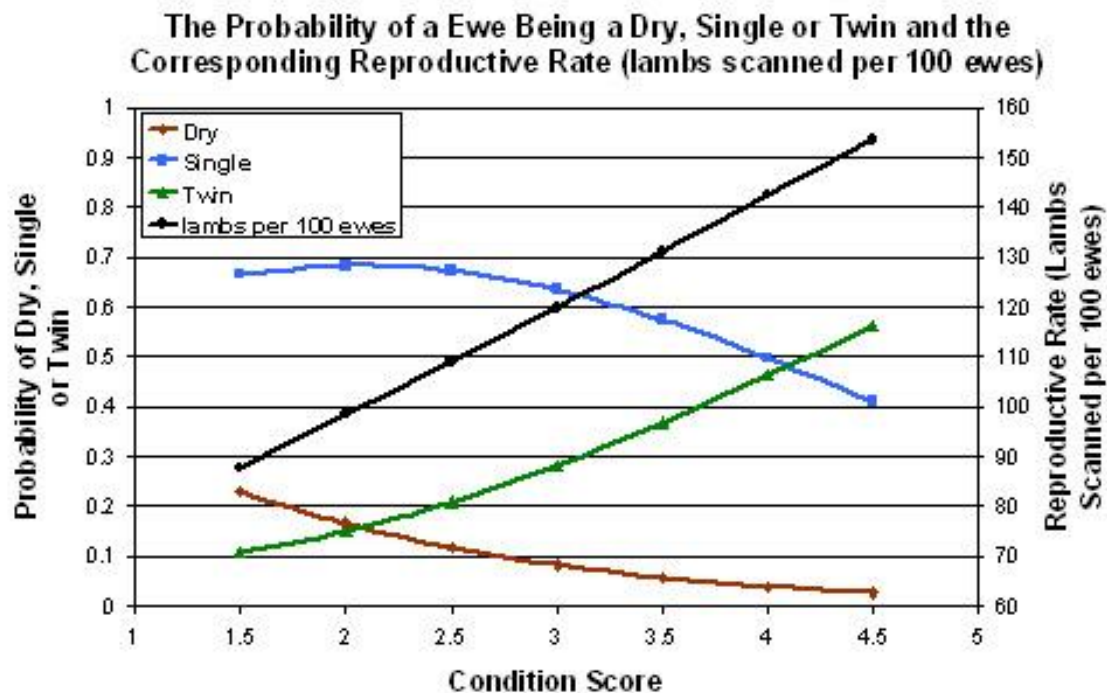


Figure 7: <http://lifetimewool.com.au/reproductive.html>



This graph is backed up by the experience of Clayton South, a mixed farmer in the Western Australian wheat belt who has persisted with his love of sheep. He has been using BCS as a selection tool for several years and has seen his pregnancy scan increase to over 180% in adult ewes – substantially above the regional average. His selection policy has been aided by comprehensive electronic ID to identify his best performing sheep – an option that could be considered by UK farmers as EID is already mandatory.



Figure 8: Clayton South. Credit: www.countryman.com.au

Rebreeding

One of the KPIs of a productive herd is calving interval – i.e., the number of days between one calf and the next. Ideally this is 365 and not more than 400 days – the UK is currently a long way off this target. As an average beef cow has a gestation of 283 days, it is important they start cycling again within 80 days of calving.

Cows with a higher BCS are significantly more likely to be ready to mate sooner than those with a lower BCS (Figure 9). (Note: scored 1-9, therefore 4 = approx. 2.5 on a scale of 1-5)

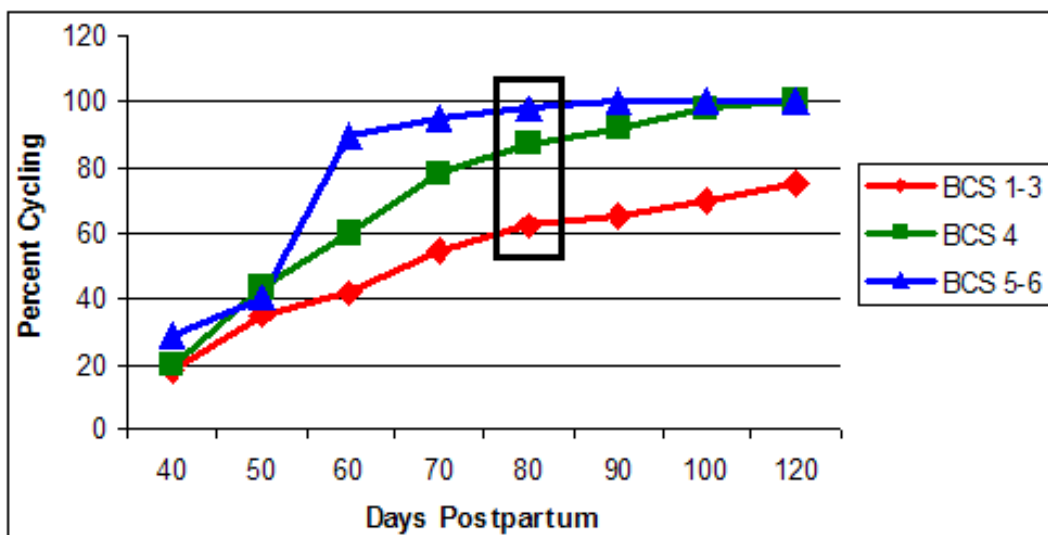


Figure 9: Effect of BCS on cow oestrous after calving. Credit: <http://infovets.com/books/beef/A/A085.htm>

Too fat? The role of body condition in maternal livestock in areas with extreme seasonal variability

A Nuffield Farming Scholarships Trust report by Vic Ballantyne generously sponsored by The Royal Highland & Agricultural Society of Scotland & The Worshipful Company of Farmers with Savills



In Canada I was looked at a little strangely when I asked ranchers at the Canadian Beef Industry Conference about BCS, as the requirement for good body condition is simply innate and something they take for granted. In a country that goes from 40c in summer to -40c in winter, the environmental pressure of a Canadian season is self-selecting – cattle fall out of the system if they fail to rebreed. If you don't have a calf to sell, it doesn't matter how nice a cow looks or how good her previous calf was.

“Fertility, fertility, fertility” was the answer I got from Jeff Braisher at Kingsclere Ranch in Alberta (Figure 10, top left with wife Sheila) when I asked him what the three most important traits in his cows were. Situated in a beautiful part of the Rocky Mountains, the cattle are exposed to some quite extreme winter conditions.



Figure 10: Canadian ranchers agreed that good fertility is paramount and good BCS is necessary to achieve this

Art and Cathy Wheat ranch in north-eastern Alberta, and like many Canadian ranchers put their cows and calves to extensive summer grazing, often a reserve or state forest. Due to lack of infrastructure there isn't much measurement, weighing or recording carried out so the best indicator they have that cows are doing well in their environment is cows back in calf. They link good BCS directly with good fertility.

The extensive systems of Canada and Australia are not conducive to special treatment of under-performing animals – so good genetic BCS is required to deal with environmental and nutritional stresses.

Too fat? The role of body condition in maternal livestock in areas with extreme seasonal variability

A Nuffield Farming Scholarships Trust report by Vic Ballantyne generously sponsored by The Royal Highland & Agricultural Society of Scotland & The Worshipful Company of Farmers with Savills



6.2 Maternal Traits – Finding the sweet spot

Terminal or carcass traits including growth, muscle & fat have been measured for decades. This has been hugely successful in delivering bigger and better carcasses. In Iceland 95% of the national sheep flock is recorded and they have made significant carcass gains in their native sheep breed.

However, if we keep selecting for muscle and growth we end up with big, tall, lean cows and ewes that require ever increasing external inputs. Chasing terminal traits has had a negative impact on maternal traits, so more recently there has been a bigger focus on traits like mothering ability, prolificacy, survival and birth size. How each breed weights these traits within their own EBV index varies.

Just a few breeds have incorporated a BCS EBV into their breeding indexes, though several others have significant amounts of data waiting to be rolled out. Signet breeding services in the UK is at the forefront of this so UK farmers can look forward to having access to more and more information.

Ian Robertson farms near Kojunup in Western Australia. He has a lifetime of experience using data to make decisions and is an industry leader delivering productivity through better genetics. He warns that whenever we chase one trait, we need to be mindful that there is likely a negative correlation for another trait and we need to ask ourselves ‘what else do I need to measure?’

This is well demonstrated by the impact that chasing wool micron in merino sheep had on other productivity traits – something the merino industry is still getting to grips with.

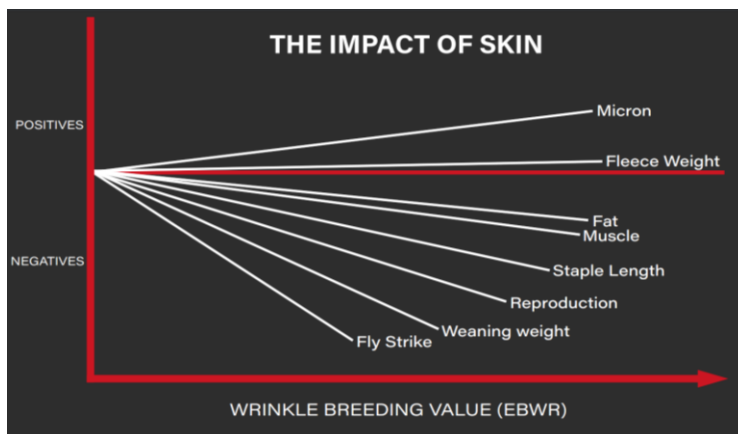


Figure 11: Negative effect of selecting for one trait in merinos. Credit: Chad Taylor

The expression ‘they need to milk off their back’ is a familiar one, though there is a direct correlation between milk yield and leanness. In cattle in particular, a very well grown calf can lead to a cow not re-breeding and/or going into winter too lean. Weaning weight is not actually a huge driver of profit in cattle and needs to be balanced against other traits.

In sheep, ewes can afford to put a bit more into their lambs, providing they are weaned early enough that they have time to recover before tuppings/joining. Weaning BCS in ewes is of negligible heritability.

There are numerous examples where chasing a single trait has come at the expense of other important traits and BCS is not exempt.

Too fat? The role of body condition in maternal livestock in areas with extreme seasonal variability

A Nuffield Farming Scholarships Trust report by Vic Ballantyne generously sponsored by The Royal Highland & Agricultural Society of Scotland & The Worshipful Company of Farmers with Savills



6.3 Case study – Chad and Louise Taylor, Mumblebone Merinos, NSW, Australia

Chad and Louise Taylor farm near Wellington in central NSW. They have not taken a conventional approach to sheep farming, selling a farm, buying a flock and later moving the whole business to a new location.

They aim to breed genetics that produce high quality wool whilst adding strong maternal and carcass traits back into the merino. With an impressive data set to back up their story, Mumblebone strive to get a better balance of traits in their sheep.

Having increased fat and muscle through meticulous use of EBV and data collection they have directly increased both scanning % and stocking rates – both big profit drivers.

“Condition Score = Reproduction + Stocking Rate = Productivity” - Chad Taylor

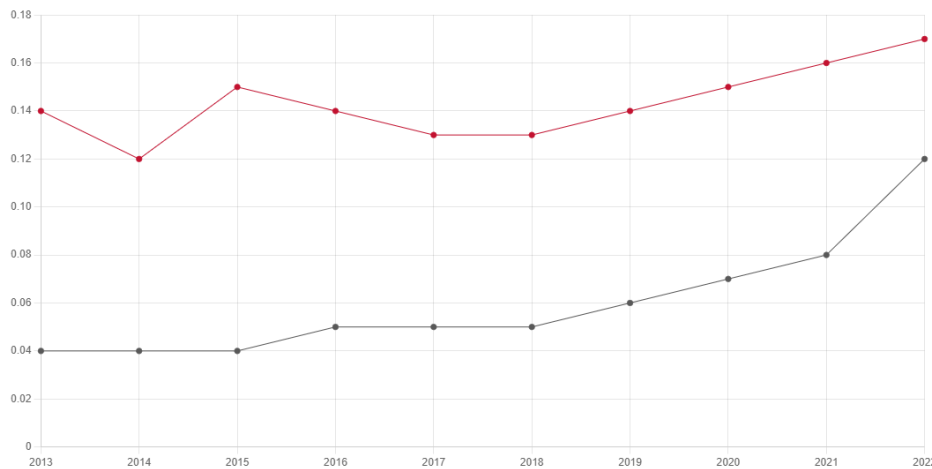


Figure 12: Weaning Rate EBV at Mumblebone (red) against industry standard (grey). Credit: www.mumblebone.com.au

The success of their on-farm ram sale demonstrates that farmers are willing to pay good money for rams that deliver robust and resilient genetics. Mumblebone now sell 400 plus rams a year and are considered a leader in the drive for a maternal merino.

They also feel higher genetic BCS brings some important welfare traits to their flock, something the next generation of farmers will be looking for as the issue of social licence comes to the fore. Their sheep are more robust and able to handle the unpredictable weather patterns of western NSW.



Figure 13: Chad Taylor, Mumblebone Merinos

Too fat? The role of body condition in maternal livestock in areas with extreme seasonal variability

A Nuffield Farming Scholarships Trust report by Vic Ballantyne generously sponsored by The Royal Highland & Agricultural Society of Scotland & The Worshipful Company of Farmers with Savills



Chapter 7 – Health is wealth

7.1 Resilient and robust animals

An animal with good BCS is a more robust and resilient animal and given we know this is a heritable trait it makes sense to select for it.

Unless our animals are healthy, we are fighting an uphill battle. Not only is it demoralising, but it is costly and counterproductive. A healthy cow or ewe is more likely to conceive and rear a good calf/lamb if she herself is healthy.

We can vaccinate, worm, bolus, inject and feed our way to keeping animals fit and healthy. But what if they were healthier, with less products and interventions required, simply through better selection?

Figure 16 indicates a direct link between good BCS and IgG (Immunoglobulin) in calves at 24hrs old. This is a measure of antibodies and immune protection provided through colostrum – essential to a healthy start for calves and lambs.

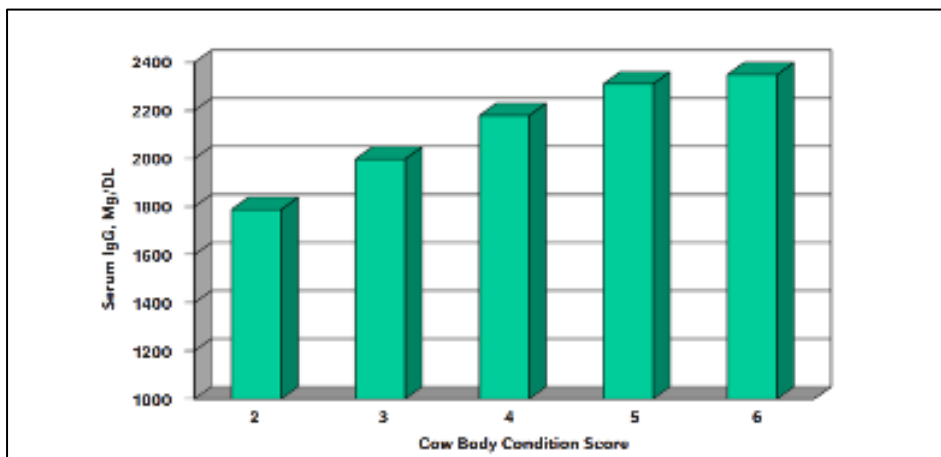


Figure 14: Credit <https://extensionpublications.unl.edu/assets/pdf/ec281.pdf>

An animal's ability to be resilient in the face of health or nutritional challenges is directly correlated with their own body condition score and that of their mother when they are young.

There is a whole topic around whole-body energy (WBE) which considers the role of other internal and visceral fat and how it is utilised during periods of stress. I'm sticking with BCS for this report but you can read a bit about it here: <https://www.nextgenagri.com/articles/whole-body-energy-and-its-importance-in-sheep-breeding>

Too fat? The role of body condition in maternal livestock in areas with extreme seasonal variability

A Nuffield Farming Scholarships Trust report by Vic Ballantyne generously sponsored by The Royal Highland & Agricultural Society of Scotland & The Worshipful Company of Farmers with Savills



Dawson and Greta Bradford at Hillcroft Farm near Narrogin in Western Australia developed the Ultrawhite, a composite shedding sheep born out of a need to reduce labour and costs. Their attention to detail combined with excellent stockmanship has seen huge demand for Ultrawhite rams in recent years. What started as a hobby soon developed into a breeding success story.

The Ultrawhite is made up of the poll dorset and dorper. The dorper belongs to a group known as ‘fat tailed sheep’, the most extreme of which is the Dumba – worth looking up. Dawson considers fat cover to be directly linked to hardiness and necessary for the unpredictable and volatile Australian climate.

A livestock business becomes unviable if they are unable to maintain a high level of animal health. Time after time the farmers I visited felt that improved animal health was one of the most significant benefits from having genetically fatter livestock.



Figure 15: Dawson and Greta Bradford with the author



Figure 16: Ultrawhite ewes with twin lambs in for weaning

Too fat? The role of body condition in maternal livestock in areas with extreme seasonal variability

A Nuffield Farming Scholarships Trust report by Vic Ballantyne generously sponsored by The Royal Highland & Agricultural Society of Scotland & The Worshipful Company of Farmers with Savills



7.2 Worms and parasites

- Worms and parasites are the biggest cause of production loss in most sheep systems
- Widespread anthelmintic resistance is a threat to livestock farming worldwide
- A healthy animal is less susceptible to the effects of worms and parasites
- High BCS animals are less susceptible to challenges from worms and parasites

Researchers in Africa found a direct relationship between BCS and parasites in Nguni goats (Figure 14). As BCS decreased, faecal egg counts (FEC) increased.

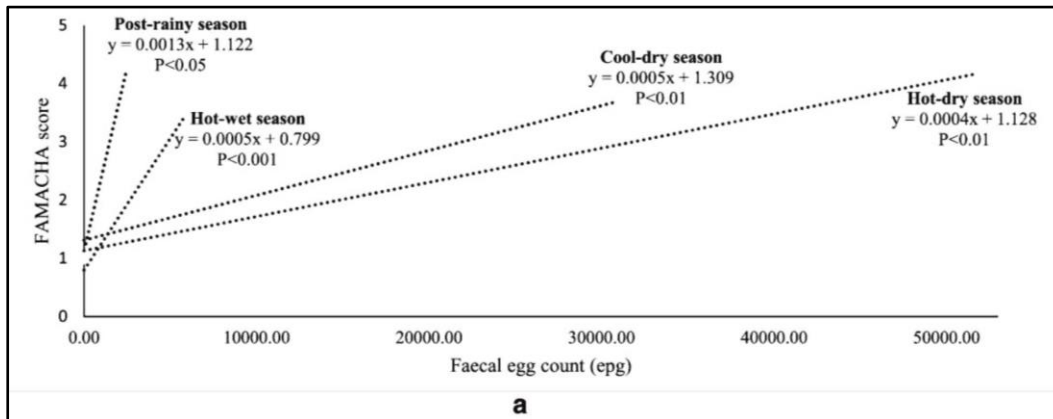


Figure 17: S. Z. Ndlela, M. V. Mkwanazi, M. Chimonyo - Relationship between faecal egg count and health status in Nguni goats reared on semi-arid rangelands

Dugald and Mandy Rutherford from Melrose Station in Canterbury, NZ, stopped worming sheep in 2009, now culling anything that needs worming. They also run a weather with foot rot with their breeding rams to identify those animals with footrot susceptibility. Some may consider they take the word 'selection' to the extreme, however this selection sees them regarded as having some of the healthiest and most resilient sheep in New Zealand.

They consider it essential that sheep are put under pressure to allow the cream to rise to the top. Through this selection process they have found those animals that come out on top invariably have a higher genetic BCS.

Animals with higher BCS are able to mount an immune response to the challenge of worms and parasites, reducing the need to use intervention products. Given the real threat posed by anthelmintic resistance it makes sense to select animals with genetically higher BCS.



Figure 18: Mandy & Dugald Rutherford and their sheep, Melrose Station

Too fat? The role of body condition in maternal livestock in areas with extreme seasonal variability

A Nuffield Farming Scholarships Trust report by Vic Ballantyne generously sponsored by The Royal Highland & Agricultural Society of Scotland & The Worshipful Company of Farmers with Savills



7.3 How fat is too fat?

Throughout my journey I asked this question and received varying responses. These responses reflected the respondent's job and location.

My study is about body condition, which most farmers think of as fat, though it is more complex than that. In this report I tend to discuss it as fat because in the UK a lack of muscle is not usually a problem. The market has been very muscle focussed and for decades continental breeds have had a big influence on UK genetics.

A tale of caution

There are many reasons people should be wary of animals which are too fat.

Many UK vets I spoke with initially were concerned about my topic – they've attended enough difficult calvings and lambings to be worried about obese animals. They've also seen the metabolic issues associated with fluctuating BCS in animals in those key weeks around calving and lambing. I can see why they feel sticking to the current recommendations is the safest bet.

There is also evidence that animals which are 'too fat' can have reduced conception. This begged the question, *'are they fat because they are barren, or are they barren because they are fat'?* Dr Nicola Lambe (SRUC) has done significant work on BCS in Scottish blackface hill ewes and was of the opinion they were fat because they were barren, as it is uncommon for a hill ewe to ever be so fat, she can't conceive.

Dr Andrew Thompson of Murdoch University suggested an animal that is too fat is inefficient. Most farmers I spoke with also felt that it isn't good for an animal to be verging on obese all the time – they are taking too much out of the system without putting enough back in. There are times in the year when a cow or ewe should lose some condition (particularly in the 2nd trimester) and it is important they rear a marketable calf or lambs.

Dr Lambe and I also discussed that different breed types have different levels of muscle and fatness, so the starting point is significant. Native highland cows and blackface ewes both tend to have a higher proportion of fat to muscle than a continental cow such as a limousine or an ewe such as a texel. Her research showed that in blackface ewes, increasing the muscle without losing the fat would deliver better outcomes and profitability than increasing fat alone. This was backed up by Dr Mark Ferguson's research who advises keeping the proportions of muscle and fat relative.

Animals rarely hit condition score 5 without extra hard feed. This obesity can cause issues for internal organs and structural mobility. Slightly down the scale, BCS 4 can be achieved at grass and this presents less problems.

BCS is a measure of the muscle and fat we feel across the back of an animal, so keeping those proportional is important. Focusing too much on either can lead to problems - as always balance is key.

Too fat? The role of body condition in maternal livestock in areas with extreme seasonal variability

A Nuffield Farming Scholarships Trust report by Vic Ballantyne generously sponsored by The Royal Highland & Agricultural Society of Scotland & The Worshipful Company of Farmers with Savills



Throwing caution to the wind

Despite the many warnings and wariness about fat animals, I came across plenty of data and anecdotal evidence to suggest it is not detrimental to animal health or performance to run animals at higher BCS than is currently recommended.

Janet Roden, the geneticist for Innovis sheep breeding in the UK has been collecting data on BCS. Conventional wisdom says BCS +4 is too fat. Yet her data on Aberfield ewes (Figure 19) shows those with the highest BCS scanned the highest, and crucially, weaned the most lambs.

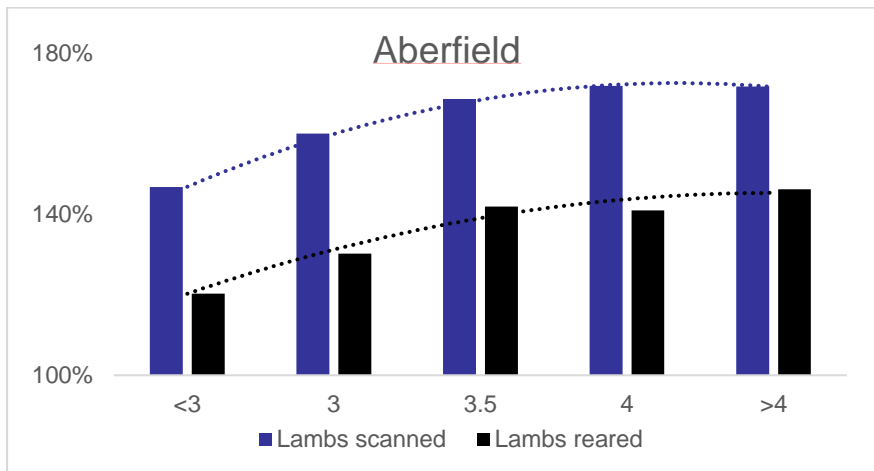


Figure 19: Effect of BCS on lambs scanned and weaned in Aberfield ewes. Credit: Dr Janet Roden

Jamie Leslie (Chapter 5 case study) runs his cattle well above the recommendations without higher incidences of calving interventions or metabolic issues than are experienced by other herds. Indeed, most extensive, low input farmers I spoke with didn't report any issues from having high BCS livestock and many felt uncomfortable running their animals at recommended BCS, as it didn't allow for much to go wrong, eg, heavy snow, long wet periods or prolonged drought

The recommendations exist to prevent farmers over or underfeeding animals and are an excellent guide. If farmers are able to stick to them by controlling intakes, they can add stability to livestock systems.

The strength of selecting for genetic BCS comes when we have less control over those intakes and want to make the most of available resources.

Differentiating between genetic and environmental BCS is important. If BCS is higher because it is selected for, rather than just fed for, there is no reason to be concerned about increased animal health issues. However, the sweet spot is probably not at the extreme (BCS 5) as it then becomes inefficient.

Too fat? The role of body condition in maternal livestock in areas with extreme seasonal variability

A Nuffield Farming Scholarships Trust report by Vic Ballantyne generously sponsored by The Royal Highland & Agricultural Society of Scotland & The Worshipful Company of Farmers with Savills



7.4 Case study – Rhys Roberts, Align Farms, Canterbury, NZ

Rhys Roberts manages several dairy farms for Align Farms in Canterbury, NZ. He is a Zander MacDonald award winner (a prestigious farming scholarship in NZ and Australia) and an impressive visionary within the NZ dairy industry, leading not just on production systems, but also staff management and retention.

He has been running a regenerative pasture trial alongside the conventional system for the last 4 years, initially to see if there is potential to even out the pasture growth curve. As part of this he has collected tens of thousands of data points, including measuring cow BCS 4-5 times a year.

Whilst his findings are mostly specific to dairy cattle, his data demonstrates what can be gained from measuring multiple factors and combining them with observational data.

They incorporate coat score and rumination data alongside BCS to provide a more balanced picture of the metabolic state of the cow. They found a cow with a low BCS, but a good coat score was able to regain condition more easily than a cow with decreasing BCS and a poor coat score. Using this extra information they could decide which cows needed to go on to once a day milking and which just needed a bit of extra TLC.

He found that maintaining BCS in his cows during mating was the most significant measure in terms of conception. Perhaps slightly different from sheep and beef cows, BCS before and after mating were less important than BCS during mating. He concluded if there was a limited pasture resource it was best to give it to cows during mating, rather than prior to or after.

Rhys was also looking at changing the genetics of the herd to increase the number of lactations and improve carcase traits. He hoped this would address concerns in NZ regarding cow turnover and 'bobby calves', i.e., those calves surplus to dairy breeding. Calves with higher carcase value will be kept for longer and become part of the food chain, rather than a waste product. He felt the potential gains in animal welfare, access to market premiums and the upholding of social licence would be worth the potential small losses in milk solids production.



Figure 20: Rhys Roberts, Align Farms, Canterbury, New Zealand

Too fat? The role of body condition in maternal livestock in areas with extreme seasonal variability

A Nuffield Farming Scholarships Trust report by Vic Ballantyne generously sponsored by The Royal Highland & Agricultural Society of Scotland & The Worshipful Company of Farmers with Savills



Chapter 8 - Opportunity Knocks

8.1 Other benefits

Stocking Rates

It is widely recognised that stocking rate is a key profit driver in commercial livestock systems. Targeting a high kg/ha output against a low £/ha input.

Dr Andrew Thompson of Murdoch University says that the modelling by Dr John Young shows that genetically fatter sheep are 10% more profitable, but when stocking rate is increased because of the extra fat in the system, they can be up to 50% more profitable.

It is well recognised that “an animal’s worst enemy is another animal” so animals must be robust enough to compete in high density stocking environments. If genetically fatter animals can sustain heavier stocking rates, selecting for them presents financial opportunities for livestock farmers.

Making space for nature

If increasing numbers doesn’t appeal there are other opportunities presented by high BCS animals and high stocking rate.

Ground can be set aside for nature recovery, trees or habitat creation without reducing overall on farm stock numbers. This can provide extra income and/or personal satisfaction.

If a fat animal eats less, there is also scope to reduce the amount of silage or cereal feed required, potentially reducing fertiliser and land use, reducing labour and allowing more grazing time during the summer months.

I didn’t investigate this element of BCS in much depth, but I think it provides a great opportunity for livestock farmers to tell a better story around the impact of livestock on the environment.

Animal welfare and social licence

Whilst it is easy to sell the idea of improved productivity and animal health to farmers as a reason for selecting animals that are naturally more robust and resilient, it is important not to understate the impact this could also have on public perceptions.

At a conceptual level social licence is *“the ongoing acceptance of a company or industry’s standard business practices and operating procedures by its employees, stakeholders and the general public”* (Investopedia.com, ‘www.investopedia.com/terms/s/social-license-slo.asp’, October 2018)

To quote Lorcan Allen, 2017 Nuffield Ireland Scholar – *“a mind-set change will be required in how agriculture approaches issues, specifically around the environment, animal welfare and climate change. If this fails to happen, the risk of losing the licence to operate is real and... farmers could find themselves on the receiving end of public scorn”*.

If genetically fatter animals are healthier, more resilient and require less inputs we are already addressing some of the challenges coming our way.

We need to be looking forward and anticipating rather than reacting to external pressures.

Too fat? The role of body condition in maternal livestock in areas with extreme seasonal variability

A Nuffield Farming Scholarships Trust report by Vic Ballantyne generously sponsored by The Royal Highland & Agricultural Society of Scotland & The Worshipful Company of Farmers with Savills



8.2 Farmability

Farming can be a stressful industry at times.

There are so many things that are out of our control – market prices and the weather being most impactful. So we are encouraged to focus on the things we can control.

All of the farmers I visited had successful businesses. They were positive about the future. They made the time and space to plan ahead. They took time out of their day to show me around, talk things through and offered me generous hospitality.

They were focussed on the things they could control.

Throughout this report I've listed the benefits that good BCS can bring. They are all drivers of profit and productivity on a livestock farm.

- Improved reproduction/fertility
- Improved animal health
- Reduced feed and labour
- Increased stocking rates
- Environmental benefits
- Improved animal welfare

Dr Mark Ferguson describes them as 'farmability' traits.

I probably describe them as sanity traits.

It is hard to overestimate the impact that knowing our animals are healthy and productive can have on our state of mind. It is actually this reason, above all others, that I think selecting for higher BCS in our livestock is so important.

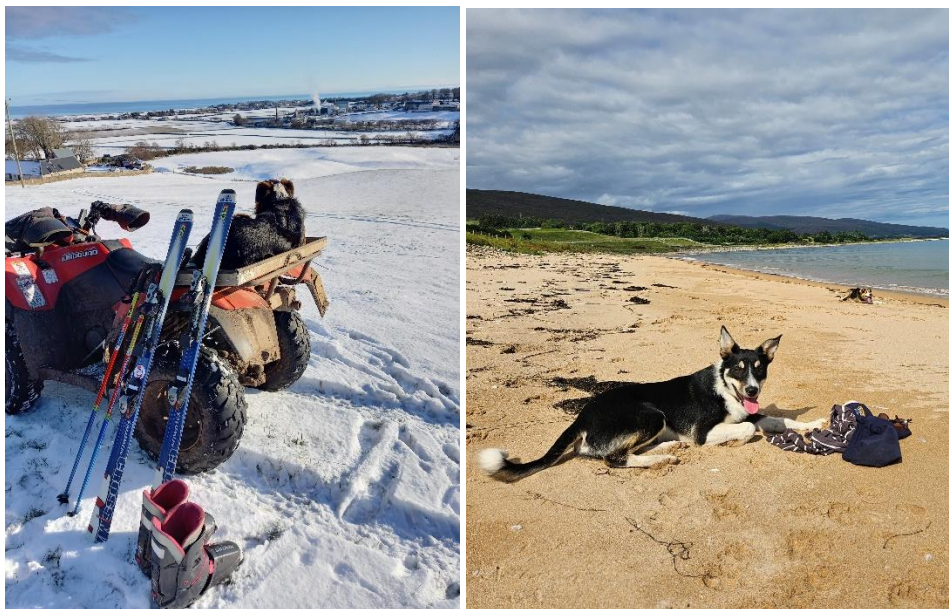


Figure 21: The author taking time out to enjoy her surroundings - an important part of farm life

Too fat? The role of body condition in maternal livestock in areas with extreme seasonal variability

A Nuffield Farming Scholarships Trust report by Vic Ballantyne generously sponsored by The Royal Highland & Agricultural Society of Scotland & The Worshipful Company of Farmers with Savills



8.3 Case study – The Harvey Family, Glen Orkney, Marlborough, New Zealand

Simon and Linda Harvey farm in partnership with their son Tom and his wife Claudie, in the high country of Marlborough. They produce mostly commercial sheep and cattle with 3000 ewes and 150 cows on some pretty steep ground.

They also sell a small number of merino rams and have been working with Mark Ferguson at Next-Gen Agri to improve conception and performance by adding fat and muscle to their flock and herd through selection for BCS.

With a strong eye on reducing chemicals and restoring habitats, they have been able to fence off some of their less productive ground without reducing stocking numbers. The aim is to restore some of the indigenous shrubs and trees which are in decline across New Zealand.

They have also found their stock are healthier and are looking to reduce the wormer and pour-ons required. Simon feels there will be greater public pressure on livestock farmers in the near future.

“I think that breeders need to shift their focus away from increasing production to increasing animal welfare traits instead. There are two reasons for this. One is that a lot of the animal health treatments we rely on are not working effectively and there isn’t much research going into new products. Also, consumers are becoming more concerned about the amount of chemicals used in the production of beef and lamb.”



Figure 22: Tom Harvey at Glen Orkney, near some native vegetation they will fence off for habitat restoration

The Harveys were also open about their succession planning and the process they had gone through during the discussion between their three sons.

I felt the Harvey family had put a lot of thought into finding the balance between their own priorities and the need to run a profitable business. It was a great pleasure to meet and stay with them on my travels.

Too fat? The role of body condition in maternal livestock in areas with extreme seasonal variability

A Nuffield Farming Scholarships Trust report by Vic Ballantyne generously sponsored by The Royal Highland & Agricultural Society of Scotland & The Worshipful Company of Farmers with Savills



Chapter 9 - The big fat bull club

9.1 The Breeders

“Feeding stud stock for condition score is a bit like putting ladders on an army obstacle course. It’s a sure way to make sure most succeed, but does little to work out who are the best performers”.

Tom Bull, LambPro, NSW, Australia

Our cows and ewes are the most important part of any commercial flock or herd. But ultimately, we need to source the sperm that produces these females from somewhere else. The breeders.

Not unique to the UK, in all the countries I visited it was felt that not enough breeders are putting sufficient selection pressure on the rams and bulls they supply, and therefore not delivering what is required by their commercial clients. Or, as described by Bevan Ravenhill of Lawson Angus in Western Australia as ‘the big fat bull club’.

Not to be confused with genetic fat and condition, he was talking about the bulls that find their way to sale, rolling fat, having never had to prove that they could thrive in a commercial environment.

Unfortunately in the UK, this kind of male breeding animal is very much the status quo. It is in part due to scale, with the size of the average pedigree sheep flock around 40 and average pedigree cattle herd around 20. Small numbers often mean there is little competition and not enough hard selection. There is also a propensity to prop up animals, particularly where big money has been spent on ‘good blood lines’.

Aside from causing breeding issues like reduced sperm quality and quantity and structural, mobility and feet problems, a bull or ram that requires extra feeding to stay in good body condition will breed females with the same requirements.

In every country there is still a large market for the over fed, over-done, over-bred males – but more and more commercial farmers, pushed by lack of available labour, increasing capital costs and decreasing returns, are turning to breeders with a commercial focus.

Those breeders I visited were adamant that their animals are run under commercial conditions, to ensure the bulls and rams they sell will deliver what their clients require.



Figure 23: The author with Bevan Ravenhill at Lawson Angus, near Albany, Western Australia

Too fat? The role of body condition in maternal livestock in areas with extreme seasonal variability

A Nuffield Farming Scholarships Trust report by Vic Ballantyne generously sponsored by The Royal Highland & Agricultural Society of Scotland & The Worshipful Company of Farmers with Savills



9.2 The Buyers

Definition: Insanity

Doing the same thing over and over again and expecting a different outcome

Credit: A Einstein

Blame cannot be laid entirely at the door of the breeders. Commercial farmers are often their own worst enemy.

I cannot count the number of times I've heard farmers complain that the bull or ram they bought the previous year had 'melted', gone lame, failed to produce any offspring or simply just turned up his toes and died.

And yet...every year they return to the ringside, get carried away in the heat of the moment and come home with a set of testicles likely to do the same again – because they really liked the look of him. It signals to the breeders that we are happy with this arrangement, despite knowing that what we see may not be what we get.

This inexplicable buying behaviour results in farmers having to adapt their systems and environment to the genetics they've bought, rather than buying genetics suited to their own commercial environment and system.

A high input system is fine if you're getting several thousand pounds for pedigree stock, but commercial returns need to be reflected by commercial inputs.

All the commercial farmers I visited who considered BCS an important selection trait had carefully chosen breeders that produce rams and bulls under commercial conditions – that is, they apply relevant environmental and nutritional pressure to their animals. In many cases there was a well developed relationship based on mutual respect and trust.

This included Hamish Murray from Bluff Station, set in the spectacular high country between Marlborough and Canterbury in New Zealand. Hamish buys rams from the Harvey family (see Chapter 8 case study) knowing the rams have been produced to survive their tough mountain environment.

The apathy of UK buyers, their belief that it is just the way things are and they can't change anything, is misplaced. 'The customer is always right' and it is time commercial farmers started voting with their wallets and buying from those breeders they know are producing rams and bulls under systems similar to their own.

Choose the breeder whose system is most similar to your own, then choose the bull/ram you like.

Too fat? The role of body condition in maternal livestock in areas with extreme seasonal variability

A Nuffield Farming Scholarships Trust report by Vic Ballantyne generously sponsored by The Royal Highland & Agricultural Society of Scotland & The Worshipful Company of Farmers with Savills



9.3 Case study – Rennylea Angus

Brian and Lucinda Corrigan of Rennylea Angus in southern NSW, Australia have grown their small farm to become leaders in the Australian cattle industry.

In 2022 they pregnancy-tested 2,200 females and sold 358 bulls. These numbers will continue to grow as they cement their reputation for breeding livestock designed to thrive on commercial farms.



Figure 24: Lucinda and Brian Corrigan and some Rennylea cattle

Their strap line is “High marbling in grass fed systems”. They combine expert stockmanship with the latest technology, undertaking thorough genomic and progeny testing of stock to provide accurate and detailed genetic information to their clients.

Most of their clients are commercial farmers who come to them because they offer structurally sound, high intra-muscular fat, high fertility bulls. Commercial farmers are willing to pay top price for their bulls.

The Corrigans see the introduction of a maternal efficiency EBV index into the Angus breed as a big step forward and have been working with Matt Wolcott and Angus Australia to develop this EBV. Their attention to female genetics was evident on my farm tour with Brian.

Lucinda sits on a number of regional and national boards and committees and brings her dynamic thinking to the business, complimenting Brians passion and knowledge of livestock. Two of their children are also involved in the business with a succession plan in place to enable a smooth transition.

It is hard to communicate just how impressive the Corrigan family are. They seem to have all bases covered and I thoroughly enjoyed getting an insight into not only their livestock, but their approach to business, the wider industry and their outward looking vision.

I was very fortunate to enjoy their warm hospitality and assistance on my travels.

Too fat? The role of body condition in maternal livestock in areas with extreme seasonal variability

A Nuffield Farming Scholarships Trust report by Vic Ballantyne generously sponsored by The Royal Highland & Agricultural Society of Scotland & The Worshipful Company of Farmers with Savills



Conclusions

- BCS is around 25% heritable and therefore worth selecting for
- Improving genetic BCS is a really easy win for livestock farmers
- There is potential to select animals genetically adapted to make better use of the peaks and troughs of the season (the pasture growth curve)
- Improved animal health and fertility are the main reasons BCS is important in sheep and beef cattle
- Robust and resilient animals, with higher BCS, can better cope with climatic and environmental challenges
- Extra BCS needs to be genetic not nutritional, or fat animals simply become inefficient
- Good BCS can have positive impacts on stocking rates (higher) and supplementary feeding requirements (lower) adding to overall productivity and profitability
- Other benefits can include enhanced environmental options and improved animal welfare
- These 'farmability' traits can help to deliver better mental wellbeing for farmers
- Breeders masking genetic BCS through excess feed and lack of pressure is a problem when it comes to supplying bulls and rams to commercial clients
- Commercial buyers are guilty of not being judicious enough about bull and ram selection
- Pedigree livestock should be adapted to thrive in commercial, low input systems
- Improving and increasing data capture of BCS in pedigree systems will help to deliver more information for commercial buyers
- None of this is rocket science



Recommendations

Commercial Farmers

- Should place more value on body condition scoring their own stock
- Place BCS higher up their selection criteria when choosing maternal replacements
- Cull or put to a terminal sire any female unable to meet minimum BCS requirements
- Be unafraid to run animals above current recommended BCS if they are able to do so through genetic progress (rather than extra nutrition)
- Monitor progress of stock and provide adequate nutrition at key times of the year
- Buy rams and bulls from breeders who subject their stock to commercial conditions

Pedigree Breeders

- Need to subject their herds and flocks to commercial environmental and nutritional pressures and select those that perform in these conditions
- Select for higher fat animals if they are struggling to manage condition without excess feed
- Be more selective about those bulls and rams that make it to sale
- Seek out buyers looking for this type of male and build relationships based on mutual trust and respect

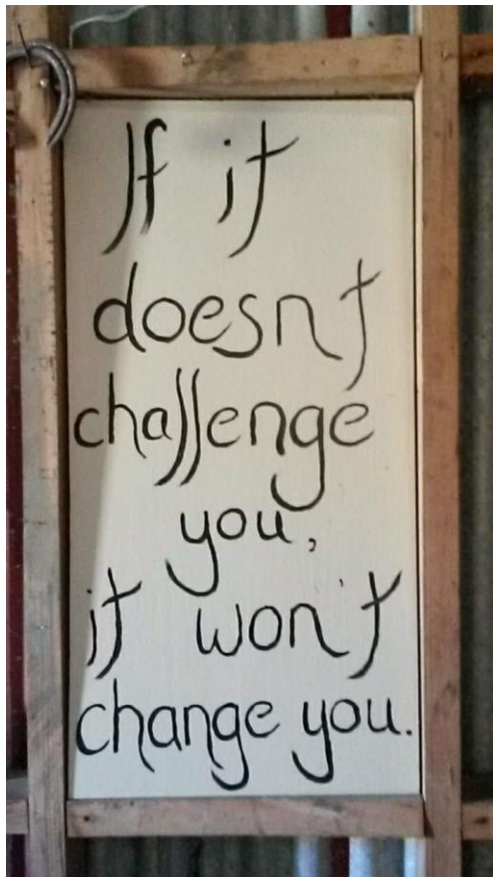


Figure 25: Sign from a NZ woolshed

Too fat? The role of body condition in maternal livestock in areas with extreme seasonal variability

A Nuffield Farming Scholarships Trust report by Vic Ballantyne generously sponsored by The Royal Highland & Agricultural Society of Scotland & The Worshipful Company of Farmers with Savills



After my study tour

I applied for a Nuffield Farming Scholarship because I love learning and applying that learning at a practical level.

One of my strengths is that I am a commercial farmer and one thing we know is that farmers like to learn from other farmers. When we have ‘skin in the game’ and can demonstrate our ideas work, we are more likely to take others with us.

I’m passionate about seeing my fellow farmers in the Highlands and Islands succeed. BCS is a topic that is easy to grasp and easy to implement on farm. It doesn’t require any special equipment and only minimal training.

Now that my study is complete, I’ll be engaging with my fellow farmers through every means possible to encourage them to think about prioritising BCS. I’ll do this through a multi-pronged approach including social media, local and national meetings and one to one conversations.

Importantly, I will continue to practice what I preach and share the outcomes of those decisions – good and bad.

Fat females aside, I have learnt so much about other parts of the ag industry and sharing these stories are also high on my agenda. Our geographic location can mean the Highlands and Islands sometimes misses out on opportunities to learn and share ideas. I’m hoping to bring the knowledge of my fellow scholars to some of the meetings and groups I’m part of – telling Nuffield stories beyond the pages of our reports.



Figure 26: The author at Bluff Station, Canterbury, New Zealand

Too fat? The role of body condition in maternal livestock in areas with extreme seasonal variability

A Nuffield Farming Scholarships Trust report by Vic Ballantyne generously sponsored by The Royal Highland & Agricultural Society of Scotland & The Worshipful Company of Farmers with Savills



Couldn't have done it without...

If it feels as though I have mentioned a lot of people in this report, so you may be surprised to read they are but a fraction of the many who offered me their time, knowledge, generous hospitality and friendship over the course of my travels.

Though much of it had nothing to do with fat females, I would need another ten thousand words to get in all the bits of wisdom I picked up along the way.

If there is one thing we know for sure, the success of our industry is all down to the people. And farming people are some of the smartest, kindest and most resilient we'll find anywhere.

So, by geographical location, a big thanks to -

Canada – Special mention to Graeme & Heather Finn and Art & Cathy Wheat for their incredibly generous hospitality and assistance in itinerary planning. Also Jim Bauer, Bart Lardner & Kaitlyn Nielson, The Stankievech Family, The Braisher Family, Ingrid & Ty Johnston & family, John & Barb Cote, The Canadian Beef Industry Conference team

New Zealand – Special thanks to Dr Mark Ferguson, who provided a lot of inspiration, pointed me in the right direction and helped with my itinerary. Also - Gavin & Heather Kay, Hamish & Melanie Marr, Rhys Roberts, Richard & Ruth Fitzgerald, Craig Mackenzie, Ben Todhunter, Hamish & Jess Murray, The Harvey Family, Dugald & Mandy Rutherford and Dan Wheeler

Australia – Special thanks to Dr Andrew Thompson who pointed me in the right direction and helped with my itinerary. Also - Luke & Theresea Dowling, Andrew & Zoe Rolfe, Jack & Brooke McGrath, Tom Bull, Lucinda & Brian Corrigan, Annabel & Bill Scott, Sam Burton Taylor, The Watson & Swift families, Chad & Louise Taylor, Mark & Claire Graham, Dawson & Greta Bradford, Clayton & Polly South, Ian Robertson, Bevan Ravenhill, John & Gabrielle Young, Rob & Kellie Bell

Iceland – Unnsteinn, Harpa and Magnus Snorrason for fantastic hospitality and organising a number of great visits. We were very lucky to get a look at several aspects of Icelandic agriculture and culture

UK – Dewi Jones, Janet Roden, Tim White, Robert & Eileen Parker, Graeme Lofthouse, Andrew & Liz Elliott, Hamish MacDonald, John & Fiona Scott, Nicola Lambe, Ann McLaren, Sam Boon, John Yeomens, James Baxter

Zoom – Niall O'Boyle, Matt Wolcott, Jamie Leslie

Notable thanks to – 'The Dollars' – my fellow 2022 scholars, the Nuffield Scotland team, Mike and Poey Vacher, Charlotte Merson, the Nuffield WhatsApp groups and the folk on Ag-Twitter who made suggestions and encouraged me along the way

And lastly - my wonderful husband - Mr B – Jason Ballantyne – who has 100% supported me through this and continues to be my biggest cheer leader. Thank you!

Too fat? The role of body condition in maternal livestock in areas with extreme seasonal variability

A Nuffield Farming Scholarships Trust report by Vic Ballantyne generously sponsored by The Royal Highland & Agricultural Society of Scotland & The Worshipful Company of Farmers with Savills



Appendix

Happy Snaps

It feels remiss of me not to include some more photos of my travels and the people I met. Unfortunately I didn't get a great photo of everyone or everything, so missing a few faces.

Canada



Clockwise from top left: Dr Bart Lardner and the author (Saskatoon University research farm); Graeme, Heather and Morgan Finn (Madden, Alberta); The author with Barb and Doug Cote (Black Fox Distillery, Saskatoon); Cathy and Art Wheat (Marwayne, Alberta); The author with the Stankieveh family (Trochu, Alberta); Canadian Beef Industry Conference signage

Too fat? The role of body condition in maternal livestock in areas with extreme seasonal variability

A Nuffield Farming Scholarships Trust report by Vic Ballantyne generously sponsored by The Royal Highland & Agricultural Society of Scotland & The Worshipful Company of Farmers with Savills



Canada cont:



Left – top to bottom: Jim Bauer and solar powered water trough for winter; Driving through forest fires near Whistler, BC; Barn dance with the Wheat family, Alberta.

Right – top to bottom: Ingrid and Ty Johnston, Onward Ranch, BC; Feed modules at Saksatoon University research farm; Beaver activity along a river in the Rocky Mountains, BC; Checking out a portable wind shelter with Graeme Finn & Jim Bauer – possibly useful in the UK?

Too fat? The role of body condition in maternal livestock in areas with extreme seasonal variability

A Nuffield Farming Scholarships Trust report by Vic Ballantyne generously sponsored by The Royal Highland & Agricultural Society of Scotland & The Worshipful Company of Farmers with Savills



The UK



Clockwise from top left: Graeme Lofthouse and author, Bankhouse Farm, Galashiels, Scotland; Dewi Jones, Innovis Headquarters, Aberystwyth, Wales; The author and Hamish MacDonald, Innovis Southfield Farm, Hawick, Scotland; Tim White, Exlana Sheep, near Warminster, England; The author with Robert Parker at Drumdow Farm, Stranraer, Scotland; Dr Nicola Lambe, Kirkton, SRUC hill research farm, Crianlarich, Scotland

Too fat? The role of body condition in maternal livestock in areas with extreme seasonal variability

A Nuffield Farming Scholarships Trust report by Vic Ballantyne generously sponsored by The Royal Highland & Agricultural Society of Scotland & The Worshipful Company of Farmers with Savills



New Zealand



Left - top to bottom: The author and Mark Ferguson, Next Gen Agri HQ, Christchurch; Vegetable garden at Clareview, Align Farms, Ashburton - all staff receive a weekly vegetable box; Hamish Murray, Bluff Station, Kekerengu.

Right- top to bottom: The Marr family, near Mount Hutt; Ben Todhunter, Cleardale Station, Mount Hutt; Dan Wheeler, Broomfield, Canterbury; Fertiliser spreading, Bluff Station, Canterbury

Too fat? The role of body condition in maternal livestock in areas with extreme seasonal variability

A Nuffield Farming Scholarships Trust report by Vic Ballantyne generously sponsored by The Royal Highland & Agricultural Society of Scotland & The Worshipful Company of Farmers with Savills



New South Wales, Australia



Left – Top to Bottom: Handpieces, Rolfe Agriculture, near Cooma; Mark Swift putting new machine together, near Parkes; Silo Art, Grenfell; The author with Chad and Louise Taylor, Mumblebone Merinos, Wellington

Right – Top to Bottom: Kennys Creek Angus, Boorowa; Yarding up with Andrew Rolfe near Cooma; Lambpro, Holbrook; The new Mumblebone wool shed, Wellington

Too fat? The role of body condition in maternal livestock in areas with extreme seasonal variability

A Nuffield Farming Scholarships Trust report by Vic Ballantyne generously sponsored by The Royal Highland & Agricultural Society of Scotland & The Worshipful Company of Farmers with Savills



Western Australia



Clockwise from top left: Mount Barker sale yards; The author and her rig on the road in WA; Ultrawhite lamb on the menu at Monty's Leap vineyard near Albany; Dr John Young and Gabrielle, near Denmark; The author at Katanning sheep yards.

Too fat? The role of body condition in maternal livestock in areas with extreme seasonal variability

A Nuffield Farming Scholarships Trust report by Vic Ballantyne generously sponsored by The Royal Highland & Agricultural Society of Scotland & The Worshipful Company of Farmers with Savills



Western Australia cont.



Clockwise from top left: The author in a giant tingle tree; Cobalex – Injectible cobalt and selenium, unavailable in the UK; Sheep belonging to Clayton South at Wagin; Enjoying a post-harvest beverage with the South family: covered, baled silage at Rob Bell’s farm (the author went on try this method at home); Optiweigh scales at Rob Bells, near Capel.

Too fat? The role of body condition in maternal livestock in areas with extreme seasonal variability

A Nuffield Farming Scholarships Trust report by Vic Ballantyne generously sponsored by The Royal Highland & Agricultural Society of Scotland & The Worshipful Company of Farmers with Savills



Iceland



Left - top to bottom: Lunch at Frioheimar a tomato greenhouse heated with geothermal water; Harpa, Magnus and Unnsteinn Snorrason, our hosts for this trip; Agricultural University of Iceland; Emily Padfield, Unnsteinn and the author.

Right- Top to Bottom – Icelandic sheep on slats; Trying to stay warm with Emily at Gullfoss waterfall; The most impressive horse stable ever; Icecream at Efstidalur dairy and café (cows behind).

Too fat? The role of body condition in maternal livestock in areas with extreme seasonal variability

A Nuffield Farming Scholarships Trust report by Vic Ballantyne generously sponsored by The Royal Highland & Agricultural Society of Scotland & The Worshipful Company of Farmers with Savills



Nuffield Family



And finally, a huge shout out to these people – my fellow 2022 UK Nuffield Scholars. They've been through the highs and lows of the last few years and it is a privilege to call them all friends.

Too fat? The role of body condition in maternal livestock in areas with extreme seasonal variability

A Nuffield Farming Scholarships Trust report by Vic Ballantyne generously sponsored by The Royal Highland & Agricultural Society of Scotland & The Worshipful Company of Farmers with Savills