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THE FUTURE OF UK THE SHEEP INDUSTRY POST BREXIT

INTRODUCTION by Robyn Hulme

Sheep farmers are becoming increasingly concerned about what the future holds in store for them as the consequences of the Brexit decision come into effect. No one knows precisely what will happen, but the general consensus appears to be that the sheep industry is likely to be one of the sectors most adversely affected.

The fact that already the average sheep farmer is losing money on his standalone sheep business is not an encouraging starting point and that is before one worries about subsidy changes or trading restrictions and their impact on prices. The following tables supplied by AHDB indicate the extent of the challenge ahead.

AHDB
BEEF & LAMB

AHDB Beef and Lamb
Stocktake
Costs of Production 2015/16

Non-SDA Breeding Flocks

	(£ per head output)			(£ per lwt kg lamb output)		
Financial Performance (£ per ewe to ram)	**Bottom Third**	**Average**	**Top Third**	**Bottom Third**	**Average**	**Top Third**
Number of flocks in sample	29	89	29	29	89	29
Average flock size	373	688	986	373	688	986
Lamb output	89.44	90.62	91.39	1.63	1.72	1.81
Other income	2.43	3.08	3.68	0.04	0.06	0.07
Gross Output	**91.87**	**93.70**	**95.07**	**1.68**	**1.77**	**1.89**
Replacement costs	7.81	9.18	9.53	0.14	0.17	0.19
Output less replacement costs	**84.06**	**84.52**	**85.55**	**1.53**	**1.60**	**1.70**
Variable Costs						
Purchased feed including minerals	15.83	8.08	3.69	0.29	0.15	0.07
Home-grown feed	0.41	0.39	0.31	0.01	0.01	0.01
Purchased forage	0.93	0.35	0.11	0.02	0.01	0.00
Home-grown forage (excludes contract)	8.70	4.88	3.46	0.16	0.09	0.07
Total feed and forage	***25.87***	***13.70***	***7.56***	***0.47***	***0.26***	***0.15***
Vet and medicine	10.19	7.14	5.05	0.19	0.14	0.10
Bedding	1.69	0.75	0.38	0.03	0.01	0.01
Other livestock expenses	8.65	8.00	8.20	0.16	0.15	0.16
Total variable costs	**46.40**	**29.59**	**21.20**	**0.85**	**0.56**	**0.42**
Gross Margin	**37.66**	**54.93**	**64.35**	**0.69**	**1.04**	**1.28**
Fixed Costs						
Labour - paid	18.29	10.62	8.35	0.33	0.20	0.17
Machinery repairs and spares	2.79	2.18	1.71	0.05	0.04	0.03
Contracting	4.14	2.66	2.12	0.08	0.05	0.04
Electricity	0.29	0.24	0.14	0.01	0.00	0.00
Fuel	3.77	2.73	2.31	0.07	0.05	0.05
Property maintenance and water	2.32	1.56	0.90	0.04	0.03	0.02
Land Rent (Actual)	10.86	7.37	6.08	0.20	0.14	0.12
Overheads	5.81	3.88	2.97	0.11	0.07	0.06
Cash Only fixed costs	**48.27**	**31.24**	**24.56**	**0.88**	**0.59**	**0.49**
Cash Only Cost of Production	**102.47**	**70.01**	**55.29**	**1.87**	**1.33**	**1.10**
Cash Only Net Margin	**-10.60**	**23.69**	**39.79**	**-0.19**	**0.45**	**0.79**
Depreciation	9.47	6.11	4.77	0.17	0.12	0.09
Finance costs (Imputed)	1.78	1.38	1.14	0.03	0.03	0.02
Labour - unpaid (Imputed)	17.03	12.78	9.08	0.31	0.24	0.18
Land Rent (Imputed)	13.82	9.77	7.43	0.25	0.19	0.15
Non-Cash fixed costs	**42.11**	**30.04**	**22.42**	**0.77**	**0.57**	**0.44**
Full Investment fixed costs	**90.38**	**61.27**	**46.99**	**1.65**	**1.16**	**0.93**
Full Investment Cost of Production	**144.58**	**100.04**	**77.71**	**2.64**	**1.90**	**1.54**
Full Investment Net Margin	**-52.71**	**-6.34**	**17.36**	**-0.96**	**-0.12**	**0.34**

The New Zealand experience post subsidy removal is often quoted by the press and politicians as an illustration of the future benefits to UK sheep farmers if subsidies are removed. This is an over simplistic analysis, which fails to understand both the different structure of their industry and ignores the acute hardships suffered by so many NZ farmers. However I do believe that the need for UK sheep farmers to embrace change has never been greater and that many useful lessons can be taken from the New Zealand experience over the last 30 years.

We ourselves made a massive change just over 10 years ago when we decided that what we were then breeding would not meet the future needs of sheep farmers. We therefore sold our long established pedigree Suffolk flock and replaced it with pure New Zealand Suffolks. This decision was inspired by a paper given at The All Ireland Sheep Conference at Greenmount College in 2005 by Murray Rohloff, a NZ sheep farmer and consultant. Since then he has become our inspiration, mentor, friend and finally partner in the whole EasyRam venture. EasyRams was founded in 2006 with the intention of not only selling 100% NZ sheep genetics but also of adopting the whole Kiwi ram breeding philosophy. We sold our first 15 rams in 2007 and now some 10 years later as I write this in the spring of 2017 we have sold over 1800 rams to 600 clients making us the fastest growing private ram business in the UK.

Since 2010 EasyRams have run summer meetings with Murray Rohloff. Our aim at these meetings has been to introduce new and thought provoking concepts to commercial sheep farmers in order to help improve the profitability of their businesses. The aim of this small booklet is to put in a more permanent form some of the subjects discussed at these meetings and to also to emphasise some of the hard lessons New Zealand sheep farmers had to learn when their subsidies disappeared overnight and the economics of farming sheep completely changed.

Today all commercial sheep farmers face the same critical question which is; what changes can they make within their own farm gate to cope with what we believe will be, at the very least, a much more volatile market for sheep meat in the future.

There are only two ways to improve the profits of a sheep enterprise – increase value of products through higher prices, or more output, or alternatively reduce costs. The following 2 tables indicate that there is plenty of room for immediate improvement with such a large proportion of lambs still missing target spec and the continuing fall in the lambing rate but a lot more will still be required of all of us.

So what do I foresee over the next 10 years?

- Continued erosion of subsidies which will probably accelerate post 2022.
- Increased volatility in our prices as we are more exposed to world markets for sheep meat.
- Minimal room for price increases as all the evidence shows that consumption declines as lamb goes up in value.
- Continued domination of supermarkets as buyers who already sell 72% of all lamb sold in UK
- Lamb production will be pushed more towards marginal ground and into the hills as more profitable enterprises including bioenergy continue to mop up land that can be cropped

So how will this scenario affect sheep producers and will they be willing to change? Two of my favourite quotations are "You do not have to change because survival is not mandatory" and "The dinosaurs disappeared because they could not adapt to their changing environment". So "Change" is the 1000$ question, because if sheep farmers embrace change and create profitable businesses, many commentators foresee a good future with increasing world demand for sheep meat.

I expect a significant part of the industry to embrace change and that the rest to be forced to leave the industry. This view is derived from personal experience over the last 10 years and from talking with many of the younger and or more adventurous sheep farmers. What we have been trying to do over recent years would not have been possible 10 to 15 years ago. But now there are large numbers of Early Adopters who have travelled the world either as Nuffield Scholars, or HCC Scholars, or purely out of curiosity. They have returned full of ideas and confidence that as individuals they can create viable long term sheep enterprises by embracing change.

So what changes do I foresee and why?

- Labour is one of the industry's biggest costs and has to be reduced either by running more sheep per labour unit or running similar numbers with less time spent on the sheep. This will be achieved by concentrating on
  - ➢ Ewes that require less labour. Some of these will be Easy Care type ewes but the majority will have to come from farmers selecting sheep from a functional as opposed to a cosmetic standpoint.
  - ➢ Low cost management systems such as outdoor lambing.
- More use of pasture (the cheapest feed) and less of concentrates (the dearest). The driver for this change will be economic, but this change will play very well with the consumer from both a perception viewpoint and from reducing the industry's carbon footprint.

- Increased rearing rate and more lambs meeting market spec. Improvements in these areas will be rapid once sheep farmers receive less outside income.
- Increasing % of self replacing flocks. This will be a significant change that will be driven by flock owners having no other way of improving the maternal performance of their flocks. Prolificacy, lamb survival, milkiness, longevity as well as the normal health traits such as worm resistance/resilience, reduced mastitis and less Footrot and less dags; all these traits can be improved more effectively by breeding than culling and to do this self replacing flocks are essential.
- More use of technology. EID will eventually be seen as one of the biggest advances for the sheep industry over the last century allowing selection based on information.
- More decisions based on figures due to regular monitoring.

What is the future for ram breeders? Until now UK breeders have made genetic gain by breed substitution rather than improvement over the last 50 years. This cannot continue, not least because there are not many other breeds to move into! On many ram breeding farms scale, or rather lack of it, limits selection with all the main terminal sire flocks being on average no bigger than 35 ewes and Blue Faced Leicester flocks in the upper teens. Ram breeders have concentrated on feeding rather than breeding and on fashion whilst ignoring the commercial market.

From a practical viewpoint I expect the following to happen

- The number of ram breeders to fall significantly as rising costs make this "hobby" too expensive for many, whilst the new techniques used to identify rams with true commercial value will demand a commitment of time and money that are too great for most current breeders.
- More large scale breeding companies or groups of breeders working together using technologies to evaluate commercial traits.
- Breed Societies will become marginalised and increasingly irrelevant UNLESS they actively promote change and bring commercial, as opposed to social benefits, to their members.
- Increased use of crossbred (composite) rams. This will be partly due to the benefits of hybrid vigour but more importantly due to breeders introgressing attributes such as Myomax into breeds that do not normally carry them.

Writing this piece has been a salutary experience because it encapsulates the reasons why I decided to cast aside a lifetime's work in breeding sheep and go back to the drawing board to start again. I am more convinced than ever of the need for change and that there is a willingness out there amongst commercial sheep farmers to embrace change.

One final point; in 2006 The Suffolk Society held a conference entitled "The Future Market". The opening speaker was Richard Sadler, the former head of meat, dairy and poultry products at Waitrose. He opened his paper with these words

"The market place is full of opportunities – these opportunities will be harvested by the energetic, the imaginative, the persuasive, the creative and from the power of knowledge"

I hope that we at EasyRams can in some small way help you, our clients, to seize these opportunities.

CHAPTER 2

MURRAY ROHLOFF

Sheep genetics and management consultant

Eight years at Invermay Agricultural Research Centre in sheep reproduction physiology (prolific flock management, breed comparisons and lamb survival studies).

Twenty five years as a leading progressive ram breeder. Awareka rams mated over half a million commercial ewes annually. Many Awareka sires have featured as trait leaders on SILACE. An instigator of Sheep Improvement Ltd. (industry owned national sheep recording facility) and instigator and leading breeder for host resistance to internal parasites. The Awareka flock was sold in 2008 and has since won the most awards for maternal breeds in the NZ Sheep Industry Awards under its new ownership since their inception in 2012.

Increased involvement in strategic and business planning of farming and restructuring of veterinary businesses since 2002. During this time numerous visits to the UK and Ireland on instructional and speaking engagements organised by Teagasc, DARNI, SAC, Eblex, HCC and Suffolk Breed Society. Part of the set-up team for Sheep Ireland in 2008.

During the last 15 years have held ongoing science and advisory roles to AgResearch Ltd. (crown owned research provider) and Ovita Ltd. (research funding provider). Instigator and former chair of FT200, an industry owned sheep production and financial benchmarking provider.

Evaluated novel genetics for out-of-season lambing, especially 3 lambings in 2 years. The original importer of Charollais and Ile de France sheep breeds, now farmed in Otago under joint ventures. Chair of Charollais breed society.

A joint venture owner of EasyRams UK based near Ellesmere.

Specialist field is strategic planning of agricultural businesses to be more profitable through appropriate structures, goals, genetics and management.

Now retired.

CHAPTER 3

SURVIVING ECONOMIC CHANGES

Sheep farming lessons from New Zealand

In 1984 the world imploded for NZ sheep farmers. No longer were they encouraged by tax breaks and subsidies to increase exports, as overnight they were fully exposed to global markets to either sink or swim in totally uncharted waters where the previous supported rural economy (most farmers received 40% of their income from Government) no longer reflected the new situation and outlook. And what an outlook! Volatility rules in times of rapid major economic change and the unpredictable occurred in NZ causing large currency swings that made export returns look pathetic and interest rates to fly into stratospheric levels as the financial investment sector smelled risk.

What will Brexit deliver to the UK sheep farmer? I can only guess, but like all others I will have to wait to see what unfolds. Whatever the outcomes are, it will not be the same as the past, or the same as NZ.

In NZ that meant product prices dipped to less than half (old ewes were a cost to have slaughtered) and interest rates doubled to over 20%. That may have been survivable if it had only lasted one or two years, but it took almost a decade to climb out, causing land values to bottom out at a third of the precollapse level. Farmers lost their ability to both make a profit and retain their equity. Those newer entrants (myself included) with a high debt to equity ratio precollapse were in a hopeless position being technically insolvent. They had two options; get out or change things to restore profitability. Sadly many were forced or opted to take the first option, but those who chanced their arm on making changes survived and subsequently grew their businesses to become very resilient and profitable.

Nobody changed anything immediately as shell shock takes some getting over, but the sooner they did the better they were, even those who had large negative equity like myself. However before anything could be changed some basic understanding of the business had to be made. Farmers only have control over those things inside the boundary fence, but many farmers burned up huge amounts of energy worrying about things they have never had control over and became consumed in the blame game.

Sheep farming is simply using a ruminant species to convert pasture and forage into saleable products. Two important things here are the fundamentals of sheep farming. Growing pasture and having sheep best suited to converting it into money. In essence; more and better pasture is the diesel of the business, while the genetic ability of the sheep determined the level of profit that could be extracted from each kilo of pasture dry matter.

Production systems determine the cost structure. Costs are fully controlled by farmers. Change the system if the established system costs too much preventing acceptable profit, because income is vanity, but profit is sanity. Job pleasure soon evaporates when it is unprofitable. Sadly, mental health is closely related to financial security, with too many farmers not seeing a way out of their financial demise and too many marriages wrecked because of a sense of hopelessness and with stoic farmers trying to protect their families from worry by shouldering all the troubles themselves, or pretending it was not happening.

New Zealand farmers learned to value the pasture they grew as no alternative feed offered the cost/benefit of pasture. Farmers in the UK must likewise appreciate the value of pasture and their ability to manipulate its supply and quality to enhance sheep production. Coupled with this is the impact of superior sheep genetics for productivity and lowering the cost of management. These offered NZ farmers a way to restore profitability and design systems to be resilient throughout the commodity price cycles. Halving the costs and at least maintaining productivity became the immediate goal.

The points of change in order of influence on profitability;

- Better control of pasture quality over late spring and summer to promote lamb growth, as "days to slaughter" is the trait with the most impact on profit by far (the farmer controls pasture quality and the ram breeder the genetic ability to express that trait).
- Better fit of feed supply in early spring, as then it is all about milk production (role of the farmer).
- Increase lambing percentage to suit the environment, especially improvements in lamb survival and reduced intervention (the role of the breeder).
- Better control of internal parasites. The greatest challenge to sheep performance globally (this role is shared by the farmer and breeder).
- Better ability to thrive and finish on pasture only (role of the breeder).
- Increase in ewe and ram longevity and ram serving capacity (role of the breeder).
- Ability to shorten winter by better pasture allocation (role of the farmer).

The NZ experience changed pasture management to a new level of efficiency based on regional variations of rotational grazing and a revolution in ram breeding occurred where only the most progressive breeders survived. They offered farmers genetics which lowered production costs (less shepherding by lowering lambing assistance and health requirements, higher ewe to ram ratios and longevity) and performance recorded increases in productivity (mainly more and better lambs). Over the last 25 years productivity per ewe has doubled.

We learn from history and history repeats. There will be no reason for UK sheep farmers to flounder around looking for a fix if post Brexit sheep farming does not meet expectations. NZ farmers identified the business principles, they are spelt out for UK farmers to adopt and adapt to their environment if UK sheep farming economics gets turned on its head, be it overnight or gradually.

CHAPTER 4

IS YOUR FARMING BUSINESS SECURE?

Based on personal lessons learned in the harsh economic changes NZ faced in the mid 1980s and subsequently assisting farming families to survive and prosper when their banks were threatening to call in their mortgages.

The following questions ask you to assess the resilience of your business to the ever changing weather, markets, family commitments, life balance and stages to your retirement.

If you have been too busy, or find it too hard to address these questions by living on the hope that all will come right one day, you are living in a fool's paradise being irresponsible for your current assets, mental health and family's future.

The following 20 questions are in order of logical attention so knowledge about performance is built up prior to addressing structural and life changes.

1. Do you have clear Key Performance Indicators (KPI's) for your business? Financial as well as physical measures.
2. Do you have timely systems in place to regularly record, measure and monitor these KPI's? (Most of these are routinely gathered, but are they timely?)
3. Do you know which parts of pastoral farming most impact on profitability? (See; "Surviving Economic Changes")
4. Have you got a vision for your business and life with a strategy to achieve it?
5. Have you discussed this vision with your spouse, key family members and an advisor/mentor you respect?
6. Have you written this down as the author and driver of the strategic plan?
7. Have you written a detailed business plan with itemised goals that you annually strive to achieve that is based on the vision outlined in the strategic plan?
8. Have you sought expertise to identify and quantify each item of change?
9. Do you have relevant annual budgets? (financial, feed and nutrients)

EasySuffolk sire lambs in Inner Hebrides.

10. Do you actively monitor and adjust these budgets throughout the year?
11. Have you measured your annual pasture growth and calculated how much each kilo of dry matter is worth?
12. Do you have an appropriate business structure for business growth, succession and funding your retirement?
13. Do you meet regularly with key people to review your business plan?
14. Do you analyse your business performance annually by benchmarking your KPIs against similar operations? (Gross farm revenue, operating costs and profit, return on assets and equity, growth in equity, etc.)
15. Do you know what cash operating surplus your farm must generate to meet your personal drawings, interest and principle repayments/rent commitments, tax and investment needs?
16. Do you know what you will need for your retirement?
17. Are you achieving your desired balance between time spent with family, friends, personal development, leisure, work and business?
18. Do you mix with motivated and positive people?
19. Do you keep up to date with farming developments?
20. Do you really enjoy what you do?

"The consequences of today are determined by the actions of the past. To change your future, alter your decisions today." S. N. Goenka.

CHAPTER 5

POTENTIAL SHEEP FARMING IMPROVEMENTS

Trait	Economic (profit) weighting
Lift in lamb growth rates of 40 g/day	**9.5**
Lift in ewe flock lambing % of 5%	**8.2 ***
Better parasite control	**7.4**
100% lambing from hoggets	**2.6 ***
Breeding for parasite resistance	**2.1**
Increase survival of twins and triplets	**1.2**

*Note: Trait weighting marked * is dependent upon a regular summer pasture surplus, therefore is the result of better utilisation of pasture grown. This option may not be suitable to farms where high quality surpluses cannot be managed, such as hill farms or highly stocked farms that can easily conserve surplus feed.*

The above analysis revised to 2017 incomes and costs further demonstrates where the "low hanging fruit" is for sheep farmers to capture.

Better parasite control, by use of tested anthelmintics for efficacy on your farm, is the only trait for which you have sole responsibility. All other traits listed can be improved by your choice of ram breeder. If your ram breeder is selecting for Growth, increased Number of Lambs Born, Onset of Hogget Oestrus or Lambing, Parasite Resistance and Lamb Survival, you get those "free lunches" in the package. Such genetics increase productivity and reduce costs giving more profit.

Subtle changes in pasture management will enhance these effects giving grass bred genetics more opportunity to express their advantage.

CHAPTER 6

FEEDING MANAGEMENT OF UK SHEEP MUST CHANGE

Sheep as a farmed ruminant species have two fundamental deficiencies compared to other ruminants which compete for the same land resource. Let's look at high performance sheep versus dairy on strong soils capable of supporting both systems.

Sheep need to consume 2.1 times more dry matter to produce a kilo of sheep product (a mix of prime lamb, store sheep, mutton from culled ewes and wool) than dairy cows to produce a kilo of dairy product (a mix of milk solids, cull cows, store cattle and veal calves) on the same property consuming the same feed.

International prices over the last decade show that each kilo of product from either enterprise has been sold at a premium to the dairy option of 1.41 to 1.53 times that of sheep product. Therefore the conversion of pasture to each species product mix shows sheep as substantially less efficient.

However the real world doesn't always work so simply as that. Generally the more intensive a farming system becomes, irrespective of species employed, the greater the costly inputs mount. So the final measure of profitability can change the ranking between species farmed.

The greatest threat on an international scale to intensive sheep farming is the future cost of grain feeding. This single factor may cause the demise of sheep farming in many parts of the world. That is because of the efficiency of sheep to convert feed to a kilo of product that is worth less will not be economically viable when more efficient species, especially poultry and pigs, will out compete sheep thereby relegating sheep to being a pasture only species. We also expect the human population, hence human demand for grain to increase by 80% by 2050 and more grain to be diverted to biofuels as energy prices rise.

Of course nature designed sheep extremely well to carry out the function of 100% reliance on grazing. However many EU pedigree breeders have been hell-bent on selecting sheep from those most responsive to concentrate diets. This results in that population going in a completely different direction, making such sheep both poorer grazers and doers in a pasture only system. It has been recognised for centuries that different UK breeds suit different hill and mountain environments where their diets are totally dependent upon local pasture quality and supply. But selection among any population of sheep will show that some will handle hard going and others cannot. This is why it is so important for the pedigree breeder to select superior performers and cull the under performers in a pastoral system in which the progeny will have to commercially perform on pasture only diets.

If sheep cannot compete for finishing concentrates in the future, let's make sure we have the genetics to do it all off pasture now. This capability is a major part of FUNCTIONALITY. All protein producing industries are going to find cost control harder into the future. A low cost pasture only sheep industry will easily compete because you always win when working with nature.

CHAPTER 7

UNIVERSAL PRINCIPLES OF PASTORAL FARMING

1. Pasture must be eaten or removed for adequate regrowth to occur.
2. Rotational grazing can induce pasture to grow up to 80% more dry matter (DM) than set stocking when leaf area per plant is severely reduced.
3. To maintain good pasture growth under sheep, keep pasture mass between 1500 and 2500kgDM/ha. But slightly longer when cattle are also grazed.
4. Temperature, solar radiation (even on cloudy days) and soil moisture are the key drivers of growth.
5. Soil fertility affects growth but especially species composition. Fertiliser gives less aggressive plants a better opportunity to compete. Early flowering grasses are just as digestible in spring before seed head emergence, but plummet once the stem to leaf ratio increases.
6. Nitrogen is essential for photosynthesis, hence plant growth. Budget on 15kgs DM/ha response to a kilo of N under sheep farming.
7. All green leaf has similar energy content, but it is digestibility that is all important, especially for sheep production.
8. The greater the ratio of plant cell contents to cell wall, the greater the digestibility. Cell wall (cellulose) is digested by fermentation which requires time.
9. Dead matter explains 70% of the variation in pasture quality. It slows up food movement through the rumen. It can be very limiting to lamb growth in laxly grazed pastures.
10. Nutritive value declines with leaf age. For most grasses leaf older than 25 days of age plummets in digestibility. Summer pastures have higher stem content further reducing digestibility.
11. Legumes have higher nutritive value because of higher digestibility even at older leaf age.
12. Nutritive value declines with temperature rises over 25 degrees C. Cell walls thicken which lowers digestibility. Dead matter accumulates when warmer and drier. The proportion of dead matter in pastures is a key driver of autumn growth in lambs.
13. White Clover grows most rapidly when soil temperatures exceed 15 degrees C.
14. Grazing pressure prevents dead matter build-up and encourages legume content which struggles to compete for light if pastures remain longer than 10cm for more than 25 days.

15. When soil temperatures drop below 5 degrees C or soil moistures are at wilting point, the grazing management makes no difference to pasture growth or composition.
16. Senescent pasture (standing hay) has similar digestibility to when it was green. However its quality plummets after significant rainfall and decomposition sets in. Fungal build-up occurs in dead matter. Mycotoxins can be very harmful to animal health.
17. Graze and fertilise to maintain a healthy clover base. Clover is the main supplier of N for the grasses due to root nodule decomposition.
18. Grass component of pasture offers quantity for most of the year. Clover and herbs offer animal production advantages due to digestibility. Late flowering grasses and high sugar Ryegrass cultivars offer a longer season of higher digestibility.

SHEEP FEED REQUIREMENTS

Maintenance

1. Sheep require 40% less feed for maintenance per kilo of live weight than other ruminants.
2. Immature sheep need 8% more feed.
3. Entire males' need 15% more feed than ewes and wethers at the same weight.
4. Shearing can increase maintenance by 40-60%.
5. The cost of grazing low pasture mass can increase energy costs by 5%.
6. Slope can increase energy cost by 20%.
7. Digestibility can affect DM requirements for maintenance by 65%.

Growth/production

1. Fat is 1.7 times more expensive to lay down than protein, so finishing is more expensive on feed.
2. Highly digestible feed allows for a 30% energy saving per kilo of growth.
3. Only in the last 6 weeks of pregnancy are ewe requirements increased. Demand is 3 times higher near birth than at 6 weeks before birth. A ewe carrying triplets requires 50% more energy than a single bearing ewe.
4. Ewes require 20% less energy to restore their body weight when lactating.
5. Peak lactation can be 80% higher than late lactation. Underfeeding can limit the quantity and duration of the peak. Feed allocation between seasons can result in a 20% weaning weight difference.
6. Milk production increases by 20-50% per additional lamb reared and greater in well fed and conditioned ewes.
7. Ewes with twins cannot eat enough pasture to grow lambs at 300g/d if feed is below 7cm even on spring pasture.
8. The most limiting factor in feed allocation is always energy; protein is adequate on pasture.
9. Fast growing animals use less energy and are more efficient. Genetics plays a large part in grazing behaviour. Animals selected to respond to concentrate diets are less equipped genetically to handle pasture only diets.
10. 60- 70% of production occurs from late spring to midsummer. Digestibility rules. About 80% of profit comes from this period.
11. Trace elements Co, Se, Cu deficiency can all reduce growth, but are cheaply corrected.

FEED BUDGETING

To accurately calculate daily flock requirements and seasonal feed budgets, a large amount of information must come together. Feed budgeting software is essential to take into account all the seasonal variations in feed quality, quantity and animal demands of a variety of animal classes which have differing demands across the seasons.

Farmers usually grow into more precision as they tackle the basic requirements and achieve skills in assessing pasture supply and demand.

The first priority is too measure pasture more accurately between seasons. The most basic tool of pasture measurement is the Pasture Stick.

- Sheep cannot harvest below 400 kgs DM/ha or about 5mm above ground level.
- 5cm equates to about 1500 kgs DM/ha of winter and spring pasture, or 2000 kgs in summer/autumn pasture but may have up to 25% as stem or dead matter.
- 7cm equates to 1800 kgs of winter/spring pasture, or 2500 kgs of summer/autumn pasture.
- 10cm equates to 2300 kgs of winter/spring pasture, or 3300 kgs of summer/autumn pasture.
- 15 cm equates to 3000 kgs of winter/spring pasture, or 4600 kgs of summer/autumn pasture.

Farmers can become very accurate in assessing pasture quantity. But they need to be mindful of the deterioration in quality as the season's progress. The common biases in assessing quantity are:

- Under-estimation of dead matter content after midsummer.
- Under-estimation of high mass pastures.
- Low soil fertility matted swards are under-estimated.
- Upright, low density swards (especially pastures under 2 years of age) are over-estimated.
- High legume content swards are over-estimated.
- Pastures appear longer when the sun is low increasing shadow length.
- Clumpy pastures give the impression of more pasture present.
- Soil fertility transfer by grazing animals to higher slopes gives the appearance of more feed over the field.


EasySuffolk X Welsh Mule Gimmers in Shropshire.

As digestibility falls, allocations should increase if production is desired.

When taking up feed budgeting, start at the simplest time of the year, which is winter when the animals are at or near maintenance. Take one step at a time and become familiar with the tools and methodology.

Aim to finish each season with a pasture cover guaranteed to deliver an optimal production level for the next season. If the seasonal budget indicates that there is a shortage to achieve such a pasture cover, the deficit must be met by bringing in additional feed or dropping stock numbers so animal performance is not compromised.

If the season proves better for pasture growth than the average season, management is forewarned. Excess pasture mass will lower feed quality which will compromise future lamb growth rates. The mixing of cattle with weaned lambs is a very effective strategy of controlling less digestible pasture components when grazing power of the ewe mob is insufficient to clean up pastures following lamb grazing. Mixing such species classes is complementary to both.

Rotational grazing enables farmers to have better control of both quantity and quality. By coupling this control with feed budgeting it enables farmers to be proactive rather than reactive when seasonal variations from the normal occur.

Other than learning some new skills, the capital outlay usually involves only the purchase of some portable electric fencing to control intakes for maintenance feeding in winter and controlling the quality of feed in summer when surplus pasture mass can cause feed quality issues.

Key points: measure supply, calculate demand and understand seasonal digestibility/quality changes, farm for clover as clover looks after the grasses and set up for the next season.

CHAPTER 8

TAKING CONTROL OF PROFIT

SPRING MANAGEMENT

Achieving a better fit of feed supply to demand in early spring is the most important function for pastoral farmers at that time of the year. Days to slaughter is the number one driver of profit, so farmers can assess how well they have done over spring by the number of lambs ready for slaughter, or how far off being ready, by weaning.

It is twice as easy to grow lambs on their mothers preweaning as after weaning. If you farm on upland pastures, poor pastures, or face regular summer drought it may be three times easier.

There are 5 things a farmer must try to get right in the dynamic environment of pastoral farming:

1. Pasture cover at lambing is the most important. A ewe cannot rear each twin at 300gms/day if pasture height is under 7 cms. Grass in equals milk out.
2. Ewe condition score is next in affecting lactation as it buffers short term feed shortages to ensure lactation reaches its peak. All ewes should exceed a condition score of 3.0, not average 3.0 as that means half are under the target.
3. Pasture quality is of extreme importance to the lambs once they are over six weeks of age. Grasses which run to seed head early lose digestibility slowing growth rates dramatically. Once summer temperatures rise, every measure to promote clover must be made to counter the drop in grass digestibility.

4. Genetics for early growth vary widely within breeds as well as between breeds. Commercial farmers rely totally on their ram breeder for this trait. Buy from recorded flocks supplying EBV data, thus buying breeding not feeding. If you expect your ewes and lambs to grow off pasture you must buy from a breeder who also evaluates his/her flock off pasture.
5. Animal health problems can undo the above management gains. Internal parasites have and will continue to be the number one health challenge. Do regular drench family efficacy tests about 10 days post worming. You could be wasting a lot of time, money and growth opportunity.

All these five are under the farmer's control.

Did you plan to get your "five ducks in a row" to put weight on your new crop of lambs when it was the easiest?

If not, brace yourself to get slapped around by seasonal variation and the necessity to buy grain based feeds to remedy the situation. Unfortunately poor planning resulting in poor ewe and lamb performance this year can also badly affect next year's lamb crop. It is a vortex sucking pasture supplies and profits that only simple management decisions can rescue affected farmers.

CHAPTER 9

SETTING UP THE FARM'S AUTUMN FEED TO SHORTEN WINTER

Romney ewe with EasySuffolk sired triplets in Pembrokeshire.

Many farms in the UK have high organic soil types over drainage impediment which do not allow for intensive stocking as they become water logged for much of the year. However large areas of the UK have mineral soils with varying degrees of drainage allowing intensive grazing for at least part of the winter. Farms on these areas could benefit from the skills New Zealand farmers developed to cut wintering costs and maintain pasture quality, especially from the benefits of encouraging clover content.

Generally speaking, rotational grazing encourages additional pasture production by not allowing the stock to continuously suppress the pasture plants. Too much of the UK's pastures over summer are grazed at a height where both clover is suppressed and leaf quality is severely compromised leading to lack of natural nitrogen fixation and lamb growth. These problems have been compensated by nitrogen application and creep feeding of concentrates, but at considerable annual cost. Both are not sustainable management practices if lamb returns reduce from the decade average price and if farming subsidies are revised downwards. So what can farmers do?

Save a bank of feed from the autumn flush. Rotational grazing by mobbing up stock into a few groups with each group having their own area to graze allows fresh quality feed to build up ahead. This is assuming most trading stock is slaughtered and breeding ewes are in forward store condition for mating. This may require some larger fields to be split by portable electric fencing for a start.

The ewes can be joined with rams over this time. Only flush ewes if their body condition is below par. Don't let the pasture height get above four inches if frosts are so hard in autumn to cause pasture burn as this reduces nutritional quality. Therefore feed off the longer pastures first, but try not to go over the same area again until at least two inches of pasture has grown as a rotation which is too fast lowers pasture recovery and usually underfeeds the stock.

At some point from late autumn and over winter each field should be eaten right down to allow all pasture in spring to be of the highest quality and encourage clover growth. Never penalise stock or pasture to achieve this. Therefore electric fence up into breaks which are no larger than four days of feeding to match the maintenance demand of the mob. This will probably require some supplementation with hay/silage etc. where topography and soil conditions allow.

It is important to feel your way into such a management system. Remember that you control the feed allocation by the size of the break and the number of days you estimate it will last. Don't blame the system if you get these two things wrong. NZ farmers slashed the cost of wintering and greatly improved the production off spring pastures by these changes from set stocking. Adopting a system to suit local conditions using the same principles will save costs and enhance spring production in the UK too.

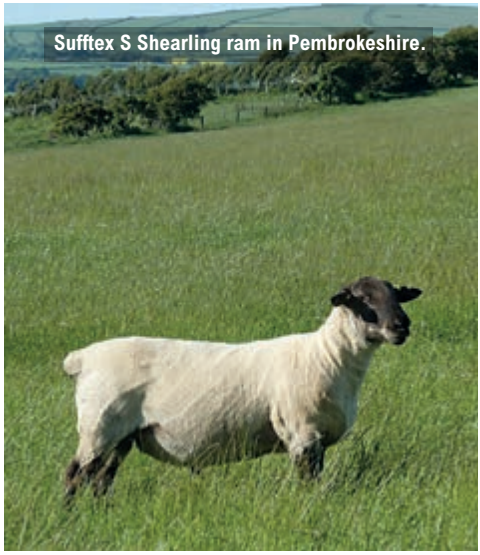
Why waste an economic opportunity if you have invested in NZ genetics with the capability to thrive in mobs on pasture only. Doing the same thing gives the same result, so try something different. Move on faster when it's wet, and catch up with supplements when soil conditions allow. It is all about taking control on a day to day basis so you set yourself up for the season to come.

CHAPTER 10

PREPARING FOR WINTER ROTATION

The skill needed to successfully plan and carry out a winter rotation is the ability to know what a kilo of pasture looks like. This usually surprises most people as autumn grown pasture is at least 85% water. The skill to determine pasture dry matter per hectare is a result of at least a season of measuring using tools, such as a Pasture Stick and serious instruction. However this skill is probably the most important skill a pastoral farmer can learn to affect profitability and is necessary to determine the supply side of the equation.

The demand side of the equation must be appreciated so ewes are not underfed resulting in loss of body weight especially loss of condition. Sheep cannot eat below 400 kg DM/ha of residual pasture. During wet spells when feed becomes contaminated and trampled into the soil surface such residuals may exceed 1000kg DM/ha which means mobs will need shifting onto fresh feed. However given more normal weather, a 70 kg ewe will require about 1.2 kg of DM down the throat. To achieve true maintenance feeding this may necessitate leaving residuals of 600-700 kg DM/ha and that is the golden figure with which farmers need to come to grips. If sheep are left longer on these minimum residuals then it is up to the farmer to supply the remaining DM as supplement or the feeding regime starts going backwards taking future production with it.


Sufftex S Shearling ram in Pembrokeshire.

If you plan your winter rotation on 130 days, and expect 4 days per portable electrically fenced block, you need to bring yourself up to speed in measuring standing pasture and stored supplement in kilos of DM to do the feed budget. Always feed those fields first where pasture quality deteriorates early and use low energy supplements early in pregnancy.

Feed budgeting for rotational grazing is the corner stone of winter management in New Zealand where the costs of wintering sheep has been more than halved, even in the wettest and coldest regions, since set stocking was superseded.

CHAPTER 11

PASTURE ALLOCATION - THE KEY TO WEANING WEIGHT

Under good pasture management, ewes are capable of weaning twins at live weights of 35 kilos plus at 100 days without any supplement. But usually such targets are never achieved because of one main factor, not enough pasture quantity in the first month post parturition.

A twin rearing 65 kilo ewe requires about 20 kilos of fresh leafy pasture per day. In early to mid spring this pasture would be at about 16% dry matter and represents one very large sack of green material. The problem all around the world is farmers for numerous reasons, such as avoiding seasonal drought, catching higher priced markets or fitting in with cropping programmes, tend to lamb too early on pasture only diets which means twin rearing ewes often cannot harvest 20 kilos of pasture per day because both the days and the pasture length are too short. There is simply not enough pasture cover to make it possible. The results of this situation can seriously affect two production years.

Firstly, twin lamb weaning weights can be down by 10 kilos each by 100 days if growth rates drop from 300 to 200 grams per day. This adds up to a lot of money nowadays.

Secondly, if insufficient pasture is available in the first three weeks of lactation, not only does that reduce the milk produced over the whole lactation, but the ewe will buffer early lactation from her own body condition. Unless additional feed is found later in the season, such as pretup flushing, that ewe will ovulate at a reduced level affecting next year's lamb crop.

Many farmers have observed that ewes which lambed later in spring had lambs just as heavy as their contemporaries which lambed two or three weeks earlier. Pasture quantity in the first half of lactation usually explains this situation. In other words, the early lambers were too early when spring had not yet built up sufficient cover.

Quality is never an issue with early to mid spring grown pasture, irrespective of species. Even weed grasses have high digestibility. Quality only becomes an issue when the lambs source more of their energy from pasture than from mum. That usually coincides with seed head emergence and a larger proportion of leaf material exceeding 25 days of age.

The higher the peak of lactation, the sooner twins start eating pasture. Rumen development is highly dependent upon lamb live weight. After lambs are a month of age farmers need to switch their management focus off quantity onto quality of pasture.

Sheep farmers worldwide need to plan better to ensure an adequate pasture covers in spring. Good pre -weaning growth is the most cost efficient way of turning pasture into profit.

Twinning ewes cannot grow lambs at 300 grams per day each if pasture height is under 7cms. Have you a strategy in place to ensure that level of cover for your twinners?

CHAPTER 12

MAXIMISING GROWTH IN WEANED LAMBS

Sheep farmers make money over summer by growing pasture which is consumed by lambs which grow fast. That is two things to consider; growing both pasture and lambs fast.

Welsh Ewe with EasyTexel Lambs in Snowdonia.

To maximise summer pasture on a sheep farm we need to grow pasture in fields to just over 2000kgs of DM/ha. That is just over two inches of thick leafy pasture, or no longer than four inches of open new pasture. This generates enough leaf area to catch as much sunlight as possible without leaf age getting over 25 days of age and before seed head emergence, when it starts to rapidly reduce in digestibility. Pasture digestibility is the Holy Grail of lamb growth.

Management must be precise or the system falls over. If this pasture is quickly grazed down to about 1000 kgs of DM/ha there will be enough residual leaf area for rapid regrowth. This can be achieved by subdivision with portable electric fencing into areas which take no longer than about five days to graze down to 1000 kgs of DM/ha., this is great before weaning. But weaned lambs don't respond to the same rules as pasture demands. Both stockmen and scientists know that when lambs graze more than one third of the pasture offered their growth rates suffer. We can keep moving them on but need to tidy up with mobbed up ewes and topping pastures mechanically or with cattle following on behind the lambs. If we don't, the whole system will fall apart in the second round of grazing.

Unfortunately on a sheep farm there is not enough grazing power in the ewes to keep pastures in good order if lambs are moved on at utilisation levels of only 30%. By trying to get them to eat more, say 50%, lamb growth rates will almost halve. One can imagine what sort of lamb growth rate issues would arise if pastures were long, mature and lacked young leafy grass and clover. Lambs eating 50% of rubbish will never impress a buyer.

This situation highlights the importance of pre-weaning lamb growth. That stage is much easier to manage as mum helps maintain pasture quality and adds a bit of milk to the diet.

In seasons of plenty, wean late so the ewes help maintain pasture quality for the lambs. In poor seasons wean early to give lambs enough to grow well. Growthy seasons are harder to manage because quality is such a big issue with lamb growth.

CHAPTER 13

A CASE FOR SUMMER FINISHING PASTURES

The role of a pastoral sheep farmer is quite simple really, but the myriad of decisions make it seem complicated because everything we deal with from weather to prices are forever moving. That said, the simple role is to achieve both numbers and weight of saleable lambs as lambs are by far the greatest income item off sheep farms since the demise of wool. If anything holds these two factors back, we as farmers must address it, as our opportunity for profit slides away with time wasted to get lambs market ready.

Lambs on the farm longer not only eat more feed, which does cost money to grow, but eat what could go into the ewe flock to maintain lamb numbers for next year and carry through the autumn to lower capital stock wintering costs.

It is quite common to see lambs growing at no better than 150 grams per day post weaning. A lot of twins and hill bred lambs fall into that category as well as being weaned about 30 kgs live weight. Such a lamb would take another 80 days to reach 42 kgs to be suitable for slaughter consuming 100kgs DM of pasture in the process.

However we do have pasture options that will improve lamb growth rates to 350 g/d that will result in lambs taking only 35 days and 60 kgs DM to reach 42kgs of live weight.

The reason this occurs is all about pasture quality first rather than quantity over the summer. Basic rules never change. It can be achieved by a variety of pasture options. But let's look at some of the permanent options. There are many cultivars of Tetraploid ryegrasses that can be grown with white clover very successfully. But be conscious of the actual clover component, as it always appears to be double its estimated percentage as its leaves are horizontal whereas the grass is vertical. Grasses lose digestibility rapidly once leaf age exceeds 25 days and upon seed head emergence. Lucerne is a terrific crop, but very sensitive to soil drainage and pH. It is also very low in sodium, so grazing animals need to have access to salt blocks.

I like the idea of Red Clover for specialist summer grazing as much of the climate and soils in the UK suit this plant so it can be permanent or semi permanent unlike Rape and Fodder Radish. Beware of some old varieties if feeding breeding ewes after puberty. These contain high levels of a chemical when broken down in the rumen becomes Equol, a very powerful oestrogen that has an accumulative effect by masculisation of the genitalia preventing sperm transport after mating through to lambing difficulties. However Red Clover is a great feed when fed to prepubescent females, all males and other pastoral species making them grow due to its high digestibility and protein content. It also helps in controlling worms as larvae prefer dense grass cover to await ingestion by grazing ruminants and the high protein content means lambs stay unaffected at much higher gut worm levels.

Red Clover will offer little over the winter months and the shoulders of the growing season. But it will give you a comparative total annual DM to permanent pasture because of its higher summer production. It is no different to the principles we apply to growing a winter crop of Swedes or Fodder Beet, we just shift them to the other part of the year which happens to be the most important part, because it is over spring/summer when you make your money.

Think about sowing out after winter brassica/beet as it will be ready for you later that season and for the next 4 years and more if you control graze it with short grazing time and long spelling between grazing.

CHAPTER 14

WISE EWE MANAGEMENT POST WEANING

Feed allocation to mobs that return the most profit post weaning is the desired aim of sheep farmers conscious of their feed supplies. Without exception, the growing lambs have the highest priority to receive the best pasture at this time of the year. Therefore the mob with the lowest priority is the cull ewes which go to slaughter. These should be sorted as soon as possible post weaning, even if it means checking udders again later to remove any ewes where problems were not palpable immediately post weaning. So, if you have your breeding ewe flock almost sorted this early, how do they look?

Some farmers may weigh a sample to see if average weight is near to that which they annually call their mating weight goal. Others may do similar using average Body Condition Score (BSC). Both share the same problem of not giving the farmer sufficient information. Averages do not describe the range and diversity of either measurement in the mob.

Let me give an example; I was asked to assist a farmer on a difficult summer dry hill farm. About half of his ewes scanned with twins which he set stocked prior to lambing until weaning on areas with the best shelter for lambing. Despite the singles being run at a higher stocking rate, nutrition was no better for the twinning ewes and their lambs. The following mating

weight was normal, but half of his ewes were in light condition, while his single rearing ewes were heavy. A bar graph of the live weights showed two population peaks. Over the following two years ewes and lambs have been rotationally grazed after a month from the mid lambing date. After weaning all ewes in lower condition were lifted by preferential feeding to the desired BCS. The production results have been huge; flock weaning improved by 19%, cull ewes were reduced by 17% and most significantly the average days to slaughter was reduced by 6 weeks. The net effect of these performance changes was an increase in profit of 40%. All this was due to more precise feed allocation, especially ensuring all ewes were in peak mating condition.

I prefer BCS to live weight assessment in mature ewes. Optimum performance comes at BCS 3.5 in any breed of sheep on any land type.

Throughout the temperate sheep world around 30% of ewes are lower than BCS 3.5 when joined with rams. Those ewes could all be BCS 3.5 with better feed allocation after weaning.

What will you be doing for your ewes?

CHAPTER 15

CHEAP CHANGES IN MANAGEMENT

The most effective way to increase profit from sheep is to allow sheep to do what they do best, that is graze pasture for as much of the year as possible.

The year can be broken into two parts; when stock are fed maintenance and when they are fed to grow or restore body weight.

The period of maintenance feeding is more about quantity of feed allocated to save cost, whereas to gain fast growth sheep require quality pasture. Both regimes depend on some very handy low cost kit which enables farmers to achieve radical changes in efficiency in management and efficiency equals profit. Without doubt portable electric fencing is the greatest tool for intensive sheep farms for both periods. Saved pasture can be rationed accurately to slash the cost of winter maintenance feeding and housing.

During the production period temporary subdivision is the ultimate way of controlling quality to achieve high growth rates by maintaining short highly digestible grass with high clover content.

However it is not efficient to provide increased feed allowances to sheep which do not need it until later. Therefore some other cheap kit is very handy.

Ram harnesses with coloured crayons to age pregnancies are a very cheap option. If rams are used at a ratio of 1:100 ewes, crayon costs are about 2p/ewe, or you can ask your scanner to age foetuses at an extra cost of 20p/ewe.

Highlander X ewes with EasyTexel lambs in Pembrokeshire.

What can you achieve?

1. Better control of lamb birth weight for singles to remain under 6.0kgs and keep multiples above 3.5 kgs for higher survival.
2. Set stocking only those ewes expected to lamb within the first 9 days of mating. If later lambing ewes are set stocked too early and pasture levels are reduced to under 1200 kgsDM/ha (under an inch of leaf) ewes take longer and more energy gathering their fill. Pasture which is too short is a major cause of multiples becoming mismothered/rejected. It is also the major cause of lowered lamb weaning weights and failure of ewes to restore body weight. The aim should always be to set stock onto covers of at least 1500 kgsDM/ha and never let that cover get lower. Pasture covers of 1200 kgsDM/ha will result in twins each weaning around 5 kgs lower than off 1500 kg covers. Covers over 2000kgsDM/ha (4 inches) will rapidly lose quality and also result in lowered lamb growth.

If you save just 3 lambs because of more accurate feeding, increase lamb weaning weight by 5 kgs and ewe body weight by 3 kgs in a flock weaning 140%, that equates to an extra £19.00 per ewe when lambs are worth £1.80/kg Live wt. Not a bad return on a few pence per ewe.

CHAPTER 16

BODY CONDITION SCORE UNDERPINS PRODUCTIVITY

Ewe body condition scores (BCS) range from 1 (emaciated and near death), to 5 which is obese and uneconomic for profitable farming. An ideal BCS for breeding ewes as recognised by both stockmen and scientists is Forward Store, or expressed as a BCS of 3.5.

Prior to the mating season, ewes which have their BCS lifted to 3.5 will gain around another 2% of lambs weaned per additional kilo of live weight gained. It becomes less effective as BCS exceeds 3.5 and the proportion of ewes which don't conceive increases. Once a mob has achieved that condition any extra feed consumed has a much diminished rate of return. Many farmers flush their ewes through tupping as a standard practice irrespective of already achieving BCS of at least 3.5. Flushing in such instances only uses up valuable feed which could be rationed out over early winter as it is the cheapest feed on the farm at that time of year.

Maintaining a BCS of 3.5 throughout winter is important for the following reasons;

If BCS slips from 3.5 to 2.0 about 20 lambs per every 100 sets of twins born may die from exposure if lambed outdoors. Therefore easy birthing ewes which just require mob observation rather than individual intervention should have their BCS maintained.

Lambs born to ewes which have maintained their BCS from tupping have heavier birth weights and have more brown fat available to keep warm if born when wind chill is a factor affecting survival.

Ewes produce 50% of their total milk production within the first four weeks of lactation. Ewes with higher BCS start at a higher level than thinner ewes irrespective of feed quantity offered. Therefore ewes rearing multiples must be kept at a BCS as close to their tupping BCS as possible. Pregnancy scanning allows farmers to better allocate feed to those ewes whose demands are of higher priority.

Welsh Mule Hogg with EasySuffolk lamb in Mid Glamorgan.

Ewes of BCS 3.5 at lambing produce colostrum for twice as long as ewes of BCS 2.5. Initially this is vital for twins and triplets which compete for sufficient quantities of energy and antibody rich milk prior to establishing suckling side preferences.

Farmers should regularly assess ewes for BCS; this is most important with ewes carrying a longer fleece and will necessitate feeling the back of each ewe. If ewes are below 3.5 they should be removed from the mob and preferentially fed to prevent further decline. Ewe milk yield is 80% higher in ewes of BCS 2.7 and above, compared to ewes of BCS 2. Milk yield directly affects weaning weight and when a lamb develops a rumen of sufficient size to feed itself independent from its mother.

The quantity of feed offered ewes during lactation not only effects milk production. If ewes are fed enough to increase BCS by 1 only 20 kilos of extra dry matter is required. However if that is not available until post weaning, a lift of BCS by 1 would require half as much again, as live weight gain is more efficiently achieved during lactation.

Sheep farmers are dairy farmers for a third of the year, therefore we should think about our breeding ewes in the same way.

CHAPTER 17

PHYSICAL FACTORS CONTRIBUTING TO EASY LAMBING AND MANAGEMENT

Many farmers in the UK are now facing subsidy reductions and an ongoing profit squeeze as direct costs continue to climb towards gross incomes. Like their counterparts in New Zealand 30 years ago, UK pastoral farmers will have to address the declining profit issue by firstly tackling costs. Increasingly farmers realise that genetics hold the key to many of the things which require additional labour, animal remedies and expensive supplement feeds.

The first cab off the rank in NZ was to breed sheep which required significantly less labour intervention at lambing time. Like the UK breeding industry, the NZ breeders had for decades chased fashionable characteristics which made the sheep appear better

for ram breeders' income purposes but increasingly compounded the cost structures for the commercial farmer. An example was NZ breeders increased wool cover so that it grew right to the edges of the lips and to the toes in an effort to increase wool weight. This led to multiple clipping of eyes just so the animal could see. This was a huge cost to hill country farmers.

The UK breeders have gone down a track of changing skeletal shape in the drive to achieve more muscularity. This appears to have happened across many breeds, especially the terminals. These breeds today have thicker and shorter leg bones, wider shoulder settings (front legs wide apart) with deeper briskets, exaggerated pelvic angle and larger and wider heads. All of these things work completely against that direction nature took millions of years to get right, but man can undo in few generations. Not only does each contribute to slowing the birth process, leading to dopy lambs and uninterested traumatised dams, but combined can often prevent natural birth.

Unfortunately these developments occur slowly over time so that each generation of farmers accept the status quo as normal. However in NZ where the economic squeeze came suddenly upon farmers, the awakening to labour saving items followed very quickly. Within a decade those breeders whom offered sheep which could lamb themselves, had good mobility and were not impinged by wool blindness or prone to disease became the dominant suppliers of sheep genetics to the commercial industry. The figures quoted after a decade were 20% of breeders sold 80% of the rams. Farmers voted with their cheque books. To remain viable, NZ farmers also increased scale. Since 1984 flock size per labour unit has gone from 800 ewes to 3800. Many of these flocks are now shepherded because any human intervention would cause more harm than good on steep hill country and a low incidence of birthing casualties now occur outside of severe weather events.


Romney ewe with EasyTexel lambs in Ayrshire.

So what changed in NZ sheep? The breeders reverted back to breeding the shape that nature got right. Instead of altering the skeleton, they measured growth and more latterly meat yield in the dressed carcass and selected for improvements in those traits thereby improving income and decreasing labour costs.

I had the good fortune of working in this very field of sheep research and this is what I found (in order of effect on lamb survival and need for assistance);

- Pelvic aperture has the greatest effect. A ewe with a roomy pelvis will have a greater chance of giving birth more quickly even if the lamb shape is not ideal or the single lamb is large.
- A broad/large head, large feet and thick leg bones of the lamb block up the birth canal, especially in first time lambers.
- High lamb birth weight of singles can be a problem. Some sire breeds average over a kilogram birth weight more than others.
- Lamb brisket depth was more detrimental than shoulder width as shoulders can squeeze together to some extent.
- Innate vigour of the ewe breed and lamb's sire breed can contribute to birthing success or failure. Some ewes give up and wait for help. This is a breeder induced difference due to lack of culling offenders rather than a breed difference.

If the animal is to be mainly grazing pasture, especially during the production periods of the year, it must have a gut a capacity large enough to process large quantities. Pasture is not always in a highly digestible state; therefore a large storage capacity for rumination (fermentation of cellulose) is essential. Sheep largely depending on concentrates do not need a big motor as they are given high octane feeds. A big motor is essential for maternal flocks which harvest pasture to rear lambs. They will eat more when feed is available as milk out depends on grass in. During the winter when on maintenance they only eat that allowance offered irrespective of gut capacity.

Sheep that graze hills need limbs suitable for good mobility. The shoulder structure is very import as it determines where the front legs are placed. Front legs must be under the weight of the animal. If placed out wide the animal has poor gait and tires easily. Mobility is essential for competitive grazing situations such as rotational grazing.

Bad foot structure is closely associated with foot health. This includes toe shape and pastern length and strength. The underside of each toe should wear evenly. Sheep susceptible to foot rot should be culled from the gene pool. A lot of poor foot structure is due to poor leg structure.

All these physical characteristics are controlled by breeders irrespective of breed.

Ultimately commercial farmers will determine what is best for them. They will have to work out if cost savings in labour, lamb losses, health remedies and ability to move and graze more effectively outweighs any income advantages of carcass shape. Both reflect directly upon the bottom line. A quid saved equals a quid gained.

CHAPTER 18

THE VALUE OF LAMB SURVIVAL

There are two ways to increase the number of lambs sold. One is to increase the number of lambs being born; the other is to decrease the number of lambs dying. It is the latter which is often under estimated as a means of boosting farm profitability. In fact it is fair to suggest, that if sheep were not housed and intensively monitored with assistance given as a matter of normal husbandry, the whole question of inherent ability to survive birth would rarely be thought about. Yet of all things that UK farmers can realise is the financial impact of management systems which exploit the genetic ability of some sheep to survive without human intervention, therefore allowing very low cost systems without compromising income, hence lifting farm profit.

It is a substantial blow to potential income when a lamb which may have fetched 80 quid is lost at birth. This is equivalent to 16 lambs having to fetch another 5 quid more per head, which can be easier said than done.

Breed and strain differences have a huge bearing on the need for assistance to survive. The breeders of many UK breeds have selected for growth and shape without paying attention to ease of birth, with large increases in birth weights and lack of lamb vigour now being lamented. It is essential that all natural functions are performed to the best outcomes, reproduction being number one and fundamental to all species. However where natural ability has been severely compromised, management must compensate often at considerable cost. It is this area of reproduction management where huge potential savings are on offer.

EasyRam's investments in NZ Suffolks and NZ maternal Texels has been to introduce enhanced strains of these breeds to the UK for ease of reproduction among other traits. NZ farmers do not tolerate animals which add costs to their already low cost management systems. Therefore one man can handle over two thousand ewes at lambing time in an outdoor/on pasture system. Although the survival of new born lambs is subject to the occasional storm, survival usually equals that of indoor systems in the UK.

Two factors come into play; the size and shape (preferably wedge shaped) of the lamb(s) which must be between 3.5 and 6.0 kilos to have enough reserves to supply energy until the first suck of milk, yet not be too big to prevent easy birth and the pelvic shape and vigour of the ewe to have a speedy delivery.

It is the lack of easy birthing genetics across much of the UK that has most farmers captured into a high cost system.

Flocks with high scanning and low mortality percentages do not have to be restricted to indoor systems if appropriate genetics for ease of birth characterise the flock. An exception would be where lambing is carried out early when winter conditions are still prevalent. Even in such circumstances, the work load can be greatly reduced and with less dependence on animal remedies to counter birth trauma and disease.

CHAPTER 19

BREEDING SHEEP RESISTANT TO WORMS

The concept of "easy care" management is not "no care", but running a flock which has the genetic ability to resist the adverse effects of all those things which have necessitated human and chemical intervention. The traits required have to be enhanced by the breeder using a proven protocol, as a commercial farmer can only cull those individuals which fail. The 20th century taught us to rely on a chemical solution, but 21st century farmers will require lower cost genetic solutions which we can describe as FUNCTIONAL ANIMALS.

The most common management intervention internationally is in combating internal parasite infection. Worms in sheep have a huge impact on production and profitability. Worming can be one of the most economically responsive interventions, but only if the target species has not developed resistance to the chemical family used. Every sheep farming nation now has widespread worm resistance to the three main chemical families.

Some breeders and researchers have already achieved and described success in enhancing natural variation in host resistance to worms. This can only be achieved by measuring and recording using a proven protocol as the basis to accurate selection.

Case study of the authors' New Zealand flock of 2000 fully recorded high performance Romneys over 15 years;

Faecal egg counts (FEC) in adult ewes decreased by 66%. That means only one third of the contamination being deposited compared to before selection against worms. Many of the younger ewes will now be destroying more worm larvae than they contribute.

Post weaning lamb FEC fell genetically by 40% as selection advanced and enhanced the onset of adult immunity.

The practical result is drenching has been reduced to two times per sheep lifetime, both either side of weaning.

Over this time no reduction in the rate of progress of production traits occurred; litter size increased by 0.17 lambs per ewe, live weight at 6 months by 3.0 kilos and fleece weight by 0.3 kilos at 12 months (from genetic trend analysis).

Just as New Zealand breeders have reduced the need for intervention at lambing time to less than 2% of ewes lambing, so have some reduced the need for drenching by selection for host resistance in their flock.

The commercial reasons for breeders to take up breeding for host resistance are;

- Chemical and labour are a significant proportion of farm running costs.
- The cost of undetected (untreated) parasitism can significantly erode profit.
- Drench resistance continues to reduce chemical choices for many farmers.
- Consumer resistance to chemical inputs into food production is increasing.
- There is a low correlation between increased productivity and susceptibility to parasites; therefore breeders need to attend to host resistance when advancing other productive traits.
- The cost of resistance testing that a breeder can to pass on is less than 3% of the average price of a ram.
- At time of writing; only 12 breeders on Signet record FEC EBVs.

All this begs the question: why aren't UK farmers more conscious of the role of functionality for sheep profitability?

CHAPTER 20

DOS AND DON'TS OF LAMBING HOGGETS

Many farmers throughout the world where intensive sheep farming exists carry out or experiment with lambing year old ewes. This practice has resulted in mixed success, often considered a failure as a generation of ewes which have had their adult potential severely restricted moved through the flock over their lifetime and contributed less to the economic performance of the flock.

If carried out successfully, the harvesting of this reproductive opportunity can significantly boost incomes and efficiency of the sheep enterprise.

There are many ways of improving farm profit. Pasture and soil development to grow more feed, better handling facilities to save time etc. The mating of hoggets is not near the top of the list if other factors are already holding back productivity from the main breeding flock. Once mature live weights, acceptable lambing and weaning percentages, lamb growth to target carcass weights and health problems are under control, then hogget mating can be considered.

The best indicator is if target mating weights for Two Tooth ewes can be regularly achieved.

The main downside of hogget lambing is the loss of management flexibility in the spring. Therefore stocking rates should be reduced according to the hogget pregnancy scanning result.

Extensive trials have never shown any adverse effect on ewe longevity or lifetime productivity. In fact ewes which conceive as hoggets are those which will be more productive over their lifetime. However, if management does not adjust to make more feed available to pregnant and lactating hoggets, they will be compromised and under-perform for the rest of their lives. Keep in mind; **never compromise future capital stock.**

As a rule, ewe lambs under 42 kilos should never be joined with rams. Any over 46 kilos would be a waste of opportunity. Therefore scales are very important in selecting young sheep, whereas body condition score is vital in assessing mature sheep.

It is really important to use easy birthing ram breeds over hoggets, especially those with smaller birth weights, narrow shoulders and smaller heads. **Survival has a greater impact on flock profit than carcass weight/grade.**

Joining vasectomised rams up to 35 days prior to introducing entire rams assists those ewes which are slower at exhibiting first oestrus.

No need to use old rams, as younger rams are best suited. If ram lambs are used it pays to run them at a ratio of 60% to that of mature rams as they produce less sperm concentration.

Trace elements such as cobalt (or inject vitB12) and selenium must be at their optimum levels as growth is essential for both the dam and her lambs.

Any abortion vaccines used as usual practice should be brought forward by a year.

Pregnant and lactating hoggets are more susceptible to internal parasite infection; therefore require more monitoring and possible treatments.

Grazing management is where most difficulties arise: pre-mating growth is the most important as live weight at mating has a huge effect on conception rates. Post mating feeding should also be above maintenance. As a rule, aim to gain 150 grams of weight per day over pregnancy, this will go to the dam until the last 6 weeks when the conceptus then takes first priority. Pregnancy scanning enables twinners to be fed on a higher plane.

Pre-lamb shearing adds to dam birthing vigour, but does not often influence lamb birth weights in lambs from hoggets.

Reduce stocking rates on pasture by about 10% for single rearing hoggets and 15% for twinners. Start rotational grazing as soon as lambs are mobile enough to follow their mothers. This may only mean splitting a field into half with a portable electric fence and rocking between halves on a weekly basis to keep sufficient quantity of highest quality feed to all these growing sheep.

Weaning should be done early. In NZ it is recommended at 10 weeks of age. Certainly by 12 weeks. This is to increase the time for the dam to reach her next mating target weight. It is important that hogget dams have restricted access to feed for several days post weaning to shut down lactation to prevent mastitis. Once this occurs, hoggets can be stoked along with quality pasture.

Be ever mindful to never compromise future capital stock.

CHAPTER 21

FARMING THROUGH COMMODITY CYCLES

Just over 30 years ago I went into an equity partnership as the managing partner with two very successful sheep farmers who were looking at increasing their investment but not their work load. The three of us visited the renowned NZ farming accountant Pita Alexander to get his insights into partner roles and avoidance of situations in which he had been called in to rescue. His words of wisdom stood us in good stead, especially soon after experiencing the most devastating economic upheaval in the history of NZ. Most newly established farmers lost everything, but fortunately we survived by sheer tenacity, selling a value added product (performance recorded functional rams), running a very tight budget, focusing solely on profit and only worrying about those things which I could control.

It was about six months ago I came across an article in a farming newspaper about managing commodity cycles by Pita Alexander. I have gathered up many of his pertinent points which are also relevant to the UK and expanded on them, as well as adding a number of my own, learned from my own experience of survival followed by rapid growth and that of helping other farmers out of the poverty trap.

Cycles keep coming around. Every six to seven years appears to be the average time it takes to complete a cycle.

Think upon each cycle as a clock, twelve o'clock as the peak and six o'clock as the trough. But unlike a clock which travels in perfect rhythm, commodity cycles run very erratically. Usually they come off a peak extremely fast as the market rejects the price and then crawls back up again as those burnt off customers return to the product. This was exactly the situation we saw with sheep meat which now appears to be sitting at about nine o'clock and slowly rising, after a dramatic fall from a record high of two years ago. Global dairy prices tracked steadily downwards after reaching their record peak only to be made worse by the EU's dairy trade ban on Russia. At the time of writing dairy may be at 6.30 as global prices firm.

So what can we learn by better understanding of the commodity cycles in which we make our living from? I suggest the following:

1. When at the top it is hard to see the bottom.
2. Bullish behaviour dominates at the top, risk seems less important.
3. Mistakes hurt less at the top.
4. Advice is always appreciated at the bottom.
5. Nothing goes up or down forever.
6. Many businessmen get surprised by predictable price changes.
7. You will see 6 cycles over a 40 year industry involvement.
8. Half of your working life will be in your favour, half against you.
9. So, where are your products now?
10. Talk to informed people and seek data on where your industry is.
11. Discuss this with your spouse, banker and key advisors.

12. A decline in gross income will mean a look at discretionary spending.
13. Revise tax provisions early especially after a price crash.
14. Capital expenses will need close inspection in a downturn.
15. Cash reserves should be made during the upside of the cycle. Aim at about 20% of net income. (Thanks to this advice from Pita Alexander I was able to smooth out price fluctuations and grow my business when others were retrenching).
16. May need to call in cash reserves during the years around the bottom.
17. Luxury spending should be postponed during the downturn.
18. But don't back off crucial expenditure (genetics, animal health and maintenance fertiliser) as these protect your future income.
19. Production/income is vanity, profit remains sanity.
20. Complete development projects if they impact on future profit.
21. Watch and talk to top operators; fly with eagles, not the turkeys.
22. Be very wary of articulate sales people.
23. Cut loss making activities early in the downturn.
24. Sideline any cash hungry new projects with distant payback times.
25. Often the boring parts of your business are the most profitable, so focus on them.
26. Minimise any annual loss in times of collapsed prices.
27. Focus on your costs to reduce the impact of price falls.
28. Professional advice into key areas of production may be very beneficial.
29. Prioritise those items which impact on profit and address these from the top down.
30. The main changes usually occur in your head and don't involve wheels.
31. Sideline risk, a bad punt hurts more in a downturn.
32. Your direction is more important than your speed.
33. Always address problems immediately, they can do your head in.
34. Problems tend to divert your direction, be aware of this.
35. You the farmer are the most important cog in the gearbox.
36. If you are the boss, take the lead and gain the respect of bankers.
37. Bankers, advisors and mentors get frustrated by procrastination.
38. Always maintain a preferred employer status; you will need these people when things pick up.
39. Never sell out on your integrity and sincerity. There is no place for inflated egos during difficult trading times.
40. Cash management is never more important than in a down patch.
41. Know the price needed to make a profit; don't be screwed by opportunists.
42. Never make promises you can't keep, irrespective of place in the cycle.
43. Never let downturns impact on your marriage and family. This could prove far more disastrous than any downturn.
44. Face a major problem with equal artillery in a downturn.
45. Then ring fence that problem.
46. Break it down into its components. You may need expert help to fix some of these components. Their fees will be minor compared to the potential outcome.
47. Structural problems are different to operational problems; they need a structural answer.
48. Optimists recover from mistakes faster than pessimists.
49. Avoid blame mongers; they are blind to the realities of business.
50. Nobody owes you a living, so it is up to you to know your business and the industry in which you work.

CHAPTER 22.

DR REX DOLBY

Soil Fertility and Animal Mineral Nutrition Consulting Scientist

20 years at Invermay Agricultural Research Centre, Ministry of Agriculture and Fisheries (MAF), in soil fertility, animal mineral nutrition and analytical research. Technical head of soil, plant and water analytical laboratories for MAF throughout New Zealand (NZ).

Development of analytical methodologies as well as research into trace element requirements of stock and pastures. Part of a development group working with farmers, fertiliser industry and veterinarians modelling the soil and plant analytical results along with many years of research to produce sound economic and environmentally safe fertiliser recommendations.

EasySuffolk X Welsh ewe with EasyTexel lamb in Snowdonia.

In 1980,s made the technical head of technology transfer group within MAF ensuring the greatest use of past research finding for pasture, crop and horticultural production within a commercial environment. This involved further modelling of nutrient requirement of pastures, crops and stock, etc plus communication with agricultural leaders.

Since 1993 have operated farm consultancy company (AgroScience Consultancy Services) interacting directly with farmers and carrying out private research. Involved in development of large number of properties throughout NZ using knowledge of soil types to assess productive potential plus fertiliser and animal mineral requirements. Seen as leading figure in mineral nutrition in NZ and contributed many publications to farming journals.

Overseas consultancy for the World Bank in Turkey aimed at improving the sustainability of farming in that country. Specific involvement with soil and plant analytical laboratories and subsequent advisory services to farmers/growers.

Retired due to ill health in 2008 but continuing to provide consultancy to farmers as a mentor to Peter Desborough, a leading consultant in the development of high country stations and farms in NZ.

CHAPTER 23

EFFICIENT FERTILISER USE: A NECESSITY!

Without subsidies farmers will need to survive on the returns from their products. The best returns need to be obtained for money spent on fertiliser. The question is, what can the farmer do to achieve this?

Farmers who run a good profit during these times are those who manage an operation that maximises production through elimination of strategic deficiencies. Profit is the difference between income and expenses, and if fertiliser expenses can be held by better targeting then farm profitability will be greater.

To achieve this end requires farmers to carry out a well managed program of soil and plant analyses so that specific requirements can be identified. The cost of such a service by a competent independent operator is small compared with the fertiliser savings or increased production. It is, however, important that you choose a good consultant, not just a cheap one or one that is selling a product.

The aim should be to produce quality pasture that produces good stock since it is stock which are being grown not just grass. To do this the consultant must know what a quality pasture is and what such pastures require.

Pasture analysis will determine the necessary minerals required by both pastures and stock. In addition, the correct pasture

analysis along with soil testing will pick up problems through differences between the two tests. These cannot be picked up by soil testing or plant analysis alone but to the trained scientist the picture can become clear.

Thus when the squeeze is on, the farmer should be carrying out more testing rather than less. However it is important that the consultant used is able to interpret the whole farm picture so that all deficiencies in pastures and stock can be corrected. He should be able to establish where you are at this time, where you could be, and provide information to get top production without damaging the soils. This estimation of the potential of your property and the identification of requirements can be achieved by mapping of the soil types upon your property along with a description of their requirements. This will allow the requirements of different areas of the farm to be identified followed up by soil and pasture testing. These together should then allow an identification of what are the limiting factors and where the greatest productive gains can be made through strategic applications of the correct fertilisers to where they will have the greatest benefit. In addition, the program should outline how to overcome animal health problems through farm management as well as nutrient treatments. The program thus should outline a way to fix the farm not just the soils, pasture, or stock on the farm.

CHAPTER 24

UNDERSTANDING YOUR SOILS:

If you are to feed stock upon pasture alone it will be very important that you know and understand the properties of the soils under your farm. In New Zealand (NZ) their are several hundred soil types and this will be the same in the UK. Soils are classified into Soil Groups, Subgroups and then soil types.

Soil Groups vary from very recent (still forming) soils by rivers/streams to very old and weathered soils within moist hilly areas. The differences between soil groups are very significant while differences between soil types within a soil group are much less. The requirements for management of each soil type are different and significantly different if within different soil groups.

In my work as a soil scientist I examine and classify the soils upon farms as well as interpret the data upon them to produce the most suitable management information. There are many cases were inappropriate soil management occurs through the farmer assuming that his soils are the same as his neighbours. In turn, advice given based upon `typical' soils within the area can result in poor production, high costs and/or the destruction of the soils present. The end result is poor productive sustainability.

There are many examples of the impact of the soil types upon the farm management and one article is not sufficient to relate all of these. An example is, however, worthwhile giving.

A few years ago a farmer rang me and asked if I could give him his farm back?! In the last 5 years the farm had gone from highly productive to low producing and the farm had become high demanding with respect to fertiliser. In the last 5 years he had undertaken a development program typical of his region.

As with the majority of these cases, this request led to an intensive investigation into the soil types present and the management involved. Soil typing in the past, and even recently, did not indicate the cause of his problems. A farm visit however, allowed me to identify the soil types present and unearth the cause of the problems being experienced.

The soils upon the farm had initially been classified as podzolised soils formed under acid podocarp forests. However, recent mapping had remapped them as firm brown soils, rather than podzolised soils (a new classification). However, an examination of the soils upon my farm visit indicated a very different picture. The soils present were allophanic brown soils rather than firm brown soils. These allophanic brown soils have sedimentary (non-volcanic) topsoil over volcanic loam subsoil (this is unlike the firm brown soils that have sedimentary clay subsoil typical of most surrounding soils). The volcanic subsoil was very high in phosphorus (P) retaining allophane clays and there was evidence of lava flows over local sand dunes. Volcanic soils had not been recognised within this location before.

The answer to his problems was now clear, the paddocks had been deeply ploughed to replace old pastures with improved pasture species. This had brought the subsoil loam into the topsoil. This subsoil loam has a very high anion absorption capacity (ASC) (about 90%) but has a poor retention of cations, such as potassium (K). This means that the raising of the subsoil lava into the topsoil dropped the soil P and reduced the soils ability to retain K. There was, therefore, the need for higher inputs of P and K than before and these higher inputs would need to be applied on an annual basis. In turn, the bringing up of the lava reduced the topsoils ability to retain moisture and this saw the topsoil dry out severely over summer.

Management of the farm now required minimum cultivation techniques and fertiliser inputs appropriate for the new soils. Fortunately, the 'new' soils have very good soil structural properties and need not be cultivated.

My investigation did not give the farmer back the farm he had 5 years before but it helped him to manage his `new' farm better. He is now able to make it highly productive again.

PHOSPHORUS: ECONOMIC UTILISATION BY PASTURES:

In horticulture and cropping fertilizer use is a relatively minor part of expenditure thus the aim is to ensure that soil fertility is not limiting growth thus levels used are generally in excess of requirements. With sheep and beef farming in New Zealand (NZ) fertilizer expenditure is their highest cost and applications must meet an optimum economic fertility (OEF).

With the removal of subsidies UK will have to follow NZ and ensure that fertilizer applications give `best returns for pounds spent'.

To do this requires farmers to have intimate knowledge of the OEF of their soils and aim to reach it without wasting monies: very important also on environmental grounds.

To know the soils OEF farmers need to have a good knowledge of their soils including their potential to produce feed. Soil types within the UK vary greatly in potential (amount of feed produced at optimum soil fertility) and the fertility needed to achieve this.

OEF involves all nutrients as well as soil structural factors. However, most attention is paid to soil phosphorus (P) since P is a major requirement and cost for grazed pastures. This is since the more expensive nutrient, potassium, is efficiently returned in urine and not lost.

Optimum soil P depends on the soil type and amount of stock able to be carried.

With each soil type a graph is drawn with yield of pasture verse P soil test when all other nutrients are optimum. From this graph the optimum biological soil P is the point where yield does not increase with added P. An economic graph is then drawn with pasture yield converted to monitory returns through stock and plotted again cost of application of P. Where cost of application is the same as the monetary gain we have the optimum economic soil P of the pasture for that soil type.

Each soil type has a different optimum biological Olsen P for maximum production. Within NZ this varies from 15, on recent soils from sandstone by rivers, to over 50 for highly weathered volcanic soils. Fortunately there are no volcanic soils within the UK but still the optimum Olsen P could vary from 15 to 35, with the latter being upon very highly weathered upland soils high in aluminium.

In NZ we measure the Anion Sorption Capacity (ASC) to establish the optimum soil P. This is a percentage scale determined by shaking soil with a P solution over night and assessing the P that is absorbed by the soil. Non clay recent soils may have an ASC as low as 10% while highly weathered volcanic soils have an ASC up to about 99%. Fortunately highly weathered soils in the UK are likely to have ASC values not exceeding 65%. The biologically optimum Olsen P (OP) for an ASC of 15% will be about 15 while that of a soil of ASC 65% will be about 35. There a major difference between soils!

Easy Care Hogg with EasyTexel lambs in Duns, Berwickshire.

In turn the cost of developing OP up to the biological optimum varies. It takes about 6 kg/ha of P to raise the OP one unit if the ASC is 15% while if the ASC is 65% there would be a need for 12kg/ha to raise the OP one soil unit: that is twice the amount for a weathered upland soil. Fortunately the higher the ASC level the slower will be the fall from optimum P through production.

With the majority of the UK upland farms likely to be on highly weathered soils, the optimum OP for good pasture growth, especially that containing clover, maybe higher than you think. However, once you have raised the OP to the economic optimum the cost of maintaining production will be similar for all soils provided they have similar slope. With the greatest economic production being near to the biologically optimum, it will almost always pay to hold the OP close to biological optimum since this will give you best returns while the cost of maintenance will be similar to lower production at lower OP.

It is now necessary to assess the economic optimum soil fertility for your farm

CHAPTER 26

IS THE CORRECT FORM OF PROTEIN PRESENT WITHIN YOUR STOCK FEED OR PASTURE?: IMPORTANCE OF SULPHUR (S):

Protein is a very important constituent of feeds and pasture. It is important since stock require protein for growth.

In general the level of protein present within feed is measured by the total nitrogen test which has a direct relationship to the amount of protein present. However, not all of protein present within feeds will be able to be utilised by stock.

Protein is made up of 32 amino acid (AA) building blocks. When stock eat pasture, or feed, protein is broken down into its AAs that are absorbed by stock (rather than the protein itself).

Within the stock AAs are then built back into animal proteins.

Unfortunately plant and animal proteins are different and some AAs needed to build animal protein can be lacking within plant proteins. If this is the case it is not possible to build all animal proteins with excessive AAs expelled.

The major variance between plant and animal AA content is determined by the level of sulphur (S) containing AAs (S AA) present within the feed or the pasture. Plants can have high or low levels of these S AA depending upon the availability of S. A lack of S within the soils and the feed will be low in S AA with stock unable to utilise large amounts of the protein present within the feed. In contrast, if the S available is high, the level of S AA is higher than needed and the excessive AA is excreted.

The aim should, therefore, be to produce feed with the correct level of S AA so that all of the protein present can be utilised. Determination of the level of S and nitrogen within feeds can indicate if the level of S AA is correct and by using this data advice can be given to ensure that the level of utilisable protein available is held high. Major boosts in stock production have been achieved by attention to this one factor of animal nutrition.

Clearly, once one has ensured a high level of utilisable protein, one can assess the ratio of protein to carbohydrate and further ensure that the protein within the feed is being balanced by the level of energy available to stock. This balance can be achieved by providing a mix of feeds with those high in utilisable protein combined with those high in available carbohydrate or energy. By using this combination, one can then make the maximum use of the feed available and/or make appropriate choices of feeds that should be bought in to boost production.

Upon free draining high country soils the use of fine elemental S can generally ensure high levels of utilisable protein will be present without this causing any stock health problems. In addition the growing of clover with high energy brassica crops will generally ensure better overall nutrition of stock: this feed can be used to grow stock rather than just maintain them.

CHAPTER 27

ALUMINIUM: A LIKELY PROBLEM IN THE UK

Aluminium (Al) levels are high in highly weathered soils in the UK apart from those derived from limestone. With weathering Al accumulates in the soil while many other nutrients are lost. Weathering is the effect of climate over many years. At low soil pH, less than 5.7, Al becomes soluble or 'available'. Available Al is toxic to root growth and it will limit the uptake of phosphorus (P). Liming to a soil pH above 5.7 in the topsoil will allow growth of shallow rooting species but the high level of available Al within the subsoil will limit the growth of deep rooting species such as the legumes Lucerne and red clover and also that of deep rooting grasses.

New Zealand (NZ) is a very young country compared with the UK. The Southern Alps, which is the backbone of the South island of NZ, is in fact still growing at several millimeters per year due to the clash of tectonic plates under NZ. In contrast the Pennines were once a very high mountain range (Alps) that has been worn down over millions of years to form their low hills. This indicates how much more weathered UK is compared with NZ.

Despite this relatively young age of NZ, high available Al causes problems with those soils weathered by past glacial activity and we have had to find remedies for these soils to be developed.

If the soil pH is lower than about 5.4 available Al is likely to be very high in many UK soils formed from sandstone. Liming to a soil pH above 5.7 will be essential to allow good growth of pasture and to ensure utilization of the P fertilizer applied. In NZ treatment with agricultural lime is often not fully effective due to Al coating larger particles of lime and thus preventing further breakdown. My work has indicated it is best to treat soils firstly with burnt lime or a very very finely ground limestone to precipitate the available Al as Al hydroxide before further development.

Of immediate importance will be that many soils in the UK will not be suited to deep rooting legume species, as are used in many parts of NZ, but suited to white clover if their true topsoil pH is above 5.7.

It will be very important to know your soils and measure the available Al in the topsoil if the true soil pH is below 5.5, and/or the level within the subsoil. This information will allow appropriate development and ensure that you are sowing the correct pasture species.

CHAPTER 28

TYPE OF SULPHUR (S) FERTILISER USED IS IMPORTANT:

Sulphur (S) was not required on UK farms due to sulphur dioxide being in the atmosphere due to air pollution. Fortunately air pollution has been lowered but S will now be required.

However, pollution S will have been stored in the soil and will have met plant requirements for several years. Thus there would have been a period when no S deficiencies were noted. However this store of soil S will to have been used and deficiencies will now occur.

When considering S it is important to consider both the type and amount.

Areas requiring S will generally be remote from the coast (greater than 10 miles); sheltered from prevailing coastal winds; and/or upon free draining soils. In addition, S will be required after the summer dry when available S drops below root depth with the water table.

Unlike the phosphate (P) present in superphosphate, the sulphate (SO4) present is not held by the soil. This means that SO4 is readily leached out of reach of the plants. This means that without other inputs of S pastures will be deficient by spring if SO4 is applied in autumn and by autumn if applied in spring.

To overcome this problem, apply fine elemental sulphur (ES).

ES at the correct particle size will allow a slow drip feed of SO4 to the pasture through-out the year. ES is converted from ES into SO4 by thiobaccilli but the rate of conversion falls rapidly as the particle size increases.

Unfortunately, the particle size of some ES products is too large and only a small amount converts to SO4 even over several years. The correct size for the UK is less than that of talcum powder (<150 micros).

This type of ES is explosive and must be diluted with inflammable compounds. In New Zealand (NZ) this is superphosphates or bentonite. Different ES are produced by adding different rates of ES to superphosphate when it is hot out of the den: the ES melts and fills pores in the superphosphate. The greater the amount added the larger the particle size produced differentiating the product to suit different rainfall zones. 20% S superphosphate to dryland while 40% S superphosphate to very high rainfall areas. In general the type needed in the UK is that in 30% S superphosphate.

Bentonite S products contain 90% S but they are generally suited only to high rainfall areas.

The amount of S needed is calculated from soil, slope, stocking rate and rainfall data. Models have been derived in NZ. However, since S is much cheaper than P, it is best to use excessive S in the ES form than insufficient.

With cropping excessive S can cause stock health problems. With the use of ES these problems can be reduced while ensuring that crops are not deficient. This is especially important with slow draining soils that accumulate SO4 while deficient during dry summers.

In NZ soil S levels are determined by soil and plant analyses. Soil SO4 levels vary with time of year with them being higher when soils are moist while they fall when the soils dry out. Available organic S (OS) indicate what reserves are within the soil accessible during dry periods. OS is broken down by cropping and after 2 or more crops it is generally low. The use of ES can replace the need for OS.

With deep rooting crops the best test for S availability is plant herbage analysis. The level in the herbage indicates if the plant is getting sufficient from sources other than those immediately measured by soil testing. This is important were there are sources of S such as subsoil S, ES, or S from coastal breezes.

In the UK it is very important to get the correct advice on S use since limitation in supply could be holding back production.

Soil type, location of the property, rainfall, topography, farm practice, and past fertiliser inputs are all important with respect to S requirements.

See also comments within the Utilisable Protein Chapter.

POTASSIUM (K): BE CAREFUL WITH ITS USE:

Potassium(K) is important for plant growth. It constitutes approximately 3% of the dry matter of most plants. This compares with about 0.3% of phosphorus (P) and sulphur (S).

Cut and Carry Situations (Conserved Feed):

There is thus a need for K fertilizer in the case of `cut and carry' crops and feed. In this situation very large amounts of K are being taken from the soil in the conserved feed: 30 kg of K per tonne of drymatter. Thus if conserved feed is repeatedly taken from a paddock without applications of K, the soil will become severely deficient in K. However the K fertilizer must be applied ***after the taking off of the feed*** not to the feed crop. K is being applied to replace the K taken out in the feed not to boost the growth of the feed.

If K is applied to the feed itself the majority of the K applied will be removed with the feed and not replace that lost from the soil.

Feed Eaten in Situ:

Stock upon pasture, or being fed in situ on a crop, return K efficiently to the soil within their urine. There is thus very little loss of K from the soil in this situation. This means that under normal pasture grazing, or when a crop is eaten in situ, no K fertilizer will be required if soil test levels are already adequate.

This makes a huge reduction in K requirements compared with cut and carry situations.

Excessive K is Dangerous to Stock:

Within my articles upon prolapsed and sleepy sickness (Magnesium (Mg) deficiency) I highlighted problems with excessive K within pastures and feed. Excessive K in the feed has the following effects:

Prolapse of the Vagina:

A major cause of prolapse is a deficiency in calcium (Ca): see prolapse article. In this case K has the following effects:

- High soil K limits the uptake of Ca from the soil by the crop/pasture: potential Ca deficiency in crop/pasture for stock;
- High crop/pasture K reduces the uptake of Ca from the rumen: insufficient Ca intake by stock from feed;
- High crop/pasture K makes the rumen alkaline which in turn makes the blood alkaline and stock cannot take Ca from the bones: inability to use reserves of Ca.

Thus if K fertilizer is applied to pasture/crop before it is cut this will potentially cause prolapse in ewes being fed upon the feed cut.

This is probably the major cause of prolapse of vagina in ewes using the present cut and carry system.

Sleepy Sickness or Hypomagnesaemia (Mg Deficiency):

- High soil K limits the uptake of Mg from the soil by the crop/pasture: potential Mg deficiency in crop/pasture for stock;
- High crop/pasture K reduces the uptake of Mg from the rumen: insufficient Mg intake by stock from feed.

The stock do not carry reserves of Mg thus if the feed is low in Mg and uptake of Mg is limited from the rumen stock will suffer Mg deficiencies especially when they are cold and they are required to use fat reserves to stay warm. With Mg being required for the metabolisation of fat by stock fat metabolisation will drain Mg levels from the nervous system of the stock and they will be prone to suffer Sleepy Sickness or Hypomagnesaemia. This problem can be offset by sheltering stock and feeding stock with high energy feed to remove the need for stock to metobolise fat. In turn, stock may be supplemented with Mg.

In Summary:

1. The requirement for K will be much lower when feeding stock on pasture or crops in situ;
2. K must not be applied to crops to be cut and carried if soil test levels are adequate. K must be only applied ***after taking off the feed*** to replace the K lost from the soil from taking off the feed.

An examination of recommendations being given in the UK suggests that the excessive application of K fertilizer to cut and carry crops before being cut is the major cause of prolapse of the uterus in ewes under present operating systems.

A problem I see with the present system is that veterinarians are treating the symptoms within stock rather than treating the cause of stock health problems!

PROLAPSE: WHAT CONTRIBUTES TO THIS:

The cause of prolapse of the uteruse (PU) is complex and cannot be put down to just one factor. We do, however, know that a flock will suffer severe problems and by moving them they can lose this problem. This suggested that there must be a significant dietary influence and it is not just related to a flock constitution.

However, constitution will have an impact with problems greater in large pregnant ewes carrying multiple births and having poor muscle tone. Problems being related to increased pressure on the abdomen caused by excessive abdominal fat, a uterus full of lambs, a full rumen and a full bladder.

Large ewes carrying multiple lambs are the aim of high producing farmers. It is, therefore, often considered that this is a side effect of high producing ewes. However, why do some high producing operations have little problem with PU?

Nutrition of the Stock:

In high producing flocks we are putting stock under abnormal nutritional pressure. We expect more than that which is `natural'. Nutrition must therefore be very good and stock supplemented if natural intakes are not adequate.

In New Zealand (NZ) farming good nutrition means ensuring that the majority of the stock requirements are being met through the pasture and there is minimal supplementation. This means the need for quality pasture.

Pregnant ewes have a high demand for nutrients, protein and energy. Lack of any of these, or the exposure of stock to inclement conditions, can produce problems. Multi-birth ewes should be given special attention!

Metabolic Disease:

PU is a metabolic disease caused by the animal not being able to cope with the conditions it is under. It is related to the nutrients in the feed and to the ability of the stock to obtain nutrients from body stores. This means that factors that cause PU are complex and it cannot be fixed by supplementing ewes with just one mineral.

Calcium (Ca):

The sheep condition determines the tightness if the ligaments around the birth channel. Thus keeping stock fit is important but muscle tension is also related to Ca levels. There is thus evidence that Ca is involved. But Ca is stored in bone so stock should not suffer Ca deficiencies! Low Ca levels are thus related to the ability of stock to take Ca off of their bones.

Putting stock upon a restricted diet early in pregnancy is recommended. This is not only to reduce the size of the pregnant ewe but to also condition her to low intakes of Ca. By putting her under Ca stress early in pregnancy she will be more able to take needed Ca off of her bones in late pregnancy hence less likely to be Ca deficient at that time!

Alkaline Rumen:

The largest impact upon the ability of stock to take Ca off of their bones is the pH of the blood, which is directly related to the pH of the rumen: if the rumen is alkaline the blood is alkaline. An alkaline rumen can thus cause Ca deficiencies in late pregnancy due to the ewe not being able to take Ca from her bones. This could thus cause PU if the stock are susceptible.

The cause of an alkaline rumen is an excessive level of cations compared with the anions within the rumen (a cation to anion imbalance). The most influential elements are the cations potassium (K), sodium (salt)(Na), calcium (Ca)and magnesium (Mg) and the anions sulphate and chloride. High K and Na within the feed will make the rumen alkaline. High sulphur and chloride levels will make it acid.

Cold, Wet and Acid Soils:

Uptake of Ca and Mg by pastures is a metabolic process: to take these up the pasture must actively interact with the soil. This means that for adequate uptake by pastures soil conditions must be ideal. This means good oxygen levels, optimum soil temperatures and an optimum biological pH range!

For good uptake of Ca and Mg from poor draining soils it will, therefore, be important to ensure they are artificially drained and that they are well limed.

A well limed soil will also increase the level of clover in pastures with these high in Ca and Mg!

Potassium (K):

In contrast to Ca and Mg, uptake of K by pastures is not a metabolic process and uptake is highest when the soils are wet and cold! These conditions thus reduce uptake of Ca and Mg but elevate uptake of K. Thus if soils are wet and cold in late

winter/early spring, pasture will be high in K, especially if soil K is high. In addition, uptake of K will be further increased by use of nitrogen (N) fertilisers at this time!

In turn, high soil K limits the uptake of Ca and Mg by plants and it also limits the ability of stock to take Ca and Mg from their rumen.

Thus high soil K can produce Ca and Mg deficiencies in stock especially when soils are cold and wet.

IN SUMMARY:

When stock are upon cold and wet soils that are high in potassium

- Stock have an alkaline rumen that limits their ability to take Ca off of their bones.
- There will be low levels of Ca and Mg in their feed.
- Stock have reduced ability to extract Ca and Mg from their rumen

This situation is thus conducive to a severe Ca deficiency that will lower muscle tension and the tightness if the ligaments around the birth channel. They are, thus, susceptible to prolapse in late pregnancy!

If possible avoid placing ewes under these conditions in late winter/early spring. Also do not apply N or K at this time.

Sulphur (S):

In contrast to K, high pasture S will make the rumen acid. There is thus less likelihood of Ca deficiencies in ewes when the soil S is adequate to high over winter: an acid rumen will increase the ability of stock to take Ca off of their bones!

Adequate to high S is thus important over winter upon prolapse prone areas. This means that if you are upon free draining soils it will be important to use fertilisers containing fine elemental S to ensure that winter rains do not leach S out of the soils and produce S deficient feed in late winter. Use of fine elemental S fertilisers in autumn might be worth considering in prolapse prone areas!

Anabolic Salts:

Anabolic salts are used to control Ca deficiencies within stock and these salts include magnesium sulphate and causmag. These salts are used to make the rumen less alkaline. Dusting pastures with causmag will also reduce the uptake of K by pastures.

Conserved Feed:

Over winter stock are given large amounts of supplementary feed. It is therefore important this feed is not high in K and it contains adequate Ca, Mg and S. It is, therefore, very important that K is not applied to conserved feed paddocks prior to them being cut.

As with other pastures, the uptake of Ca and Mg will be improved through good drainage and the maintenance of a good soil pH. Mg fertiliser should also be applied with maintenance fertiliser and, if prolapse problems are severe, some Mg should be applied along with the N fertiliser used to boost the growth of the conserved feed and its protein levels.

In turn, if prolapse problems are severe, the conserved feed could be treated with causmag and molasses when being fed out to boost Mg, Ca and energy levels.

Salt:

The stocks requirement for salt is highest during pregnancy and lactation. This means that if stock require salt they should be supplied with salt blocks during this period. However, high salt (sodium) levels make the rumen alkaline, like K does, so dusting pastures with salt can cause Ca deficiencies and thus prolapse problems.

Pastures should thus not be dusted with salt in late pregnancy and if supplementing stock with salt, magnesium should be added to that salt.

By the sea, the impact of deposition of salt upon pastures and the high inputs of sulphate sulphur from sea breezes will often balance each other out. But in many situations, high inputs of salt and high soil K cause prolapse in ewes. In these cases there will be a need to treat pastures with fine elemental sulphur fertiliser to boost pasture S levels.

High Energy (Carbohydrate) Feeds Like Grain:

High carbohydrate feed breaks down in the rumen releasing carbon dioxide and makes the rumen acid: it can cause acidosis. Feeding grain, or other high carbohydrate feed, to ewes in late pregnancy can thus be used to neutralise an alkaline rumen thus reduce the chances of prolapse.

Clover & Lucerne:

Clover and Lucerne contain a high level of Ca so their use in conserved feed will increase its Ca level. However, as with other feeds, the value of this high Ca can be negated if K is also high: again K inputs must be controlled!

Summary:

As stated above, the factors causing prolapse are complex. There will be factors relating to the stock constitution but it is important when prone to prolapse to follow the rules below:

- Only apply K fertiliser when it is definitely required.
- Do not apply K to conserved feed paddocks prior to cutting: only apply it after cutting the feed to replace K taken out within the feed.
- Do not apply N in late winter to pastures when soils are cold and wet.
- Maintain a good soil pH through a regular liming program.
- Use S fertiliser when it is needed.
- Graze ewes in late pregnancy upon well drained warm soils: the use of sunny slopes will be appropriate.
- Grow high quality pastures that are high in clover.
- Dust pastures with causmag, treat feed with a causmag/molasses mix, and or supply stock with high magnesium sheep nuts if pastures are high in K.
- Supply ewes with high energy feed or grain in late winter/early spring if prone to prolapse.
- Add causmag to salt blocks if salt is needed.

The cause of prolapse is complex but if we can maintain a good quality pasture that is upon a soil that is not too high in K, has a good soil pH, is well drained and receives enough S fertiliser, we should be able to reduce problems. We may, however, also need to supplement stock with causmag and grain and to ensure that stock are not too fat!

CHAPTER 31

MAGNESIUM (MG) DEFICIENCIES IN STOCK: SLEEPY SICKNESS AND HYPOMAGNESEAMIA

Like calcium (Ca), see article on prolapse, magnesium (Mg) is often deficient in early spring pasture for stock. The factors that cause Ca deficiencies outlined within the prolapse article will also cause Mg deficiencies in pastures and stock. That is cold, wet and acid soils high in potassium. It is also aggravated by the use of nitrogen fertilisers when the soils are too cold.

Welsh ewe with Sufftex S lamb in Rhaedr, Powys.

However, unlike Ca stock have no reserves of Mg Thus once Mg intake is inadequate stock will suffer Mg deficiencies including sleepy sickness and hypomagnesaemia. Their onset characteristically follows a cold snap when mobilisation of fat reserves in the body depresses Mg blood levels: Mg is used to metabolise fat thus cold conditions depress the Mg levels needed by the nervous system.

Such problems can be reduced by grazing stock upon free draining sunny faces in spring and supplying them with high energy feed to reduce their need to metabolise fats. Nitrogen fertiliser must not be applied to pastures until there is true growth which will be when the soil temperatures are above 7 degrees C.

If Mg problems are expected it will be essential that the Mg supply to stock is adequate which will mean either treatment of feed, dusting of pastures, or treatment of water supplies.

VITAMIN B12 (COBALT) DEFICIENCIES IN SHEEP:

Many farms have suffered vitamin B12 deficiencies in the UK and need to treat stock to obtain adequate production. This is also the case in New Zealand (NZ) with a steady increase over the last 30 years. Vitamin B12 contains cobalt (Co) and deficiencies result from a lack of Co within feed.

Soil Type: Soil type is vitally importance with respect to Co deficiencies in pastures. Some soil types will be unlikely to produce pastures low in Co while others will be severely deficient. In turn some will produce deficiencies in stock in some years and not in others.

The major factor is the extent of weathering of the soil. The more weathered, or aged, the more the Co within the soil is not available for uptake by pasture.

Weathering will increase with rainfall and soil temperature provided soils are free draining. Thus high rainfall areas with free draining soils are likely to have Co deficiencies in pastures when they are dry. In contrast deficiencies are unlikely on soils that are only mildly weathered (eg recent soils by rivers and streams), have a high water table (wet all year) or are under low rainfall.

As in NZ, the UK has a range of soils that vary from severely deficient to sufficient in Co. Soils in the middle of this range may or may not be deficient with this dependent upon the specific season involved.

Rock Type: The next factor to consider is the rock type from which the soil as formed. Within NZ the majority of the mineral soils have formed from sandstone (greywacke or schist) which is very low in most trace minerals. The soils formed from these sandstones are likely to be Co deficient if highly weathered. Soils formed upon sandstones are found within much of the UK used for grazing sheep and if these are free draining we can expect Co deficiencies.

Pasture Species: The type of pasture grown influences deficiencies with clover containing often twice the Co of the grasses within the same sward. This, therefore, indicates that growing pasture with good clover content can reduce vitamin B12 deficiencies.

Treatment: Treatment for vitamin B12 deficiencies varies from treatment of the stock with vitamin B12 injections to applying Co to pastures. The method of treatment can have long term effects upon the deficiency within a flock. For example in NZ the popularity of vitamin B12 injections to lambs alone to boost their growth rates rather than treating the whole flock has resulted in deficiencies throughout the breading stock not being treated. Vitamin B12 deficiencies reduce appetite reducing feed intake and can cause liver damage. Liver is the storage organ for vitamin B12 thus its damage makes stock more prone to deficiencies. The result has been an increase in vitamin B12 problems through this type of management. It is important that ewes as well as lambs are treated since they are the backbone of your farm production.

Note that if ewes are deficient during pregnancy the unborn lamb will be deficient and when dropped will be deficient in vitamin B12 which reduces their appetite thus their need to suckle and to grow.

Deficiency Period in Pastures: Sheep that are in good condition can store vitamin B12 for 3 months while those of poor condition can store for less time. With pastures upon vulnerable soils being low in Co when they are dry over summer, climate change in NZ has had a significant effect on the presence of vitamin B12 deficiencies within sheep. This is since the term of Co deficiency has extended longer than 3 months over summer causing widespread rather than only occasional deficiencies. A similar situation is likely to be the case within the UK.

Further information on this deficiency can be provided if requested.

THE EASYRAMS SOLUTION

The theme of all the articles within this book is "How can sheep farmers change their management systems to increase their profits without incurring large expenditure?" We believe that EasyRam tups will play a significant role where ever the commercial flock owner is trying to reduce input costs – particularly those associated with shepherding – and is relying on a forage, as opposed to a high cost concentrate production system.

What makes EasyRams so different? Year on year year more ram breeders are adopting innovative approaches, but we are confident that our points of difference still make us unique. First, and foremost, we are and will remain a family business. All the family is involved on a daily basis, which gives us an immediate empathy with our clients. We breed sheep to make a living and we share the financial and regulatory pressures that all our clients have to bear. However, because sheep are our core business, we fully understand that providing sheep to improve their sheep profitability will in the long run determine whether or not clients will continue farming sheep.

10 years ago it became obvious that if the Hulmes were to stay in the ram breeding business then dramatic changes to both our type of sheep and our management systems employed were urgently required. We decided then (and believe it even more now) that, as ram breeders, we must produce rams that will increase client's profits in the face of static sale prices, rising costs and the reduction and eventual removal of all subsidies. This requires us to produce sheep that are functional, cheap and easy to manage, long lived and robust and above all animals that can grow and thrive on a grass only diet. We decided that natural selection and culling of our traditional flock would take too long to make any serious difference to what we were producing and so we reached the momentous and high risk decision to cast aside 50 years of pedigree breeding and to start again.

Our first significant decision was to source only NZ genetics because most of their sheep and certainly their Suffolks had been originally sourced from the UK's leading flocks during the first half of the 20th century. They had then been run on a very commercial basis within large flocks and the pressure to increase functionality increased further 25 years ago, when subsidies were removed from NZ agriculture overnight. Since then the average number of NZ sheep of all breeds managed by one man has increased from 850 to 3500. It is only by having truly functional sheep that lamb outdoors with no assistance, rarely if ever go lame, can resist worm challenges and above all will thrive on a grass only diet and require minimal shepherding it is only then that you can run a profitable sheep enterprise. We believe the same basic principles will apply in the UK in the coming years and we believe that our pure NZ sheep will deliver the same benefits in the UK as they have previously done in New Zealand.

We then decided that as ram breeders our management systems should mirror as far as possible those used by the majority of our clients.

Grass fed rams are an essential part of what we sell. Most clients use little or no creep feed and it is vital that our rams sire lambs, that will perform on grass only systems. So we use zero concentrates for lambs or rams at any stage in their life here and instead grow everything on grass and over winter rams on either grass or stubble turnips again with no concentrates. By using NZ genetics that over very many years were developed to produce lambs that "do" off grass and by only selling grass rams we are confident that their offspring will grow and perform on a grass only diet.

Outdoor lambing is another important area for us and as we move away from selling ram lambs and sell more shearlings we are lambing more and more of our ewes outdoors so this year 60% of our ewes and all our ewe lambs lambed outdoors. Lambing ease is as important for us as for our clients and by careful selection of wedge shaped sheep and ewes with larger pelvises we can ensure that all clients will have minimum labour input at lambing time whether lambing inside or out.

High serving capacity and long living rams are essential to minimise costs. We are confident that through their genetics and management our rams will serve 70 ewes each as lambs and 150 as yearlings or older. By producing rams that do not melt when working and also live a long time, we are able to help clients to significantly reduce their costs.

Reduced dagginess, worm burdens and foot rot susceptibility are all attributes that help in reducing shepherding costs. We do not trim sheeps feet routinely and like New Zealanders will cull sheep that give us problems in these health areas. This helps our clients to reduce their costs.

High maternal qualities and easy lambing are all attributes associated with NZ sheep and Easyrams of all our breeds are proving throughout the UK that they produce ewes which are thrifty hard working long lived and outstanding mothers.

We believe that all the above attributes have a significant impact on the profitability of client's sheep enterprises and would encourage all who have not yet given us a try to look at our website www.easyrams.co.uk or to contact us direct.