

THE WOOL PRESS

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EDITORIAL

Welcome to another packed edition of the DOA Wool Press. I am constantly impressed by the ability of Siân to coerce the staff of the department and the general community into producing enough high quality material to keep the Wool Press coming out every month. Well done Siân; a hard task done extremely well!

This edition of the Wool Press is not an exception; it contains a multitude of highly informative articles ranging from quite technical to 'just good fun'. Readers are urged to link the articles from Peter Johnson (Winter Protein Supplementation) and Joe Hollins (All Flesh is Grass) and to carefully consider them in the context of what goes on in their animals during July, August and September each year. Poor nutrition during this period is believed to have a profound impact on the profitability and productivity of farming in the country – results of Peter's trial work will be eagerly anticipated.

Thank you to Zoe for the summary of the 2007 Meat Export Season and her article explaining the definition of lamb, we look forward to many more contributions from Zoe over the years. Welcome to the department Zoe!

Thanks are also expressed to Helen Otley for taking the time to describe some of the research that BAS has going on with leopard seals and how we can all help.

This month Steve Pointing makes another contribution. Steve's views on the subject of animal welfare, traceability and general farming issues are always welcomed and as always poses food for thought.

As a final point I would like to make mention of the departure of Joe Hollins from the DOA. Joe has been a regular and dedicated contributor to the Wool Press and indeed to the DOA overall. Lets hope that we see you in the Falkland Islands again. Thank you!

Neil Judd
Senior Agricultural Advisor

WINTER PROTEIN SUPPLEMENTATION

By Peter Johnson

Animals require two main things in their diet, energy and protein. Sure, they also need other nutrients like calcium, and various micro-nutrients such as selenium and cobalt, whose deficiencies can affect animal performance, but without energy and protein, the animal can not survive and be productive. The other thing to remember is that animals that are ruminants, like sheep and cattle, have bacteria in the rumen that actually use what goes into their system, not the animals themselves. It is these bugs that then overflow and are digested later on down the digestive tract.

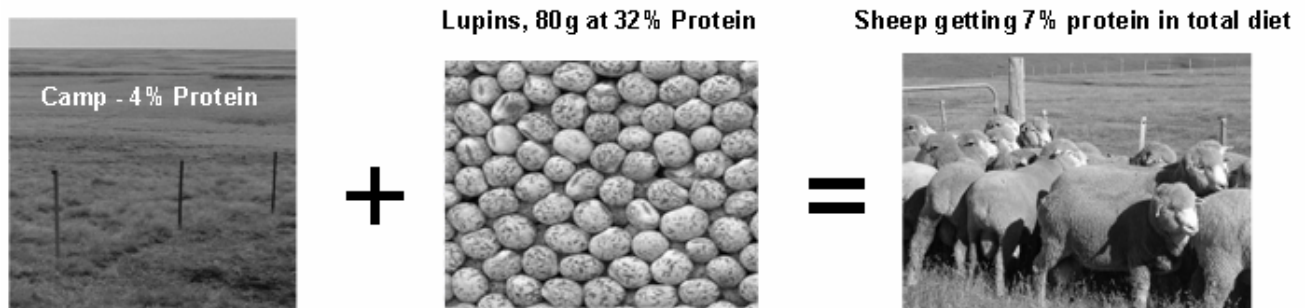
So what does this mean? Well it is the **bacteria** that you are feeding your precious grass to! We need to make sure that the bacteria are doing the most productive job they can based on what the animal selects from the camp to feed them.

During the beginning of winter, the bacteria aren't doing too badly. The animal is selecting enough green feed from the camp, all that fine grass hiding close down to the ground underneath the dead material we see from above. But, this doesn't last forever. Eventually the green grass, which contains the vast majority of the available protein in a camp, runs out. All that is left is the rank, dead material that has a high energy content, but a low to non-existent protein content. The animals eat the rank material, but it just sits in the rumen, not doing too much. This is because the rumen bacteria do not have the protein that they require in balance with the energy to effectively digest it all. That is where protein supplementation comes in.

If we can give the rumen bacteria a hit of protein every few days, they will function much more effectively, speed up the digestion process of the rank grass in the rumen, and increase the animals feed intake, as the whole process is going through the animal at a much faster rate. Research shows that the rumen bacteria can go for about 72 hours without a 'protein hit' before they lose their effectiveness. So if we as animal managers can provide that hit every 3 days, they will be much more productive.

How do we do this? One way is to use a high protein supplement! The DoA has recently acquired high protein, whole lupins for the purpose of trialling the supplementation during winter. Trials are planned where groups of ewes and hoggets will be feed a small quantity of lupins every three days, or longer depending on circumstances. At this stage, the cost is £2.10 per animal for 90 days worth of feed.

The sheep only require about 80g/head/day of the lupins (or 240g every 3 days) to have a significant effect on the overall diet protein levels. Lupins are about 32% protein, while dead, weathered native camp can be as low as 4% protein. Depending exactly where an animal is in its growth or reproduction cycle, it can require between 6% and 12% of its diet as protein, and this addition of lupins can raise the overall diet protein percentage to this productive level.



The DoA still has trial positions available for interested farms, to see if this form of supplementation works and is cost effective in your conditions. We are after mobs of approximately 500 ewes and/or 500 hoggets, as well as a control mob, to monitor differences in live weight, reproductive performance and wool quantity and quality. Feeding will start in early July with an introductory period and then move on to the lupins every 3 days for the following three months.

We are flexible with how we will be feeding the lupins out. I would certainly value anyone's ideas or

suggestions as to how to feed large numbers of animals in the wet, cold conditions of the middle of a Falklands winter. These recommendations and what we learn from all of the different trial sites, learning what does and doesn't work, will be another important output for the trial.

A ROUND-UP OF THE 2007 MEAT EXPORT SEASON

By Zoë Luxton

We are pleased that this season seems to have run fairly smoothly. The following spiel is summary of the most pertinent happenings this season.

The new Animal Movement Certificates were introduced and despite being a little 'user unfriendly' one has arrived with every load of sheep. Few have been perfectly filled out but all have had the important treatment box ticked or filled in for which I am very grateful.

Without wishing to sound like a broken record, it is dull, but true that ADDRESSES NEED TO BE IN FULL e.g.: Sheep Farm, West Falklands, Falkland Islands FIQQ 1ZZ.

The other common problem is that the number of stock written on the AMC doesn't tally with what arrives at Sand Bay. With Lots coming from the West this is hardly surprising as there are several places where you could lose/gain a sheep or two. This is a fact of life but it is far from ideal. The shortage of indoor lairage space at the abattoir adds to the risk of gaining/losing numbers from Lots as sheep often have to be held in paddocks.

The AMC forms will be reviewed. No big changes will occur but there will be some re-wording to make them clearer to fill in and to read at this end. There may also be spaces for farmers/truckers/receivers stock tallies. The OVS/FIMCo will also make every effort to contact farmers and discuss discrepancies in stock numbers. These changes are all in an effort to tighten our traceability system.

Sheep identification requirements are due to be legislated i.e. the requirement for tags +/- or paint brands. The most ideal solution would be to have an initialled tag AND a matching paint brand on an animal. Thus if a tag was pulled out or a sheep was too dirty to see the brand and then had to be shorn to render it clean enough to kill, there is a second method of identification present. Obviously tagging AND branding takes more time and materials and you will not be legally obliged to do both. You will be legally obliged however, to ensure that any paint brands are clearly legible. Sheep with smudged, unreadable brands that cannot be identified will not be accepted for slaughter. Remember to fully document your identification method(s) on the AMC.

In total 34,276 sheep were processed through the slaughter hall this season. This is approximately 1000 more than last season, and with the export season being a week shorter. This shows that the workings of the abattoir are getting more efficient and until more space is available for storing animals/carcasses/boxed product, it will not be possible to increase the production rate much more.

The usual types of pathologies were found in carcasses. Boils (Caseous lymphadenitis), bladder cysts (C.tenuicollis), Sarcocysts, arthritis, tumours and 3 hydatid cysts. Several carcasses had to be condemned due to emaciation and some because they were so heavily bruised there was very little meat available on them that was fit for human consumption. Boils and hydatids are subjects for separate articles but I would like to draw your attention to the high incidence of trauma that has been noted on carcasses this season (bruising and

broken ribs).

Sheep/carcasses will sustain trauma from the following procedures;

1. Gathering and drafting on farm and loading onto the lorry
2. Transport on lorries and ships
3. Unloading, drafting and movement into lairage pens at the abattoir
4. During stunning if the electric stunners are set too high

Point 4 is a situation that is checked daily (and immediately rectified on the rare occasion the settings have been altered).

Points 1, 2 and 3 are obvious, yet valid. Any handling of sheep stock will cause bruising to some extent unless the work is tediously slow and done on a thick bed of straw! Drafting sheep to select them for slaughter, penning to tag or brand the selected ones and then loading them onto a lorry all involves fairly intense handling. One of the commonest bruises we see is down the back of a sheep – speckled bruises that are simply due to wool-pull.

Bumping about in the back of a lorry, bouncing off each other and the sides is another sure way to cause some bruising.

Unloading, drafting and movement at the abattoir carries the same risks as handling on the farm. This is not an accusatory paragraph. It is simply to serve as a reminder that severe bruising, as well as being a welfare issue, reduces the value of a carcass. So stop and think. Take an extra 10 minutes to load the shed or lorry, let the animals slowly investigate where they are expected to go rather than hurrying them through gates and wondering if you can just squeeze that extra sheep in the pen. Let the infuriatingly flighty one rush past you back into the pen, rather than rugby tackling it and turfing it over the fence with your boot in its bum. Consider lining your stock trailer with some straw if you are expecting a rough journey. Remember that a bang on a fence that is going to bruise you, will bruise your sheep in the same way – and that bruise will have to be trimmed off your carcass reducing its weight and its value.

This advice is for farmers, truckers and abattoir staff alike.

I am now based in the Department of Agriculture and any question or comments are always welcome telephone 27366 or email zluxton@doa.gov.fk

STIFF OLD BONES

By Joe Hollins

Working Collies and their close relatives Kelpies have a great tendency to stiffen up with age. As vets, we tend to pull a few limbs around, tweak a few bones, and say that they've got a touch of arthritis. It's no lie, but the trouble with the term arthritis is it encompasses a huge array of different conditions: its simply means inflamed joints. If I spent a day digging post holes or running a marathon, I would almost certainly have a touch of arthritis myself, but it would hopefully go away. What we really mean is osteoarthritis, the long term or chronic inflammation of a joint with the accumulation of extra bone, which grates, stiffens, and occasionally - usually through over exuberance (daft racing, penning sheep) - becomes exacerbated. Any joint can be affected, especially if it has been injured at some point. But the working Collie/Kelpie specialises in one type: spinal osteoarthritis, known professionally

(because we medical folk like obscure terminology!) as *spondylosis deformans*. Okay - let's just call it spinal arthritis.

Joints are finely designed affairs: moving interfaces between bones which are lined with slippery cartilage, wrapped around with an enclosing membrane, and filled with lubricating oil (synovial fluid). Unfortunately like all moving parts, they can wear, and the body's attempts to repair the damage results in the laying down of slightly less efficient materials which wear all the more - and so on. It's a self-perpetuating process that begins to obstruct the range of the joint, pinch between the moving parts, and - because joints are well endowed with nerve endings - hurt.

Working sheepdogs are famed for their enthusiasm. They love to work. As youngsters especially they are more than content to grind themselves into the ground gathering sheep. It's what they live for. Inevitably, they wear out their joints - such is life. The commonest joints to be affected in these breeds are the joints between the vertebrae of the spinal column, especially the lower back. From here comes power and thrust, and the spaces between the vertebrae are constantly compressed and squeezed together.

Between each vertebra lies a disc. This consists of a fibrous ring with a jelly-like centre, a resilient shock absorber evolved to resist compression but allow spinal flexibility. It is probably progressive damage to the underside of these discs - the most compressed part inside the curvature of the spine - that starts the process of spinal arthritis. Bone begins to accumulate on either side of the disc, attached to the bodies of the two adjacent vertebrae, and over time this forms a bridge which just occasionally fuses and welds the 2 vertebrae together. This removes the source of pain, but unfortunately more usually a painful working gap persists between the two sides.

Generally this process occurs all the way along the lower (lumbar) back and occasionally higher through the thorax. One of the most painful areas is the very base of the spine, the lumbo-sacral joint, where the pelvis attaches. In the early stages dogs just tend to show stiffness after rest, especially after a day's work, but as it advances, the dog will become stiff throughout the day.

What can be done? Prevention is difficult: a working dog must work. The only factors that may have an influence is to make sure that the dog has a good balanced diet for healthy joints and bones, and is not obese. Obesity not only aggravates arthritis, but speeds it up. It's simple engineering: more weight, more wear.

Treatment is easier. It is worth remembering that dogs are stoic and keen to serve; it is up to us to recognise the signs. If obese, keep lean; simple dieting has a marvellous effect. In addition certain dietary additives help (the modern catch word is 'nutraceuticals!'). The easiest are omega-3 and omega-6 fatty acids, the essential fatty acids, also vital for good skin and coats. The cheapest source of omega-6 is sunflower and corn oil. Fish oils are high in omega-3. Small quantities are required (eg: ½ tsp once or twice a week) - don't overdo a good thing. Kidney beans and soya beans are rich in both! Also popular and believed to help is the over-the-counter combo of glucosamine with chondroitin. These are said to protect the cartilage, and are used extensively by medical professionals but don't come cheap.

Which leaves the non-steroidal anti-inflammatories, or NSAIDs. Aspirin is still a good drug, cheap, non-prescription and well tolerated by dogs. The dose is 10mg/kg up to twice daily (150mg for a 15kg collie). Use sensibly and strategically. NEVER be tempted to give a dog ibuprofen: remarkably - because dogs are very drug tolerant - it poisons them. For that special dog though we have some excellent, powerfully effective prescription NSAIDs here at the surgery. You might have to dip into the beer money, but feel free to enquire!

My contract comes to an end shortly and I leave for the UK. For all the cups of tea, cookies, roasts and warm welcomes, very many thanks. You're a tough, hard working, hospitable people farming in difficult conditions, and I wouldn't have missed this past year for all the world. Where else can you herd reindeer, flush embryos and grovel around in the working innards of fishing vessels?! But... next time a friend at home complains about the UK weather, I will simply laugh! Hasta luego. Joe

HYDATID CONTROL - MY VISIT TO WEST FALKLAND

Thank you all for allowing me to visit your farms and for the numerous cups of coffee and tea. Kept me going while journeying the rough roads of the West (well parts of it anyway)!! An enjoyable week on my part and it is good to meet up with you all.

If anyone would like a laminated copy of any of the displays shown during my visit, please contact the Department of Agriculture. Please indicate which ones you would like and how many of each.

If there are any other queries with regard to the Hydatid Control Programme or you just want a chat please feel free to get in touch with me.

Kind regards

Shona

THE FALKLAND ISLANDS DEFINITION OF LAMB

By Zoë Luxton

We have had some queries this year at the abattoir as to why some hoggets have been sold as mutton as opposed to the lamb carcasses they were intended for.

The Falkland Islands definition of 'lamb' is as follows: 'a sheep under 12 months of age or with no permanent teeth in ware up to 15th March of the killing season. All sheep processed after 15th March are considered to be mutton.'

This definition was agreed and documented by the DoA Veterinary Section in conjunction with FIMCo before the start of the 2006 export season.

It must be remembered that 'lamb' is defined for purely marketing purposes, it defines carcasses we can sell as 'lamb' as opposed to 'mutton'.

The age of sheep, however, must be taken into account with regards to how it can be processed through an abattoir. Specified Risk Material is the parts of a carcass that are considered able to spread disease, namely the Transmissible Spongiform Encephalopathies such as BSE and Scrapie. SRM is material such as brain, spinal cord, spleen, and some parts of the small intestine. With regards to sheep; Scrapie is a disease that develops slowly therefore the brain and spinal cord that are considered dangerous in mature sheep are not considered as Risk Material in ovines under 12 months of age. Obviously not every young sheep arriving at an abattoir has a passport with its date of birth on it to prove its age so the

EU define 'safe' neurological tissue as that which is from ovines that are under 12 months old or those that have NO PERMANENT INCISORS ERUPTED. Sheep cut their permanent incisors between 12-18 months of age so any animal with a permanent incisor cut through the gum could potentially be over 12 months of age.

Consumers require young carcasses that are marketed as 'lamb' to be cut in specific ways, ie they want loin cuts, this is ideal in sheep under 12 months or with no permanent incisors erupted as the carcasses can be split lengthways, the spinal cord left in or removed and be further processed with no worry of spreading Scrapie by contamination of meat with SRM. To process carcasses over 12 months or with a permanent incisor erupted, the carcass must be split, the spinal cord removed and the empty spinal canal double checked that there is no visible SRM remaining. All this has to take place separately from the main processing table and under very strict hygiene rules.

The DoA and FIMCo recognised that simply defining 'lamb' as a sheep under 12 months of age or with no permanent incisors erupted was not ideal for the Falklands farming system. Only being able to market these defined animals as lamb would mean that much fewer 'hogget' carcasses could be sold as lamb, several animals would have permanent incisors through the gum and would have to be sold as mutton thus attracting a much lower carcass value. The more lenient definition of 'lamb' was thus introduced and is based on similar systems as shown below:

Australia: 'lamb' an ovine carcase derived from a female, castrated male or entire male ovine animal, that: a) shows no evidence of eruption of permanent incisor teeth and b) in the case of males, shows no evidence of secondary sexual characteristics.

New Zealand: 'lamb' a sheep less than 12 months of age or which does not have any permanent incisors in ware.

Chile: 'lamb' a sheep under 16 months old based on lambing date or which does not have any permanent incisors in ware.

There HAS to be a cut off point. A point of view that has been raised is 'why can't we just use 15th March as a cut off date and not be concerned with permanent incisors in ware'. This is a good point. The reason being that old season lambs born early in Sept 2005 for example would be 18 months old by the time they were slaughtered as 'lamb' in March 2007, everyone agrees that the taste difference between a 16 month old sheep and an 18 month old sheep is not going to be vastly different however the more and more mature lambs that are sold the more likely at some point there is going to be a complaint 'my lamb didn't taste like lamb'. A few complaints from consumers to 1 or 2 main buyers can have devastating effects. Having teeth erupted and in ware is a good indication of the general maturity of a sheep. Having a lamb definition system in place that is similar to huge lamb producing countries is good common sense and a reasonable defence against any complaints. Old season lambs with teeth in ware will be sold as mutton, lowering your profit. It is best practice to mouth the hoggets you are planning to send to the abattoir, any with permanent incisors erupted need to be on the lorry ASAP so you can still sell them as 'lamb'. This season we monitored some old season lambs at the DoA to try to determine how long it took from a tooth erupting to being 'in ware' – to give you an idea how soon you need to ship your more mature hoggets out. The results are displayed below.

Sheep 1

Day 1 – first incisor just erupting



Day 9 – first incisor growing



Day 21 – second incisor growing, first almost in ware.



Day 31 – first in ware, second almost so.

Sheep 2

Day 1 – no eruption



Day 9 – both erupted



Day 21 – in ware



Sheep 3

Day 0 – 1 already erupted



Day 9 – first one almost in ware



Day 21 – first well in ware, second growing



Day 31 – second almost in ware

The 3 lambs we kept here were confined in mobile yards that were moved on a daily basis so that fresh feed was always available to them. Their diet was supplemented with high protein finisher pellets at a rate of 1.5kg per animal, split into two daily feeds. The front teeth of these lambs were photographed every Monday, Wednesday and Friday for the time they were here. The trial extended from the 5th February 2007 to the 8th March 2007 during which time all 3 had lost their central deciduous incisors and the permanent teeth had erupted and come into ware.

ONCE THE BABY TEETH FALL OUT THE LAMBS SHOULD BE INTO THE ABATTOIR IN LESS THAN 3 WEEKS OR THEY WILL TURN INTO MUTTON

15 KG OF LAMB VALUE= £18.75

15 KG MUTTON VALUE= £0.00

THE SPOTS OF A LEOPARD SEAL

By Helen Otley, Environmental Planning Department

There is a saying that a leopard never changes its spots and British Antarctic Survey (BAS) seal scientists have recently shown that it's also true for the leopard seal. Leopard seals are solitary animals, which haul out in summer on Antarctic pack ice to breed and for the rest of the year travel about in search of prey. A proportion moves northwards, some even reaching the Falkland Islands during the winter months.

At Bird Island, BAS's long-term biological research station at the north-west tip of South Georgia, biologists have been trying to work how the leopard seals seen between April and October fit into the sub-Antarctic food web ecosystem. "We wanted to mark the leopard seals but getting a tag on a live animal without restraining it is difficult" explains Dr. Jaume Forcada. "But as all leopard seals have a unique pattern of colour spots and patterns, we can recognise them through photographs".

Jaume and his team have identified over 120 leopard seals and already the biologists over-wintering at Bird Island are checking the beaches each day with cameras in hand. "We would love to expand our research and observation effort to the Falkland Island. Its only 1,390 kilometres from Bird Island and that's nothing for a leopard seal" says Jaume.

Leopard seals, like most wild animals, aren't very aggressive unless disturbed and good photos can be obtained from 20 metres away. Dr. Forcada requests good quality photos of the left and right sides of the head and body, throat and belly area, as well as any scars and wounds, if possible. Small plastic coloured hind flipper tags have a four number/letter combination. Details of your sighting and photos should be sent to jfor@bas.ac.uk or to Falklands Conservation who will pass on the record.

CHAMPION SHEEP DOG TRIALS RESULTS

Held at Goose Green on Saturday 12th May 2007

Position	Handler	Dog	Total Points	
1	L. Morrison	Duel	112	2nd Port Howard
2	T. Hirtle	Twig	108.5	4th Port Howard
3	S. Dickson	Day	100	1st North Arm
4	T. Hirtle	Quill	97	1st Port Howard
5	O. Velasquez	Ronaldo	92.5	4th North Arm
6	S. Hirlte	Jody	84.5	3rd Port Howard
7	H. Grierson	Mick	76.5	3rd North Arm
8	G. Castro	Mac	62.5	2nd North Arm

FULL FEEDING OF NEW-SEASON LAMBS – WHAT WE’VE LEARNT SO FAR

By Peter Johnson

This trial began in February with the identification and separation of two mobs of approximately 180 wether lambs at both Port Howard and Elephant Beach. The primary aim of the trial was to finish as many lambs as possible for the abattoir as new season lamb. In March, 46 lambs from Swan Inlet also started a feeding program. The second aim of the trial, but equally important, was to bring the processes, skills, management and supply lines of lot feeding to the Falkland Islands.

Method

Port Howard

Lambs entered the trial in mid February after being selected based on their bodyweight, with a minimum weight of 19kg set for lambs entering the trial. Lambs were initially locked into a small part of the airstrip for a few hours each morning until they got used to the feed. Some pet lambs were also added to the mob to help teach them to feed. Open troughs were used to place the feed in and were cleaned every day. A highly palatable starter ration was used to introduce the animals onto the feeding regime, and then the higher protein, higher energy ration was introduced.

Elephant Beach

Lambs entered the trial on the 1st of March, and were selected by visually assessing and tagging the biggest lambs at lamb marking in mid January. Lambs were placed in a small holding paddock of about 5 Ha. Two self feeders were used for the lambs and were filled every few days to supply a constant supply of feed.

Swan Inlet

Lambs entered the trial in mid-March. The animals were placed in a small paddock that had good, clean water access. They were initially fed using troughs checked and filled twice a day, but were then moved onto self-feeders.

Results

So far, the lambs from Port Howard (pictured left) and Elephant Beach have been slaughtered. The animals from Swan Inlet are expected to be killed in the next few weeks. A full economic analysis will be carried out after the last slaughter, which will compare animal growth rates, feed prices and look at individual animal performance. It will also include a price sensitivity table, and we are hoping to use the price schedule for next years abattoir season as the basis for these calculations.

Timing is also an issue that will be looked into further, with the flexibility offered by pellet feeding of being able to unload lambs into the export season rather than having to carry them through the winter an economic bonus in some people’s circumstances.

A few comments on what has been learnt at Port Howard

Citta Lee was one of many having involvement in the trial at Port Howard, and he felt that establishing a routine for the animals was important; “we slipped up by not getting the lambs into a feeding routine immediately”. Intensively farmed animals thrive on routines and rituals and also need a constant feed source in front of them. “In future, it would also pay to get the lambs on the high protein feed much quicker as I felt that there was a marked improvement in the condition of the lambs and they just seemed to have a bit more vigour”.

This was probably due to the conservative advice given by the DoA to slowly introduce the higher energy feed, as we were very cautious of acidosis, or grain poisoning which can occur with any grain based ration. In retrospect, the lower than expected growth rates in all of the trials can probably be attributed to the below optimal energy level within the diet. The bottom line is in full feeding – the higher the energy level (grain content), the higher the growth rate, but the higher the risk.

Another comment from John Morrison at Port Howard related to water. The airstrip was chosen specifically as it had access to high quality water in the well, and I personally thought that it was more than adequate for supplying the lamb's needs. John noted that when the lambs were let out from the holding paddock around the well, many of them ran to another water point near the old dairy (which is supplied by another water source) to drink. This is an interesting observation and highlights that intensively feed animals must have unrestricted access to high quality water to reach their maximum performance. Perhaps there is something in the well water that limited the animal's water intake from that source?

Look out for the follow up reports and results for this trial in future Wool Press articles.

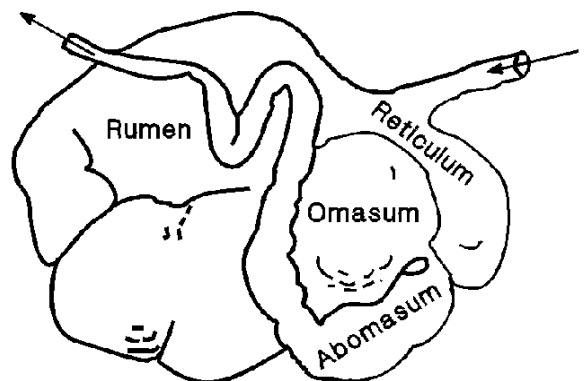
ALL FLESH IS GRASS

By Joe Hollins

One of the most famous questions set in the finals of a veterinary degree was a Biblical quote. It said, quite simply: *'All flesh is grass.'* *Isaiah 40:6. Discuss.*

Of course those four quoted words aren't as simple as they look, and in a final exam you can be sure that the examiners wanted a detailed biological analysis of how it is that ruminants thrive where most other mammals would starve and die, and how they therefore provide the link in the chain for converting - as far as we are concerned - indigestible materials into calories. And into beef, mutton and lamb, wool and milk. It's a neat trick - and in truth, ruminants can't digest grass at all. It's done for them. This is the story of the four stomachs.

Most people know that the ruminant has four stomachs: the reticulum, rumen, omasum and abomasum. In actuality the fourth stomach, the abomasum, is the true stomach. It is much the same as our stomach and has similar functions, to acidify and break down the food before it descends into the intestine where fats, carbohydrates and proteins are fully digested and absorbed. How the ruminant knocks us monogastric mammals into a cocked hat and off the grassy plains, is in the preceding three stomachs. Here, woody based fibrous materials such as grass, rich in locked up energy in the form of the complex carbohydrates cellulose, hemi-cellulose and lignin - and utterly indigestible to us monogastrics - are broken down into digestible fatty acids (chiefly acetic, propionic and butyric acid). So ruminants have a double digestion system that permits them to thrive on poor quality food: the first breaking down indigestible materials into digestible materials, and the second more or less exactly like ours.



This can only be accomplished with a little help. The first two stomachs, the rumen and reticulum, are intimately associated fermentation vats packed with literally many billions of

bacteria and protozoa that do the work on the ruminant's behalf. The inhabitants of this microbial zoo release enzymes which break down mainly cellulose into calorific fatty acids and glucose. They have a purpose: the glucose is used by the microbes as a source of energy. The inside of the rumen is their world: they use the glucose to breed, live and die. As a bonus, they have not only produced digestible fatty acids, but the microbes, dead and alive, spill out with each churn of the vat into the abomasum and intestine where they themselves are digested and utilised as food. So nutrition is derived in effect from three sources: ordinary digestible food; indigestible food made digestible, and the microbes themselves.

To achieve this, the ruminant has to assist the microbes in their business to gain the maximum benefit from the food. It does this in several ways:

- It churns over the morass of food in a mixing cycle between the reticulum and rumen. If you place your ear/hand in the dip immediately beneath the pelvis on the left flank you will hear/feel this 'cement mixer' action going on. When ill it slows or stops.
- It regurgitates and chews the cud. Grinding the woody and fibrous materials into finer and finer particles massively increases the surface area for the microbes to get at, and speeds digestion. Failure to chew the cud properly (eg: broken or malformed mouths) therefore results in a poor animal – which will be an inefficient grazer as well.
- It belches. The microbes live without oxygen and produce methane as a by product. It's unhelpful, occupies space and inhibits rumenal contractions. Failure to remove it is one cause of bloat. Classically this can be caused by overindulging in highly fermentable foods (eg: clover), or having a touch of pneumonia (enlarged lymph glands in the centre of the chest squeeze off the gullet).

Armed with this knowledge, it becomes more understandable why different quality forages with different fibre contents or even fibre lengths have different digestibilities. It also explains why over consumption of lactic acid producing feeds such as grains can so acidify the rumen that it can cause rumenal death - the death of the microbes, without which the ruminant itself will die. The microbes need a relatively stable environment, although they can adapt to gradual changes in food. Starvation alone will kill the microbes since they too have to feed, a key factor here in September when heavily pregnant ewes are desperate for grazing. Some fibre to keep the microbes alive - even if it is technically of very poor nutritional quality - is better than none at all, which is probably where the much scorned White Grass has a role to play.

This also helps explain something that may become of great importance in the future: bypass protein. The microbes also digest protein, but the digestibility of protein varies enormously. Some proteins can be digested or degraded within 30 minutes, and are utilised by the microbes to build their cell walls. Ultimately these are readily digested by the abomasum and intestine at a later date, so they are still useful. Other less degradable proteins may theoretically take several days, so they flow out of the rumen to be digested in much the same way as we digest proteins, in the ruminant's second digestion system. Supplementing with bypass protein is a way of utilising the ruminant's double digestion system more fully, and increasing calorie intake.

All this raises a question: how do young ruminants cope with milk? At birth the gut is of course completely sterile, the rumen, reticulum and omasum poorly developed and devoid of microbes. Suckled milk is digested in the abomasum and intestine, as with us monogastrics. Cunningly, the act of suckling stimulates a fold to form called the oesophageal groove, which acts as an aqueduct and allows the milk to bypass the forestomachs straight into the abomasum. Spillage into the rumen causes unwanted fermentation and bloating. This is a common problem with hand reared lambs, and is more often seen with bucket feeding or the use of poorly shaped nipples causing them to swallow

air. Nibbling on forage inoculates the rumen with microbes and stimulates rumenal development, so that it is usually functional in the lamb by the time it is 50-60 days old.

And if you're wondering what the omasum - alias the 'butcher's Bible' - has to do in all this, the answer is, relatively little. It absorbs water.

COMMENTS ON HYDATIDS AND TRACEABILITY ARTICLE

The comments below were received from Steve Pointing, former Senior Veterinary Officer at the Department of Agriculture on an article written by M Alazia, Port Edgar called Hydatids and Traceability, on why he believes animal welfare is such an important issue and why farmers in the Falkland Islands have to be aware of the subject.

1. Poor animal welfare standards could have a serious deleterious effect on the ability of Falkland Island farmers to export live animals or animal products - be it wool or meat. The product itself could be perfect but if the purchaser/consumer found out that the animals from which it came had been kept or reared in less than satisfactory conditions this could be a reason for choosing to buy elsewhere.
2. The animal welfare problems that occur in the Falkland Islands are different from those that occur in the UK because the farming systems are so different. I am not sure that I ever said that the welfare conditions were worse in the Falkland Islands - but that farmers needed to be aware of them - just as British farmers need to be aware of the welfare problems in various sectors of the livestock industry back here. Much of my current work involves visits to various farms to investigate complaints relating to animal welfare issues. Some are justified, others are rather more spurious.

In many ways Falkland Island farmers are very fortunate in that, because of the extensive nature of farming in the Falkland Islands and because of the low density of population, very few members of the public come into contact with livestock on a regular basis. In the UK most farmers' fields are surrounded by housing and criss crossed by public rights of way - so the public has many opportunities of seeing livestock at close quarters. If they see anything amiss - you can bet your bottom dollar that someone will report it - either to ourselves, the local authority or the RSPCA.

I don't, for one minute, think that welfare problems are worse in the Falkland Islands than here; by the nature of the farming, terrain, weather conditions etc - they just tend to be somewhat different.

3. Michael particularly mentions the problem of "fly strike" and how he had seen many untreated sheep with the condition while working in the UK. He is quite right to say that this is a serious welfare problem in the UK. It does, however, get reported on a regular basis and, if following investigation the problem is found to be genuine, the farmer concerned may well find himself being prosecuted under UK animal welfare legislation.

The problem of fly strike is obviously much more common in the UK than in the Falklands for a number of reasons - a) the lushness of the Spring grass in the UK leads to sheep with very mucky backsides thus encouraging flies to lay their eggs, b) the UK has a much warmer, wetter Spring than the Falkland Islands - better conditions for the adult fly and also for development of the maggots, c) the climatic conditions in the UK also encourage high worm burdens in Spring leading to diarrhoea and further soiling of the rear end.

In the farmer's defence (but not to condone him) it can be quite difficult to see fly strike in the early stages of infestation as the maggots are hidden beneath the fleece and you might only know that the sheep was feeling uncomfortable by observing it closely and for a period of time. That can and should be done under UK sheep farming conditions but would prove very difficult in the Falkland Islands if (as a result of global warming, for example) the incidence of fly strike increased significantly.

4. My final comment is that you ignore welfare issues at your peril. In the highly competitive marketplace in which farmers now operate there will always be one group looking to capitalise on their own strengths and pointing out the weaknesses of others. This will involve many different factors (in the case of wool - fineness, whiteness, staple length of the product etc) but how the animals are reared and looked after will also have an impact in certain markets - so it is in the farmer's own interest to make sure that he is not disbaring himself from future higher priced markets by ignoring animal welfare issues.

Now Michael will have every justification in saying that I have written yet another article on the importance of animal welfare. I am only doing so, and have always only made an issue of the subject, because I am aware of the potential danger of not taking the subject seriously enough with the result of farmers suffering financial consequences further down the line.