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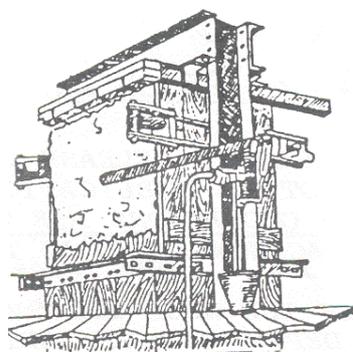
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HAPPY NEW YEAR!!

EDITORIAL

The warm weather over the festive period and into the New Year has made it difficult to recall quite how chilly it was for the Saladero open day at the start of December. Information was presented on a range of current agricultural issues and a couple of the items in this Wool Press recount some of that information. The day included a tour of Saladero to discuss pasture improvement and concluded with a demonstration of back fat measurement and condition scoring in beef. In relation to beef, Mac discusses opportunities for beef production here together with options for utilising National Beef Herd bulls.

A couple of articles in this first Wool Press of the year demonstrate the complexities of modern agriculture. Tony considers the ins and outs of genetic selection pressure in sheep flocks and offers the option of processing information through an indexing software package. Andrew discusses factors affecting plant growth and sets out a host of parameters which could be measured and analysed to compare actual yields to potential yields. All this raises the question of whether there is demand for additional agricultural services to investigate some of these issues.

Susan and Ian provide what may well be their valedictory contributions in this edition of the Wool Press. Susan has done much work on parasite control in the Falklands, highlighting it as a significant factor. Her article summarizes recommendations for internal parasite control. Ian provides his thoughtful and measured views on a number of current aspects of Falkland's agriculture, together with some of the issues he has been engaged with. Ian and Susan depart at the end of the month after some 3 years here. We thank them for their time at the department and wish them well for the future.

Two days before Christmas and I thought I was hallucinating. I looked out the window and there were fat lambs everywhere. This would undoubtedly be a joyous sight to farmers and abattoir managers but it came as a bit of a surprise to me living about as centrally in downtown Stanley as one can get. I didn't know what to do first; grab the FIMCo price list, dust off the eskilstuna, or check the item on Wandering Livestock in last month's Wool Press. They were so close to the barbecue I thought it must be a sign. Anyway in the interests of harmony on Fitzroy Road they were returned to their owner.



Finally, best wishes for a Prosperous New Year from all at the Department of Agriculture.

John Barton
Director of Natural Resources

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RECOMMENDATIONS FOR INTERNAL PARASITE CONTROL IN THE FALKLAND ISLANDS

By Susan Campbell

As a result of increasing information on the development of drench resistance and the implications of this for the timing of drenching it has been suggested that there should be a guide for time of drenching written for the Falkland Islands.

There appears to be some difficulty in getting 'clean' pastures by spelling and also possibly by grazing with cattle. There are a number of possible reasons for the apparently disappointing results we have received with spelling and cross grazing pastures, but the end result is that if we are unsuccessful in getting 'clean' pastures then young stock may need to be drenched more frequently until in the short term, they are old enough to develop some age related resistance and in the long term, parasite resistance is successfully incorporated into the genes of our flocks. In the interim it is still strongly suggested that paddocks being used for susceptible stock, i.e. those under twelve months of age and ewes on the point of lambing or with lambs at foot, should be spelled. Spelling is most effective over the summer months, possibly between late November and early March and preferably for three months over this period. Winter spelling would require at least 6 months in order to have any major beneficial effect. Use of cross species grazing should also assist in reducing larvae. Further work is being conducted to establish how effective spelling is in the Falkland Islands.

Weaning lambs at 12 weeks from the start of lambing and drenching them onto a good quality parasite safe pasture should help prevent lambs developing heavy burdens of parasites before weaning, thus slowing their growth and also reduce the build up of parasites on the lambing camps with benefits to the next sheep in those camps. Also the ewes will gain more weight before the next joining as a result of a shorter lactation with on-going benefits to the next years lambing percentage. The lambs should then be monitored on a 4 weekly basis until they are twelve months of age and drenched as required over this time. This is especially important when lambs are put onto reseeds.

Where possible the same camp should not be used for hogs each year as this will result in the build up of all parasites but especially Nematodirus which can survive for up to two years on pastures and may then become a serious problem in young sheep.

At their first shearing a WEC should be performed and sheep should be drenched if necessary and placed onto a clean pasture. Once sheep have developed age related resistance, which usually occurs at about twelve months, less frequent monitoring should be required. Thus shearlings should be monitored every couple of months unless parasites are proving to be an issue in which case more frequent monitoring may be necessary.

Adult ewes should be monitored just prior to shearing, drenched at shearing if required, and then again four weeks prior to lambing and just prior to lamb marking. If ewes are moved into their lambing camps earlier than a month before lambing then they should be monitored prior to this too.

Once again due to the possibility of Nematodirus building up on ewe camps it is not desirable to use the same camp every year for lambing although I appreciate that this may be difficult to achieve on some farms.

Rams are more susceptible to parasites than dry ewes and therefore should also be monitored and drenched as required. Monitoring of adult rams should occur at least several times during the year with drenching preferable a couple of months prior to joining at least. Young rams are far more susceptible to parasites than young ewes and need careful monitoring on a 4 weekly basis to ensure they do not develop large parasite burdens which will slow down their growth considerably and take six weeks to overcome.

It is very important that all sheep and rams being introduced from another farm are drenched immediately with a three way drench of a normal dose for weight of each of the drench groups being (white) benzimidazoles, (clear) levamisoles and (mectins) macrocyclic lactones and then held for at least 24 hours in

yards. This is the approved method of drenching to ensure that no drench resistance is transferred from one property to another.

Rotation of drench groups is also important to slow down the development of the parasites resistance to drenches. It is recommended that drench 'groups' be changed annually and the same drench is used on all sheep for the period of 12 months. Ideally the change of groups should occur at the shearing drench.

In Summary

Sheep less than 12 months old;

Drench at weaning (preferably in early January) and then monitor every 4 weeks and drench as required, especially when moving into a clean camp.

Sheep 12 months to 2 years;

Monitor every 2 months especially prior to moving into clean camp.

Sheep older than 2 years;

Monitor prior to shearing, four weeks prior to lambing and prior to lamb marking.

Rams;

Monitor three times a year especially 8 weeks prior to joining.

Worm Egg Counts (WEC)

As a general rule, sheep should be drenched

when there is a total worm egg count of 300epg or more, or a Nematodirus count of 50epg or more. This will vary according to the general condition of the sheep; the better the condition of the sheep the less likely they are to require drenching; The age of the sheep, the younger sheep sometimes needing drenching at 250epg especially if they are light for their age and the situation regarding the movement of sheep into clean paddocks or not and the availability of good feed.

It is common to give a drench despite levels as low as 100epg when there is a period of maximum kill of larvae on pastures as found in summer, this is particularly relevant when sheep are being moved into a clean camp.

On organic farms where drenching requires quarantining of sheep and possible loss of income as a result of the wool clip no longer being organic, the economics of when to drench will alter. Therefore a recommendation of a total worm egg count of 700epg or a Nematodirus count of 150epg is made for the cut off for drenching. However a combination of a quite high total worm egg count with a count of 100 epg Nematodirus may justify a drench.

These values are not set in concrete and the decisions will be made in conjunction with other information such as feed availability, season of the year, stage of pregnancy or lactation, closeness of weaning and general health.

Next Dog Dosing Date

Wednesday 2nd February 2011

DRONTAL

Please remember to contact the Veterinary Service on telephone 27366, fax 27352 or email imports@doa.gov.fk and advise when your dogs have been dosed



TIME FOR A BULL CHANGE?

By Mac McArthur

Demand For Local Beef Is Growing

Over this past year the demand for quality young beef has increased considerably. FIMCo had previously been processing about 365 young cattle a year or approximately one a day. Now with the increasing demand from the oil and gas exploration workers and other domestic demand, around 400 head are being processed annually.

Added to this are the older, poorer quality cattle, that are being processed as manufacturing beef for export. Last year 115 cattle were processed for this mainly food service industry market. Interestingly, this export market development has guaranteed that there is a market for most types of cattle as long as they are carrying a minimum of 3-4mm of fat. This is in contrast to the situation some years ago when farmers were producing excellent quality cattle for which there was little or no market.

There is a lot of imported frozen beef in the supermarkets and some being imported for restaurants that could and should be grown here in the Falklands.

Supply Shortage In Some Months

In some months there are supply shortages of certain specifications of cattle that FIMCo requires. As farmers improve their ability and management skills to ensure their cattle are up to the required fat and carcass weight specifications, this periodic shortage of good quality young cattle should diminish.

Correct incentives combined with binding contracts to FIMCo can enable these shortfalls to be overcome. Farmers however must be regularly monitoring their stock and reacting with the appropriate management strategies in order to ensure animals are ready, to specification, at the right time.

Beef Cattle Genetic Traits Need Improving In Many Herds

There are a lot of very high quality beef cattle throughout the Islands and a number of farmers

producing consistently high quality young cattle weaned straight off their mothers (young beef) or around 2 year old. Most of the herds producing this beef have good quality beef genetics in their herds either through cattle they have bred or through buying or leasing NBH bulls.

Other herds that are continuing to use crossbred or purebred bulls of unknown genetic potential are sometimes having difficulty getting the progeny to fatten sufficiently around 24-36 months old. Nutrition is as always a key factor, however what is sometimes not recognised is that bulls that haven't been performance tested for their own growth potential or the milk producing potential of their daughters may often be the reason that young cattle do not reach reasonable weaning weights at 6 months old (target 220kg).

Milk production in the beef cow herd contributes in a significant way to the age that young cattle can be finished at. Bulls that are from backgrounds where there has been no selection for milk production of their dams or measurement of their heifer progeny's ability or lack of it to produce milk are likely to be considerably reducing your beef enterprises profitability.

To lease a NBH bull which has been growth performance and reproductive soundness tested and comes from strains of cattle selected for high milk production, low calf birth weight, fast growth and early maturity costs only £12 per calf. You may be in love with your old 'scrubber' bull who does the job and gets calves for you every year or maybe every second year. But think whether he is costing you money in that his heifers don't produce more than a cupful of milk and his calves don't grow very fast on good quality crop or reseed.

Maybe time for a New Years present for the bovine girls in the form of an NBH bull for joining 2012-sorry all 9 NBH bulls are leased or required for natural mating at Saladero after the AI programme for the 2011 joining. If you are contemplating either leasing or buying a NBH bull in the future please discuss with me or other DoA staff (27355) as we need to plan required numbers of high performance bulls needed in the future.

A FAREWELL MESSAGE

By Ian Campbell

It will be with a great deal of sadness that Susan and I will soon pack our bags and head out to MPA for the last time - at least for the time being. We have both enjoyed our time here on both a personal and a professional level. I thought I would leave you with my views on some of the issues that have been filling my time over the last three years.

A wise farmer said to me when I first arrived (I think I understood the accent):
"You look like you might have something to offer us. Just keep it to yourself until you have been here a while..."

I hope I have waited long enough.

The Organic Program

Organics sits well in the extensive agricultural systems in the Falklands and the seemingly never ending logistical issues associated with importing inputs just makes this even more relevant.

The irony of me trying to promote organic principles here whilst Susan is preaching the need to expand sheep drenching is not lost on many people. Despite this the relationship with Australian Certified Organic has worked well and the Falkland Islands is unequivocally and officially the most organic country in the world (32 % of all agricultural land is certified organic). Of that I am both pleased and proud, however, organic marketing is not going at all well. Firstly there is apparently no premium at all for organic wool, and the organic production systems for meat (which would pay a premium) still have a lot of development to go through before they are useful here. Having said that I do think we should investigate exporting organic mutton and beef any time now. Secondly there is petty bickering with enormous amounts of red tape involved when the international trade of organic raw products occurs, and this is making a farce of organics the world over - where an enormous bureaucracy is being made of what should be such a simple

concept.

I would very much like to thank my organic farmers for having faith and I can only hope their patience lasts and their faith can be suitably rewarded very soon.

Wool Marketing

Since taking over the wool report from Peter Johnson in April 2008 the price of wool has steadily increased and the value of the pound has dropped relentlessly. These two factors have worked together and caused a big increase in the price of wool. Any changes to this trend can be traced to times when Tony Mills has been filling in for me. I do think however that the real price of wool is still very cheap when compared to the past.

The premiums for finer wools however are consistent, real and permanent. While the debate about the ideal micron to suit the Falkland Islands production system rages, there is no question that if you are selling wool then the answer is unequivocal - the finer it is the better. There are two sides to choosing the ideal micron sheep! It is my own view that micron premiums are well worth chasing but perhaps come at a cost - for example extra drenching, eye locking or crutching. The push to reduce fibre diameter is an important part in maintaining farm incomes from dual purpose animals.

Sustainable Agriculture

Some might say that the definition of a sustainable farmer is one married to a teacher or a nurse; but I think sustainability is a huge issue world wide and is only getting bigger. I wrote in a previous Wool Press (May 2009) about the tonnage of nutrients that get exported in wool and meat each year from the Falklands and that is an immense issue. I am aware of both the cost and hassle of importing fertilizer but I think the future will rely on addressing this problem with maybe fish or seaweed products, abattoir waste or even treated sewage or composted Town waste. There were precious little nutrients here when

agriculture started and we can't just afford to keep sending them off by the tonne in exports, and dumping them by the tonne at sea or in landfill.

It is important that the terms of trade in agriculture are sufficient that it can continue without causing further nutrient decline, erosion or loss of biodiversity. It is also important to act upon the encroachment of invasive plant species like calafate and thistles, and to prevent the escape of allegedly useful species like gorse and goats.

Meat Exports And Beef

Agriculture needs a second string to its bow and increasing meat exports is a key. The projected lamb exports are admittedly ambitious but we have never steered away from that. I do think perhaps the mutton and beef trades should also be concentrated on as well and their export projections are more conservative. Perhaps in reality there will be a trade off.

It is also important not to ignore the domestic market as there is still a lot of meat imported as well. I am sure meat on the supermarket shelves is very cheap here compared to anywhere else in the world. Whilst this is great for consumers it is not so good for farmers and means they cannot earn enough to address all the issues they need to deal with.

I would like to see beef herds taken far more seriously here. Cattle fit in well with sheep and the pastures here for numerous reasons and I think expanding the cattle herds will be a good way to phase out camp burning. Undoubtedly in my mind there needs to be attention and funds put into genetics and handling facilities in particular on many farms, and research put into management systems and cattle health.

Self Sufficiency

Importing food comes at a great financial cost and also means that despite amazing efforts by importers it also suffers in quality. I would like to see more people delving into commercial food production systems. A

reliance on imports is essential in this environment - but that means we tend to lose sight of the opportunities that are here for expanding home grown root vegetables, berries, herbs, eggs, bean sprouts, even rhubarb, all of which can be grown here but which we import at great expense to both price and quality. Admittedly a small market and we need to be very aware of stimulating an over supply- but there is some way to go before that happens.

Mortality Rates

The loss of lambs around birth and of hoggets in their first winter is a huge issue. The reasons are obvious – the ideal nutritional profile for a pregnant ewe is the exact opposite of what they do in fact get here. With fat ewes being mated on good nutrition they are all cycling like Lance Armstrong and conception rates are excellent. Unfortunately nutrition relentlessly just gets worse until lambing and lactation when ewes are lambing in poor condition on poor feed - consequently any live lambs are a miracle. The solutions are difficult; but worth chasing. Fodder crops, grazing management, reseeds and ensuring freedom from parasites are big issues.

I admit the weather can be bad, the ditches horrid and many things can go against survival. I am however convinced that working on resilience is the key, and increasing body weight and condition over summer are the keys to ewe management

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and hogget survival over winter. It is a bizarre concept that losses in August and September have their roots in the preceding December and January which is why it is easy to ignore this, but I believe that is the case. Small increments can be made by timely movements, marking, weaning, drenching or whatever, and these add up to being significant and will have a significant pay back over the winter.

Its Not All Negative!

Reading back I notice a somewhat negative sentiment from me but I do not mean it to be that way. I am in continual awe of the farming skills I see here. Camp driving, gathering, shearing, horse riding, quad biking, butchering, fencing, animal handling and understanding - the list is endless. Improvisation has to come high on the list as well - and it doesn't seem to override the need for attention to detail when required, such as in wool preparation, which is on the whole excellent. People are keen and willing to

embrace new ideas and concepts such as worm egg counting, doing business plans in their FIP application and assessing live animals for FIMCo sale, all of which have been adopted with gusto.

Finally the EDS, RDS and Island Plan are all documents that Government has requested as future planning templates but they do also firmly support agriculture as an important Falkland Island industry. Current emphasis and discussion about training the next generation of farmers is also a welcome initiative. The FIP plan and the expansion of the abattoir as well as services provided by DoA are all proof of the commitment by others to support the dedication shown by the farming community.

Agriculture has been the quintessential Falkland Island industry and in my view is looking like staying that way, but there will need to be a few changes. Not that that in itself is an issue - it has always been that way.

Dohne Breeding Flock For Tender

The Department of Agriculture on behalf of the Falkland Island Government has for sale by tender the following breeding animals located at Saladero:

- 78 Ewes with lambs at foot (2005 to 2008 drop) - unshorn
- 21 Ewes (2009 drop) - shorn
- 17 Rams (2008 to 2009 drop) – shorn and unshorn

The flock is being tendered as a whole flock and bids should be presented in this manner.

The closing time and date for the tender will be 4:30pm on the 10th January 2011.

Appointments for inspection of the flock can be arranged with the manager at Saladero by phoning 27357.

The Government does not bind itself to accept the highest or any tender and may publish the amounts or value of any tender or quotation received and the identity of the tenderer.

Sealed bids should be endorsed – Dohne Breeding Flock Tender and addressed to Tony Mills, Department of Agriculture, Bypass Rd, Stanley, Falkland Islands FIQQ 1ZZ.

SELECTION OF FUTURE SIRES - IT'S EASY!

By Tony Mills

As I sit down to write this article I am a little nervous that in some way this may keep open the less constructive side of the debate on breed. But then again I have never been one to take a step back from a useful discussion (as you can tell by my dashing good looks!!!) especially if a better understanding can be achieved.

It appears to me that the breed card is more often than not used as a key reason for the lack of change in key productivity measures relating to wool quality and quantity or reproductive rates. However I often wonder how much selection pressure is being applied and what processes are being used to achieve the necessary genetic lifts (as these are permanent) which would make farming more profitable.

In this article I aim to focus on some of the key economic traits to highlight a few of the baseline principles of selection.

Below is a table that is a summary of the current information available from the National Stud Flock (NSF) and the three joint ventures ram drops. Pondering this information I wonder what people's selection decisions would be based on this information alone?

Table 1. Summary of key production data for the 09 Drop Rams from the NSF and joint ventures.

Breed	GFW (Kg)	BWT (Kg)	MFD (<i>u</i>)	WEC (Epg)
Polwarth				
Average	3.2	31.8	19.3	429
Minimum	1.5	19.0	15.4	0
Maximum	4.9	40.6	23.7	2075
Range	3.4	21.6	8.3	2075
Dohne				
Average	2.2	31.2	17.3	1028
Minimum	1.5	26.2	14.9	51
Maximum	3.6	42.6	19.6	4625
Range	2.1	16.4	4.7	4574
SAMM				
Average	2.4	43.0	22.7	660
Minimum	1.6	30.4	18.7	75
Maximum	3.2	52.8	25.6	2175
Range	1.6	22.4	6.9	2100
Afrino				
Average	3.1	44.1	*	2412
Minimum	2.2	34.0	*	275
Maximum	4.4	53.5	*	5550
Range	2.2	19.5	*	5275

* At the time of publication these results were not available

Variation between breeds and within breeds: It is worth remembering the rigorously tested fact that there is as much variation between breeds as there is within breeds. This is one of the cornerstones of population genetics (and breeding) which is what producers are dealing with on a daily basis. It is also what is being highlighted by the range calculation in Table 1. By the way this spread would be considered within normal ranges given that the groups are being managed as a whole and no early selection on performance has been carried out. Variation is a good thing when exploited in a selection programme as it allows us to move the flock or herd average forward (I think this would be a goal of all breeders).

Figure 1 and 2 demonstrate the story behind the data in Table 1 when comparing mean fibre diameter and greasy fleece weight for the 09 drop rams of the NSF and the SAMM's. The red lines mark the average of the group for both traits. It can be seen from these graphs that if you wanted to improve wool quality and quantity it would be possible to choose from a number of sires to improve fleece weights and fibre diameter simultaneously or on one trait alone.

Figure 1

Relationship between Fibre Diameter and Greasy Fleece Weight in the SAMM 09 Drop Rams

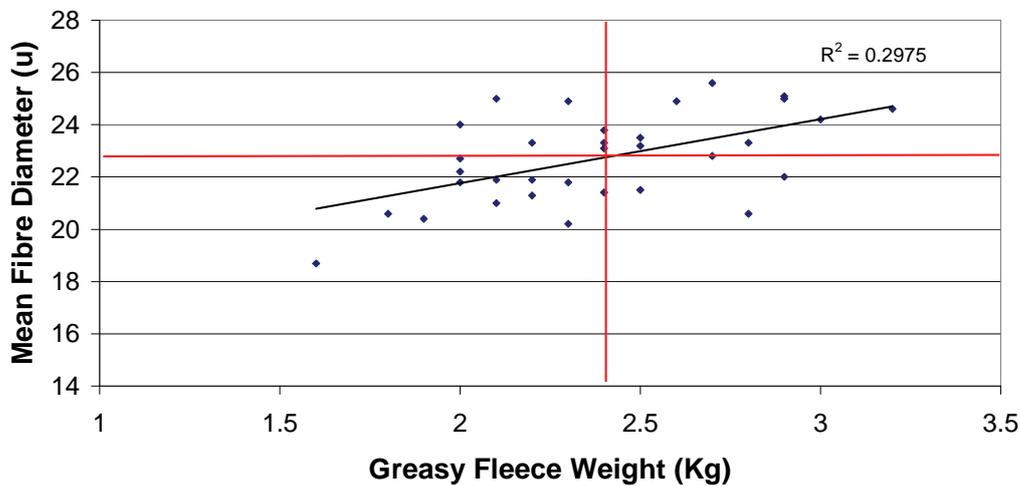
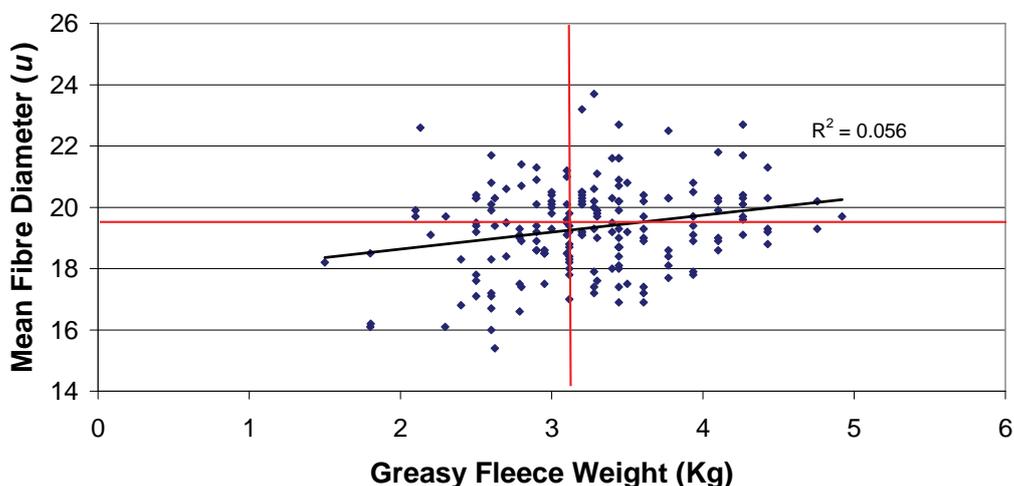


Figure 2

Relationship between Greasy Fleece Weight and Fibre Diameter in the 09 Drop NSF Rams



Selection on a single trait: It is also well recognised that selection based on one trait will give you significant change in the direction you choose. However the flip side of this is that most traits we want to select for are controlled by many genes and are often correlated to other key traits. A common one is fibre diameter and fleece weight. These two traits are generally considered to be positively correlated. This means that selection in one direction will influence the other trait in the same direction. The two graphs above also demonstrate that it is also possible to achieve a reduction in one and an increase in the other which is evident by the animals identified in the bottom right hand quadrant of the graphs.

Selection on raw data: Raw data can be actual records such as fleece weights, bodyweights or worm egg counts or it could be the visual assessment of an animal. What is being recorded is the phenotype of the animal. The phenotype is the combination of the genotype (or genes) and the environment. Environment can include the actual climate/weather, age of dam, birth/rearing type, birth date, sex, plus the way the animals are managed and even luck. All of which have an effect (positive and negative) on the raw data that is collected. An example of this is comparing two rams based on their weaning weights, one of which was reared as a twin and the other a single. The single will have a higher weaning weight, however, research has shown that offspring off a ram reared as a twin will perform the same or even better than offspring off the ram reared as a single. Therefore the environment masks the genetic potential of the animal.

Figures 3 and 4 demonstrate the effect of environment in relation to total worm egg counts. These groups were run and managed in two different environments. Based on the raw data you may make the assumption that the Afrinos are more susceptible to internal parasites. However, because of the different environments it is not possible to do a direct comparison. A further confounding factor is that if you were to compare the group averages for bodyweight and fleece weight, the Afrinos weighed 12.3 kg heavier than the Polwarths and cut 3.1 kg of greasy wool which is only 0.1kg lighter than the Polwarths.

Figure 3

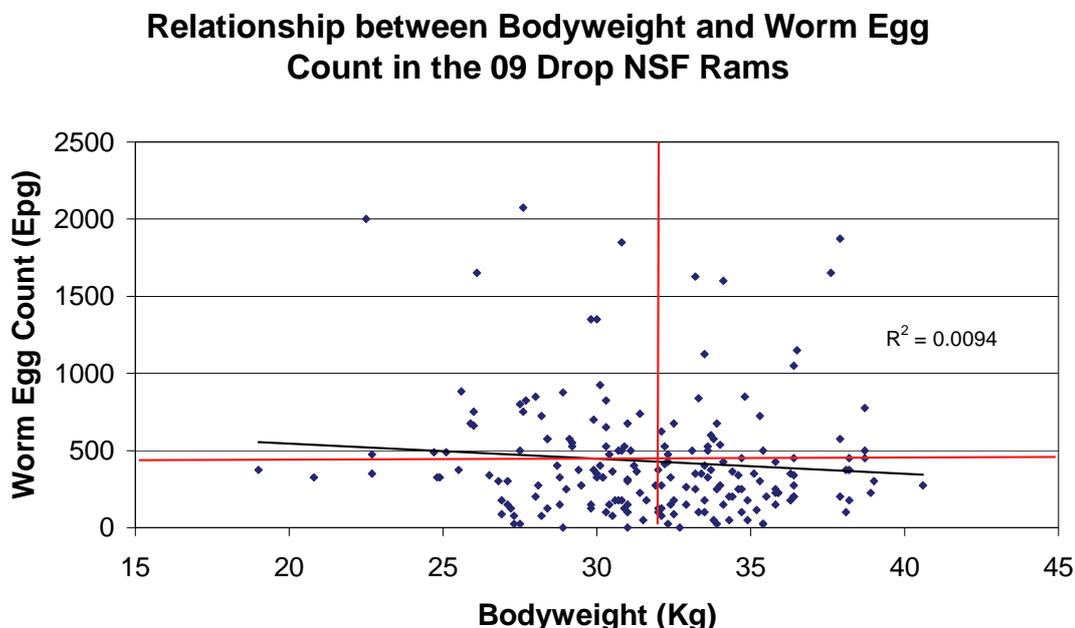
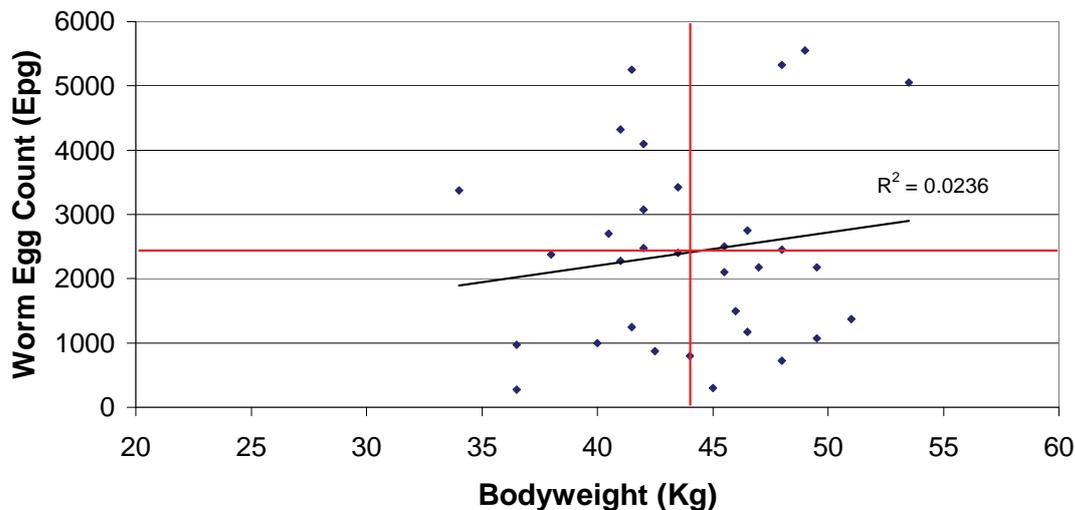


Figure 4

The relationship between Bodyweight and Worm Egg Count in the 09 Drop Afrino Rams



Heritability: Unfortunately at the time of publication I don't have any reproductive data in a suitable format to demonstrate the same type of differences seen above. Suffice to say that there is plenty of research to show that a similar amount of variation will occur. The other important thing to remember is that the traits discussed above in general have a higher level of heritability than reproductive traits. That is there is a higher level of transmission of the parents superiority to their progeny. This is one of the key reason as to why more evident shifts can be made in these traits and why traits with high heritabilities should be included in a selection programme. Reproduction has a low level of inheritance and thus is more influenced by environment but this doesn't mean animals cannot be selected on the basis of reproduction. Indirect measures such as scrotal circumference and lambing records combined with pedigree records can be used to select sires and dams for higher reproductive rates. What are you doing to select for higher reproductive rates?

Breeding goal and multi-trait selection: One of the most important parts of a breeding programme is setting the direction in which you want to go. By doing this task you are defining the traits you want to select for and then the type of animals you want to be as your next generation of sires. A robust research project carried out in southern Australia clearly demonstrated that if you set a goal and select along these lines no matter which selection method you chose then you will head in that direction.

Of course in practice it is not practical to select on one trait alone as the financial side of the business dictates that a number of traits are used because the animals you are dealing with produce a number of different products.

The following information demonstrates the use of multi-trait selection.

Table 2. Phenotypic production performance of three different sires.

Sire	GFW	CFW	MFD	BWT	WEC	Index
1	3.6	2.8	17.5	36.4	75	123.5
2	3.9	3.4	18.9	38.7	450	124.4
3	2.8	2.2	20.6	49.8	75	123.7

All of the sires listed above have had their raw data processed through the Rampower indexing packing. The index used was the 8% micron premium plus bodyweight index. This index ranks higher animals that will increase fleece, reduce fibre diameter and increase bodyweight. If this was your aim then each of these sires will take you in that direction. Also each of these sires represent three of the breeds present in the Falkland Islands. Sire 1 is a Dohne, sire 2 is a Polwarth and sire 3 is a SAMM.

In the absence of complex genetic analysis tools that develop breeding values and indexes utilising both phenotypic and genotype correlations, heritabilities and pedigree records as well as the animals own records to remove the affects of the environment, raw data will have to be used. If this is the case then it is worth remembering that what you see or measure may not be moving your flock forward genetically. Also if you do want to collect additional information we can help by processing through our index package.

FACTORS AFFECTING GROWTH

By Andrew Pollard

For plants to grow, develop and complete their life cycles they require the basic necessities of:

- Carbon dioxide and oxygen
- Light
- Water
- Nutrients
- Temperature (within a specific range)
- Space

Potential plant growth can be modelled utilising climatic data. This can then be compared to the crop/pasture yield measured in the field (for example 5 t DM/ha for swedes). Differences between actual yield and potential yield can then be investigated and if there was no mechanical or human error, one of the above factors must have been limiting.

Carbon dioxide and oxygen

CO₂ is required for photosynthesis, the process where plants convert solar light energy into chemical energy in the form of carbohydrate molecules, and oxygen is a product of this reaction. Whilst there are many negatives about climate change, increasing CO₂ levels should lead to increased yields of forage if the other factors are not limiting. The oxygen produced from photosynthesis combines with the carbohydrates produced from photosynthesis in a process called respiration, which provides the energy needs

of living cells, driving metabolism, growth and movements.

Light

The maximum yield of a crop is determined by the availability and interception of light energy (strong linear relationship). Fastest plant growth occurs when light interception is at its maximum and temperature, soil moisture and nutrients are non-limiting. If the actively growing leaves are not intercepting the light, its energy is not being made available for plant growth. Light is also important in relation to the photoperiodism of the plants, in other words telling the plant when to flower or lose leaves. The MET service record days of sunshine and this can be useful in determining whether light has been a limiting factor to potential yields or not when compared to long term means. Two of the DoA weather stations on farms at the moment measure Photosynthetically Active Radiation (PAR) which gives us information on the intensity.

Water

Water requirements need to be maintained in order to allow photosynthesis to proceed efficiently. High temperatures and high light intensities can be detrimental to the plant (affecting enzyme function) if water availability is limited as plants maintain cool leaf temperatures through transpiration and evaporation from the leaves. The 'water

holding capacity' of a soil can be calculated and this varies with soil type (for example, the sandy soils at Fox Bay will hold less water than a soil of a more 'peatier' nature). The depth of soil is also important in calculating the 'water holding capacity'. Water is added to the soil through rainfall and this varies across the Islands. Water is lost from the soil by evapotranspiration, evaporation from the soil and transpiration from the plant. Short pasture heights and poor ground cover lead to higher evaporation rates. Evapotranspiration is a complex calculation but can be estimated and when combined with rainfall and the water holding capacity of soil enables us to estimate the period of time when water is limiting growth.

Nutrients

Plants require a range of essential nutrients; a nutrient is essential if the plant cannot complete its full life cycle without it. The macronutrients are nitrogen, phosphorus, potassium, magnesium, calcium and sulphur. Micronutrients include iron, manganese, zinc, copper, chlorine, boron and molybdenum. Low soil nitrogen availability is often the major nutrient limiting the yield of crop plants. Nitrogen is an important component of many structural, genetic and metabolic compounds in plant cells. Phosphorus is essential for the energy-generating systems in plant cells, such as respiration and photosynthesis. Potassium is a catalyst for enzyme function and thus plays an important role in many cellular processes. It also regulates the opening and closing of stomata, proper functioning of stomata is essential for photosynthesis, water and nutrient transport and plant cooling. Soil testing in the FI indicates that the macronutrients P and Ca are deficient in most soils (90 and 70% respectively), S in about 20% and in no cases for K and Mg. Nitrogen

fertiliser is a lot harder to interpret but 15% of pastures are deficient from soil test results. Incidentally a 12 tonne swede crop contains approximately 300 kg of N. If you are applying 50 kg of N, the crop must be getting 250 kg from the soil. I would assume that in many cases this cannot occur and yield is therefore limited by nitrogen.

Temperature

Whilst light interception is the key driver of growth, germination and the rate of new leaf appearance is driven by temperature. Different forage varieties have different 'base temperatures' or minimum temperatures at which they will grow. The base temperature for a brassica is regarded as 4⁰C, white clover 2.5⁰C, cocksfoot 3.3⁰C and tall fescue 5.1⁰C. Thermal time (temperature units per day) can be calculated by taking the average daily temp and subtracting the base temperature. Specific thermal time relationships exist for germination of species, time to 50% emergence and as a predictor for forage crop yields. For example new leaf appearance for Gruner and Kestrel Kale, Goliath Rape and Green Globe turnip occur after 64, 68, 61 and 51⁰C days respectively. Modelling in New Zealand (shouldn't be different here) has shown that were other factors are not limiting yield, brassica crops should accumulate at a rate of 1,100 kg DM/ha/100⁰Cd.

Space

Space is important, allowing the plant to develop its root and shoots. This involves seed rate and also the soil structure.

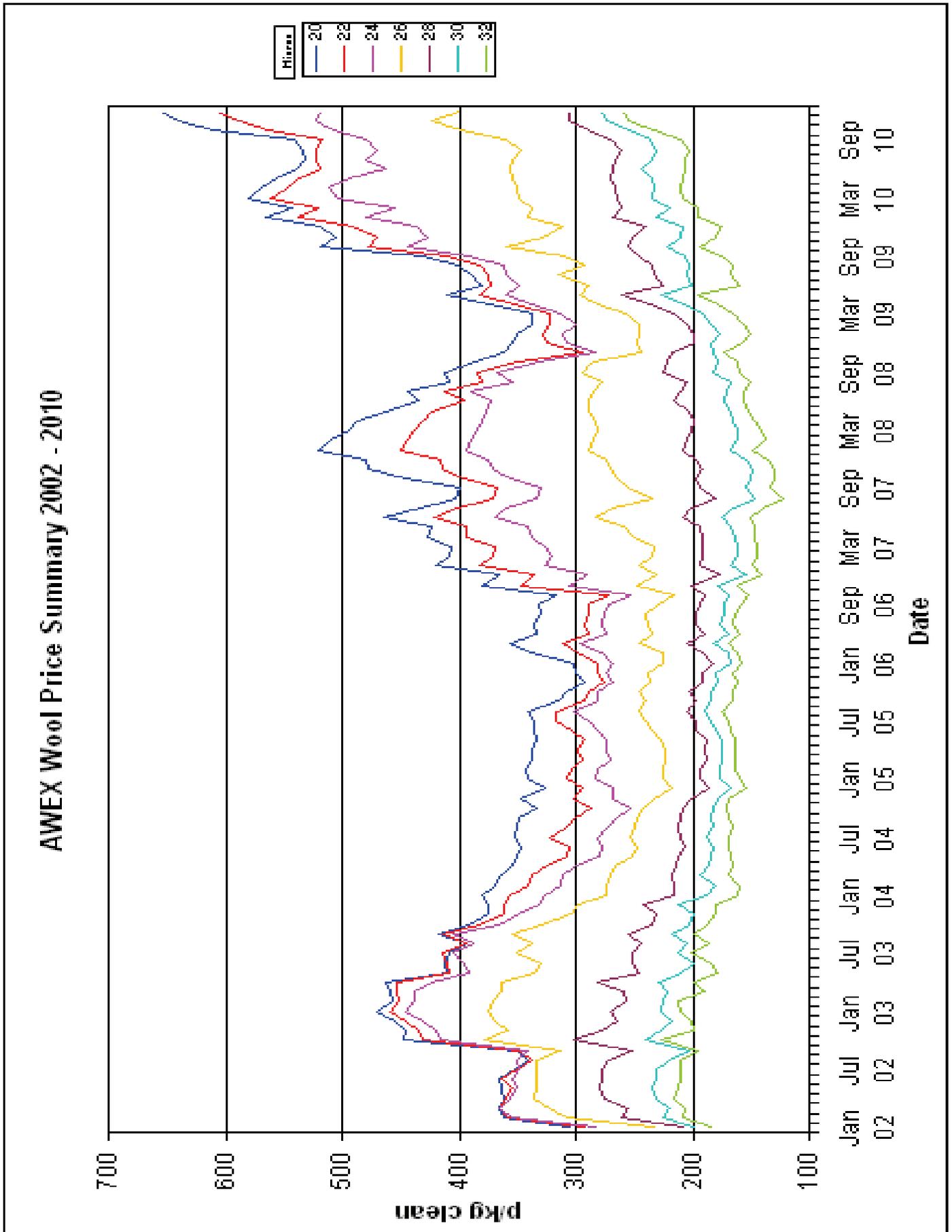
Whilst this is a generalised summary I intend to follow up this article with specific articles on light, temperature, nutrients and water utilising real FI data.

Changed your email address, fax or phone number?

Don't forget to let us know so we can continue to send you departmental news, including wool reports and trial information.

WOOL PRICE TREND OVER TIME

Based on weekly DoA Wool Reports



DOGS V CATS: WHICH IS MORE INTELLIGENT?

By Steve Pointing

Scientists at Oxford say that socially active dogs have developed bigger brains than standoffish cats and, as a result, are more intelligent than cats. What do you think?

In a recent publication in the *Journal of the National Academy of Sciences* Oxford University researchers stated that dogs are smarter than cats. In fact their study found that all socially active species – including dogs, monkeys, dolphins and horses – have developed larger brains over time than solitary ones like cats, deer and rhinos. But does that settle the long – running debate over the relative intelligence of cats and dogs?

What did the study find?

The Oxford team looked at how 500 species, both living and extinct, have evolved over about 600 million years and found that the ones that lived in social groups had much larger brains, relative to body size, than those species that tend towards self sufficiency. Lead researcher Susanna Schultz says that “dogs have always been regarded as more social animals than cats and it appears that social interaction leads to the development of a larger brain”. The Oxford team hypothesises

that the cooperation and coordination necessary to live as part of a group is more mentally challenging than making do on your own, and brains have evolved accordingly among different species.

What do cat lovers have to say about the findings?

Not surprisingly cat lovers (including our very own Zoë Luxton) do not buy into the Oxford team’s conclusion. “The domestic cat is highly intelligent thanks to its wild ancestry” says Beth Skillings, a vet working with the Cats’ Protection League. “Unlike dogs, they are smart enough to hunt alone and don’t have to depend on others.” Cats are also “very successful at subtly training their owners” by purring, meowing, “and sitting pitifully by their food bowl!”

Have there been previous studies reaching the same conclusion?

Yes – a 2009 study in the journal *Animal Cognition* also declared that dogs were smarter than cats. This was based on a test which involved dogs and cats pulling on a string to get a reward. Dogs performed better than cats in the test but this doesn’t necessarily “prove” that dogs are smarter than cats. Dogs have bigger brains, but cats have 300 million neurones in their cortex (the “thinking” part of the brain) whereas dogs only have 160 million.

What do neutral observers have to say on the matter?

The general view is that the pet owning public is fairly evenly split on the subject of which species is the more intelligent. About 30% “bark” for the dogs and 40% “yowl” for the cats with the remainder saying that they are equally intelligent. For those who don’t come with a prior bias in favour of one species over the other their view tends to be that cats and dogs are both smart – but in different ways.

Come on Falkland Islanders – where would you place your vote?

SEEN ANYTHING STRANGE LATELY?!



**DON'T LEAVE IT...
OR SHOOT IT...**

**Call the Veterinary
Section on 27366**

ACTIVE SURVEILLANCE IS OUR BEST DEFENCE

MY FIRST MONTH AT THE DOA

By Teenie Ross

As you already know I am the new Agricultural Assistant and I started on 22nd November. My first day is a bit of a blur now of introductions to both familiar and new faces, being shown around the department, looking through the handy How-To guide left by Siân and generally settling in.

On my second day Tony took me to FIPASS where we met up with Lucy, who showed me the coring machine. I went with Lucy the following Monday and had a go at using the machine and learning the paperwork side of things.

Lucinda, who left in December, sat with me and showed me how to do a few of the office based jobs including:

- ☼ The weekly AWEX Report which is done every Tuesday, Wednesday and Thursday
- ☼ Collecting the monthly Rainfall data
- ☼ Setting up the monthly Wool Press

The Saladero Open Day was on 1st December. I found all the presentations interesting, even with my limited knowledge of the subjects. Although the weather wasn't desirable I still enjoyed my first look around Saladero, fields that are being utilised under the principals of 'Managed Intensive Grazing', seeing the National Beef Herd and watching the demonstration of backfat and muscle scanning.

On the Friday I drove out to Saladero, on my own, to go lamb marking for the first time with Brian and Diana, which I thoroughly enjoyed. I helped them with the mothering up of each lamb, putting the small number tags in their ears, as they get bigger the coloured tags will be used. Once they were all tagged they then had their tails removed – and I didn't get a single drop of blood on me!!

I started my third week unexpectedly with a days worth of coring - solo. Ian asked if I was comfortable enough to cover for Lucy

because they had two lines that needed to be cored as soon as possible so they could go into the container. With the help of Lindsay and Ginny we got the two lines done and a further seven lines, all went very smoothly.

Only a couple of days after my lamb marking session it was off out to Saladero again, this time to weigh and tag calves with Tony. Each calf had two tags, one in each ear, one was the main colour and number tag and the other was an electronic EID tag (machine readable). Although it was slightly easier to tag the calves I found them a lot noisier than the lambs!

I have also been pottering around the Veterinary section. I helped Steve take a dog to the KEMH to have some x-rays and I have watched two operations on a now three legged guinea-pig and a poorly (now well) dog. I have also become very fond of a kitten, which we have come to know as 'Poppet', she was roughly only 10 days old when she was found out at MPA and could fit in the palm of my hand! I did try to get her a home with me, but my Mum wasn't having any of it!



At the moment I have started to learn the Mid-side sample process from Lucy and familiarising myself with the Farming Statistics spreadsheets, which isn't usually done until May. I have also been learning some of the terminology; Tony will hopefully be impressed that I am now 100% sure what a wether is!

I have done and learnt so much in my first month, I am really enjoying all aspects of the job.

FARM MANAGEMENT HANDBOOK INDEX

To ensure that your Farm Management Handbook is up-to-date, we regularly send out loose sheets with your Wool Press to be put in your folders (these always have four hole-punches).

To enable you to make sure your FMH has all the recent updates, I have compiled a list of what you should have and the date of a recent change so you can make sure everything is in order.

If you do not have a FMH and would like one, or have any questions, please get in touch with me.

	Section/Sheet	Recently Updated On
General	Area	
	Body Condition Scoring	
	Camp Medicine Chest Contents	
	Contact Information	October 2009
	Fees	July 2009
	Fire Guidelines	September 2008
	Labour Scheme Conditions	September 2009
	Labour Scheme Application Form	September 2009
	Length	
	Public Holidays	December 2009
	Rainfall	
	Staff Chart	December 2010
	Training Schemes	
	Video's	December 2008
	Volume and Temperature	
	Weight	
Finance	Depreciation Allowances	September 2010
	Extra Statutory Concessions	September 2010
	Farmers Tax Guide	September 2010
	General Tax Guide	September 2010
	Guide - POAT	September 2010
	Insurance Issues & Perils	December 2008
	POAT Examples for Self-Help	
	Self-Employment	
Legal & Codes of Practice	Annex A Sites	
	Annex B Sites	
	Burning Permit	November 2006
	Designated Sites Legislation	
	Grass Fires Ordinance 2002	
	Licences	August 2010
	Plant Import Guidelines	January 2009
	Notifiable Diseases	
	Planning Permission	
	Species Legislation	
	Transport of Animals	
	Welfare of Cattle	
	Welfare of Dogs	
	Welfare of Horses	
	Welfare of Pigs	
	Welfare of Sheep	
Livestock & Wool	Clip Preparation Guide	January 2009
	Core Sampling	April 2009
	Coring SOP's	April 2009
	Fleece Sampling Guidelines	September 2009
	Horse Colours	
	Organics	September 2008
	Quality Falkland Wool	January 2009
	QFW Checklist	January 2009
	QFW Shed Inspection Report	January 2009
	Scanning Guidelines	September 2009
	Table for FIP Genetics Plan	April 2010
	Wool Sample Summary Sheet	January 2009
	Wool Test Request Form	September 2009
Pasture Improvement	Agronomy Tests	
	Artificial Breeding Programme - FIP Funding	November 2007
	Fertiliser Rates	
	Pasture Improvement Programme	August 2008
	PIP Funds at Ram Sale	November 2007
	PIP Sheep Genetics Application	November 2007
	Proposed PIP Priorities	November 2007
	Purchasing Live Rams with PIP Funds	November 2007
	Soil Test Application	November 2007
	Soil Testing & Site Selection for PIP Funding	November 2007
Trees		
Veterinary	Advice for the use of Estrumate	January 2009
	Animal Movement Certificates	September 2008
	Beef Kill Report Form	November 2009
	Bovine Tuberculosis	September 2008
	Caseous Lymphadenitis	June 2007
	Cattle Identification	September 2008
	Consultation Hours	September 2008
	Dog Dosing Dates	December 2010
	Dog Neutering	
	Gestation, Oestrus and Temperature Tables	
	Import of Live Animals	September 2008
	Is Your Dog a Health Hazard?	
	Killing Facilities on Farms	September 2008
	Lambing Care	September 2008
	Ram Exam Workshop Handout	May 2007
	TB Monitoring on Farm	August 2008
	Veterinary Fees	September 2008
	Veterinary Diagnostics	September 2008
	Worming Horses	

WOOL PRESS RECIPE CORNER

Coddle

INGREDIENTS

4 back bacon rashers
15ml/1 tbsp vegetable oil
2 large onions, chopped
2 garlic cloves, crushed
8 large pork sausages
4 large potatoes
1.5ml/¼ tsp dried sage
300ml/½ pint/1¼ cups chicken stock
30ml/2tbsp chopped fresh parsley
Salt and ground black pepper
Soda bread, to serve



METHOD

Preheat the oven to 180°C/350°F/Gas 4. Cut the bacon into 2.5cm/1 inch strips. Heat the oil in a frying pan and fry the bacon for 2 minutes. Add the onions and cook for a further 5-6 minutes until golden. Add the garlic and cook for 1 minute, then remove from the pan and set aside. Add the pork sausages to the frying pan and cook on all sides for 5-6 minutes until golden brown. Slice the potatoes, thinly and arrange in the base of a large, buttered oven proof dish. Spoon the bacon and onion mixture on top. Season with the ground black pepper and sprinkle with sage. Pour over the chicken stock and top with the sausages. Cover and cook in the oven for 1 hour. Serve with fresh soda bread.

FANCY DRESS BID TO SAVE THE PANDA Source: Ananova.com

Conservationists are dressing up in fluffy panda costumes to help prepare captive-born cubs to live in the wild.

They are anxious to ensure the endangered animals have as little contact with humans as possible, reports the Daily Mail.

So rather than being hand-reared, they are being brought up by their mothers in a piece of protected woodland.

Human help is always on hand, as their every move is monitored by CCTV. Their keepers can see in a moment if they need medicine or a health check-up.

But they make sure to slip into their



panda suits before venturing anywhere near, as they are anxious their charges don't become used to humans.

Keepers at the Hetaoping Research and Conservation Centre in western China believe the costumes are vital if the cubs are to survive when finally released into the wild. In 2006, Xiang Xiang, a five-year-old male, was freed after spending three years being taught survival skills such as foraging for food and marking his territory.

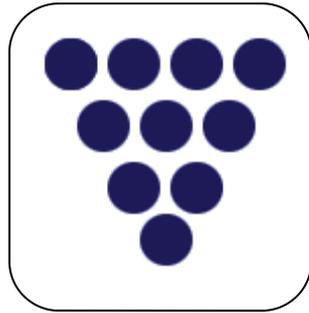
After initially appearing to be adjusting well, he died after getting into a fight with a group of wild pandas.

They are thought to have sensed something different about the human-reared interloper.

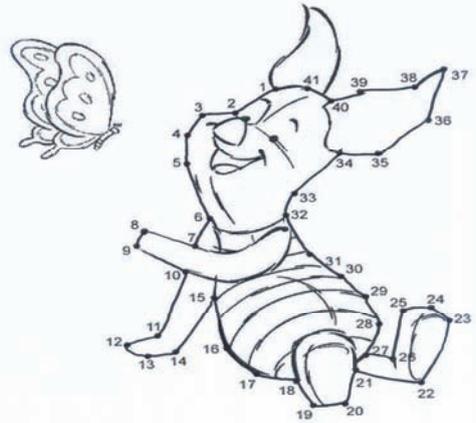
With fewer than 2,500 giant pandas living free in China, conservationists are desperate not to take any chances with the next group facing life in the wild.

Puzzle Page

There are 10 skittles in an upside down triangle, can you move the skittles around such that the triangle is the correct way up? You can only move **3** skittles!!



December Solutions



Sudoku

				3	2			5
4	7	6				3		
	2				4		1	9
		4	9	8		5		1
6			1		7			3
7		9		4	5	2		
1	8		6				2	
		3				8	5	6
5			4	9				

Each Sudoku has a unique solution that can be reached logically without guessing. Enter digits from 1 to 9 into the blank spaces. Every row must contain one of each digit. So must every column, as must every 3x3 square.

Good luck!

5	3	7	1	8	9	2	6	4
2	6	9	7	3	4	1	5	8
1	4	8	5	2	6	9	3	7
6	8	3	9	1	5	4	7	2
4	9	1	6	7	2	5	8	3
7	2	5	8	4	3	6	1	9
3	1	2	4	6	8	7	9	5
9	7	4	3	5	1	8	2	6
8	5	6	2	9	7	3	4	1

Fill-In

1		2		3		4		5		6		7		8
9									10					
11	I	C	I	C	L	E		13						
								14						
15					16									17
														S
19														Y
														N
														T
22										23				H
														E
25						26						27		T
														I
28										29				C

Complete the crossword-type puzzle by placing the words provided into the grid.

- | | | | |
|------------------|------------------|------------------|-------------------|
| 3 Letters | MANGY | 8 Letters | YESTERDAY |
| NET | NASTY | LECTURER | |
| OIL | NOTED | NORTHERN | 10 Letters |
| | RELIC | RECHARGE | GLUTTONOUS |
| 4 Letters | SCOUR | SANCTION | ORCHESTRAL |
| CAGE | | | PLAYGROUND |
| EDDY | 6 Letters | 9 Letters | YESTERYEAR |
| LAWN | HORROR | CROSSWISE | |
| SPRY | ICELE | LETHARGIC | |
| | JOSEPH | MILLINERY | 11 Letters |
| | YEARLY | SYNTHETIC | INDUSTRIOUS |
| 5 Letters | | UPPERMOST | INTERROGATE |
| EIDER | | | |