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## Sheep Updates 2005 - Part 7

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# Sulphur in wool and its implications for fleece weight and sheep health

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## ABSTRACT

Sulphur-containing amino acids, methionine and cysteine, are crucial for wool growth and immune competency in sheep. Approximately half of dietary supplied cysteine is retained in wool, thus strongly competing for cysteine to maintaining immunity. Reducing cysteine requirements for wool growth implies that limited sulphur supplies can be used to maintain immunological competency. This would need to be achieved by selection of sheep without loss of fleece weight but producing low sulphur content wool. Wool sulphur from 485 male offspring of 41 sires from Merino flocks were analysed for sulphur content. The sulphur concentration in clean wool was not phenotypically significantly correlated to fleece weight, but was negatively correlated to fibre diameter ( $r=-0.148$ ) and positively correlated with curvature ( $r=0.172$ ). Near-infrared spectrometer is being calibrated to measure wool sulphur content.

## AIMS

Our recent investigations of gastrointestinal nematode resistance using Rylington Merinos and an unselected control line found that resistant sheep had a lower concentration of the antioxidant, glutathione (GSH) in their blood, and nematode infection caused a depletion of GSH (Liu et al., 2005). Depletion of cysteine in the body during nematode infection has also been reported in Scottish Blackface sheep (Hoskin et al., 2002). These results indicate that GSH and cysteine are involved in parasite resistance with the infection causing a depletion of cysteine in the body, because cysteine availability limits GSH synthesis. Wool growth creates a high demand for cysteine, competing strongly for cysteine requirements with the immune system. This competition limits either the immune response or wool growth when dietary supply is inadequate in summer and autumn of the Mediterranean climate. Therefore, reducing cysteine partitioning to wool without losing wool growth is one approach to using limited cysteine supplies to maintain immunological competency of sheep. It has been demonstrated that cysteine concentration in wool has minimal effect on fabric finished properties (Marshall et al. 1990).

The aim of this work is to examine relationships of wool sulphur (mostly as cysteine) with other important wool traits, and to establish a rapid, non-invasive method to determine wool sulphur.

## METHOD

Wool samples from 480 male offspring of 41 sires in Merino base flocks at the Great Southern Agricultural Research Institute were chemically analysed for sulphur (S) and nitrogen (N) concentrations using LECO NS-2000 (LECO Corporation, Michigan, USA) and the S:N ratios were calculated. Other wool traits were measured using standards procedures (Greeff et al 2005). Sub-samples of greasy and clean wool samples were dried overnight at 105 °C, and scanned over the 400 - 2500 nm wavelength range on a Near-Infrared spectrometer (NIRSystems Inc., Silver Spring, MD, USA). Calibration curves were derived for S concentration and S:N ratio based on the NIR spectrum and the LECO results from 240 wool samples randomly selected from the 480 samples, and then validated using the results of the remaining 240 samples.

## RESULTS

Sulphur concentration in clean wool ranged from 2.47% to 3.94% and averaged 3.22% (SD 0.24), and in greasy wool from 1.76% to 2.75% with an average of 2.22% (SD 0.17). Nitrogen concentration averaged 17.26% (SD 0.71) in clean wool and 12.43% (SD 0.88) in greasy wool. S:N ratio in clean wool ranged from 0.152 to 0.217 with an average of 0.186 (SD 0.012), and in greasy wool from 0.157 to 0.199 with an average of 0.179 (SD 0.007). There were significant differences in S concentration and S:N ratio due to sires ( $P < 0.001$ ), indicating a potential genetic component to the S content of wool.

There were no significantly ( $P > 0.05$ ) phenotypic correlations between wool sulphur content and greasy fleece weight and clean fleece weight (Table 1). As shown in Table 1, the correlations with fibre diameter and staple strength varied depending on the sample status (greasy or clean). There was a positive correlation ( $P < 0.05$ ) of wool sulphur with fibre curvature.

**Table 1. Phenotypic correlations of greasy and clean wool sulphur concentration with other wool traits in 480 rams**

	S:N ratio in greasy wool	S:N ratio in clean wool
Greasy fleece weight	0.103	-0.007
Clean fleece weight	0.042	-0.075
Fibre diameter	0.023	-0.148*
Staple strength	0.205*	0.072
Curvature	0.233*	0.172*

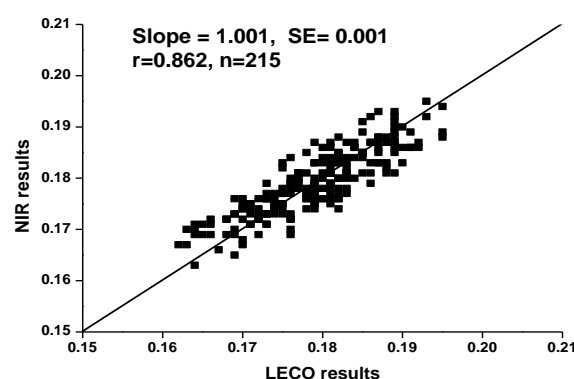
\*  $P < 0.05$ .

To allow for a rapid measure of wool sulphur, a NIR method was established in CSIRO Livestock Industries, Floreat Laboratory and validated, as shown in the graph opposite. This technique will allow for the rapid determination of wool sulphur to determine its heritability and genetic correlations with other wool traits.

## CONCLUSION

A significant amount of the variation in wool sulphur was accounted for by sire.

Phenotypically wool sulphur level was not correlated with fleece weight, but there are significant correlations with fibre diameter and curvature. It would be possible to select sheep with low wool sulphur without losing fleece weight to spare cysteine in the body.



## KEY WORDS

wool sulphur, cysteine, NIR

## ACKNOWLEDGMENTS

Paper reviewed by: Dr Dean Thomas and Dr Yvette Williams.

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# Stubbles for sheep: a reality check

Roy Butler and Keith Croker, Department of Agriculture, Merredin and South Perth

## ABSTRACT

Stubble paddocks are the primary source of food for many sheep throughout summer and autumn. Leaf material and spilt or unharvested grain provide the most nutritious components of the diet of sheep grazing cereal and legume stubbles. Some farmers and researchers have questioned the amount and availability of these nutritious components and consequently the feed value of today's crop stubbles, especially for lambs and breeding ewes. Following the 2002 and 2003 growing seasons the amounts of unharvested grain in 90 un-grazed stubble paddocks (64% wheat stubbles) were determined by field counts. Over both seasons, residue amounts were highly variable but generally low, ranging from 7 – 130 kg/ha for wheat. There were no correlations between residue levels and harvest yields. Farmers should be conservative in estimating the amount of residual grain in stubble paddocks for sheep, especially when pursuing high growth rates and reproductive performance in their flocks.

## AIMS

To determine the amounts of residual grains in harvested, but un-grazed crop paddocks, in selected paddocks on properties chosen at random and located in the south west of Western Australia.

To determine what, if any, correlation exists between the amount of grain harvested from a paddock and the amount of grain left after harvest.

To determine whether the amounts of residual grains, and the correlations between residual grain and harvest yields differ following a poor (2002) and a good season (2003).

## METHOD

In late 2002 and late 2003 Department of Agriculture staff throughout the cropping areas of the south west

1. counted whole grain residues in randomly chosen, un-grazed, recently harvested crop paddocks, and
2. recorded the amounts of grain (kg/ha) harvested from each paddock assessed.

### Grain residue assessment

*The grain residues in the stubbles were estimated from the numbers of whole grains counted in 20 squares (0.1 m<sup>2</sup>) sampled at regular intervals on a line across each paddock. The lines were at right angles to the harvest runs and the sites sampled included areas with and without cocky chaff. The average weights of grains reported in The Crop Variety Sowing Guide 2004 (1) were used to estimate the weights of the residual grains in kg/ha.*

Other plant-origin components of the stubbles were not recorded because without grain these crop residues are useful only for short-term weight maintenance, at best, in adults. Nor were the amounts of attached and loose ground cover in the stubbles recorded, but it is important that farmers consider the amount of ground cover when making stubble grazing management decisions.

## RESULTS

*The harvested yields of the crops and the residual grain in the stubbles are recorded in Table 1.*

**Table 1. The detailed results of the observations on the crops and their stubbles for 2002 (poor season) and 2003 (good season)**

Grain	Year	No. of paddocks	Yield range (kg/ha)	Grain residue range (kg/ha)	Residue/Yield (%)
Wheat	2002	16	500 – 4,000	7 – 130	0.3 – 12.0
	2003	42	1,200 - 4,000	8 - 123	0.3 – 6.2
Barley	2002	7	450 – 2,500	16 - 96	0.6 – 19.2
	2003	6	1,200 – 3,500	95 - 506	3.8 – 19.0
Lupins	2002	10	150 – 3,000	68 - 391	4.5 - 139
	2003	4	800 – 1,300	130 - 241	10.0 – 30.1
Peas	2002	1	220	80	36
	2003				
Canola	2002	1	1,000	34	3.4
	2003	2	1,100 - 2,200	Less than 0.1 - 76	3.4
Oats	2002	1	2,500	13	0.5
	2003				

The correlations between crop yields and grain residues were close to zero for wheat, barley and lupin crops in both years.

## CONCLUSIONS

- Wheat stubbles, without supplementation, contain insufficient amounts of residual grain on the ground to adequately support growth and reproduction in sheep.
- Lupin stubbles tend to have higher grain residues than cereals, and lupin seed can satisfy both energy and protein requirements of young sheep and breeding ewes, but not for very long.
- There is no correlation between harvested crop yield and grain residue on the ground in the stubble, irrespective of the type of season. To assess the value of any stubble for sheep (and the risk of erosion from grazing) it is necessary to go into the paddock and look at it closely, and then recheck it regularly while it is grazed.
- At normal stocking rates, very few stubble paddocks – whether cereals or grain legumes – sustain weight gain or maintenance in any class of sheep for at best six weeks.

## KEY WORDS

Sheep, crop stubble, grain residue

## ACKNOWLEDGMENTS

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**Paper reviewed by:** Danny Roberts, Department of Agriculture Western Australia

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# Genetic benchmarking using artificial insemination

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## ABSTRACT

Benchmarking of commercial flocks has become popular in the WA sheep industry, with 356 flocks currently benchmarked for wool traits through wether trials. However the biosecurity issue of Ovine Johnes Disease encourages benchmarking on the home farm. An alternative approach to benchmarking on a host property is to conduct the comparison on farm. Artificial insemination (AI) of semen from rams benchmarked in progeny test schemes will provide the genetic links. The benefits include elimination of biosecurity risks, benchmarking achieved under the normal management and environment of each flock, and access to desirable genes.

This paper outlines the procedure required to use AI in undertaking a genetic benchmarking activity. Where a breeder is already implementing an AI program, benchmarking will add value to the AI program. Where AI is not conducted routinely, the cost may be offset by a reduction in ram replacement costs, provided some of the progeny are kept entire for breeding purposes.

## INTRODUCTION

In the past genetic benchmarking of commercial sheep flocks (Butler, 2003) has been undertaken by industry in WA via wether trials (for wool sheep), and more recently, ewe trials (collectively known as Sheep Productivity Trials or SPTs). These represent a major genetic tool available to the commercial producer and have proven a very important extension vehicle (Gianatti *et al.* 2000). Industry has generally accepted that the shortcomings of these trials are outweighed by the benefits. The main message from the dataset is that there is a huge variation in genetic productivity (Butler *et al.* 2003, 2005) between flocks (and ram sources) that commercial breeders can take advantage of (Figure 1). For example, half of the flocks in WA could improve wool production by half a kg or more without changing fibre diameter by getting their genetics right.

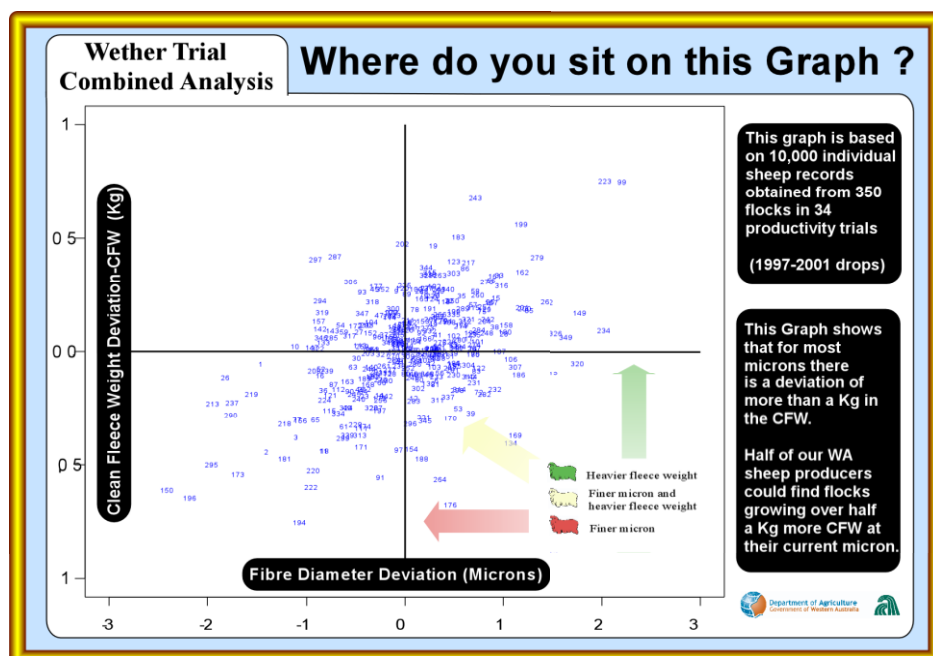


Figure 1. There are large genetic differences between flocks in clean fleece weight and fibre diameter.

## REVIEW

Artificial insemination (AI) programs are becoming more common in commercial flock management. There is greater incentive to avoid biosecurity risks (particularly Ovine Johnes Disease). This means that an approach to genetic benchmarking based on each participant using AI within his own flock on his own farm to provide the genetic links may be more attractive than in the past. This approach eliminates most early environmental, age, and genotype x environment interaction effects, provides access to superior genetics, and saves on replacement ram costs or adds value to an existing AI program. However the process is more complicated, the cost is greater and there is a 12 month lag in generating the required link team and the home progeny.

Interested participants can choose to purchase semen from sires accurately benchmarked through the Central Test Sire Referencing system, i.e. between-flock EBVs from Sheep Genetics Australia (SGA). This semen provides a link between each on-farm benchmark exercise, utilising the links across flocks and from SGA. The current wether and ewe trial datasets will also be linked to the Sire Referencing system by benchmarking progeny of well proven rams. Suitable semen would include Rylington Merino for worm resistance, a package of ram semen prepared by DAWA and any individual benchmarked ram identified from a web based genetics database. It is important that only rams that have a large number of progeny, and therefore EBVs of a high accuracy, should qualify to be used to generate link progeny.

The process involves dividing a mob of ewes into two groups of identical structure (in terms of genotype, age, etc). These ewes should not be selected 'tops' but should rather represent the average of the flock genetics. The number of ewes required need to be sufficient to generate the required number of link and home progeny (recommended minimum of 50 ewes or 20 wethers). One group will be inseminated to the link source using AI to produce 'link' progeny, and the other group be mated to the entire home ram mob to ensure the 'home' progeny reflect the flock average breeding value. Both groups will be synchronised and mated at the same time so that both link and home progeny will be born at the same time and with a similar proportion of multiple births. To identify the progeny groups correctly the the link and home mated ewes need to lamb separately. Tag lambs for identification and run together as soon as possible.

Use appropriate protocols as per DAWA wether and ewe trial manuals to ensure fair comparisons (except that teams do not need to be drafted as the progeny for benchmarking are already generated).

Each participant will be responsible for collecting their own records on farm (DAWA Genetics team will provide support and data analysis). The minimum measurements required will be as per the wether and ewe trial manuals, namely body weight, fleece weight, fibre diameter and yield, and for ewe trials only lambing percentage and progeny growth rate. Additional measurements can be made including faecal worm egg count, staple length and strength, and eye muscle depth and fat depth.

The wether trial software will be available for data entry on the day, or data can be forwarded as an excel spreadsheet DAWA. A DAWA representative should be present to provide support at weaning and at shearing.

If a participant normally conducts an AI program, the cost is confined to synchronisation of ewes to be mated to home rams and monitoring procutivity. Alternatively if a specific AI program is conducted the participant needs to weigh up the benefits of low risk genetic benchmarking (leading to better breeding decisions and greater gate of genetic gain in the future) against the added costs. These costs may at least in part be offset by avoiding ram replacement costs through keeping some male AI progeny of higher genetic value.

## **CONCLUSION**

Artificial insemination provides an alternative method of providing genetic links to enable the genetic benchmarking of different flocks. The primary benefit is to provide information under the home farm environment and the indirect benefit is managing the trial without any new Biosecurity risks.

## **KEY WORDS**

Genetic benchmarking, link progeny, artificial insemination, ewe trial, wether trial.

## **ACKNOWLEDGMENTS**

**Paper reviewed by:** Sandra Brown

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# The potential lambing performances of ewes in mixed age flocks

**Keith Croker**, Department of Agriculture, South Perth; **Rob Davidson**, WAMMCO International, Burswood, formerly University of Western Australia; **Ken Hart**, Department of Agriculture, Narrogin; **Doug Harrington**, "Cowcher Farms", Narrogin and **Mario D'Antuono**, Department of Agriculture, South Perth

## ABSTRACT

Mating fit and healthy ewes for one or two years longer than is the usual practice is particularly suited for prime lamb production and could partially address Western Australia's current lamb shortage. This trial reports on the performances of ewes in a mixed age (youngest 2-year old, oldest 7-year old) Merino flock. There was a range in the potential lambing from the youngest (97%) to oldest (140%) ewes in the flock. However, the two oldest age groups had lower lamb survival rates than the other age groups. Despite this the marking percentage of the oldest ewes was still greater than that of the maiden ewes. If we are able to improve the survival rate of lambs born to the older ewes there is potential for a big increase in lambs weaned by mating and managing these ewes appropriately.

## AIMS

Keeping ewes for a further one to two years is one option for producers to immediately increase the number of reproductive ewes on their property. In this study we examined the reproductive potential of ewes of a range of ages grazed together in the one flock to re-define the relationship between age and lambing performances. Turner and Dolling (1965) reported that lambs born per ewe joined peaked in 7-year old ewes. We also compared the survival of lambs born to maiden ewes when they lambled in their own age group or in a mixed age flock (the normal practice on the farm where the study was completed). The rationale for this farm management option was that young ewes would learn from older ewes and so in a mixed age flock it would be expected that there would be a higher survival for the lambs born to maiden ewes.

## METHOD

A flock of 560 Merino ewes of the same bloodline, representing six age groups was used in this study. On the farm where the trial was done all ewes that failed to raise a lamb were culled at marking. There were 80 ewes per age group for five of the age groups (3, 4, 5, 6 and 7 years old at lambing) and 160 two-year old ewes. Merino rams of the same bloodline were joined (2.5%) with the ewes for five weeks on 25 February 2004. The ewes were weighed and condition scored at the start and end of the joining period (31 March), and at pregnancy scanning (25 May). They were pregnancy scanned using an ultrasound probe to determine the numbers of fetuses. The ewes were run as one mob until just before lambing. At this time 80 of the maiden ewes (with similar pregnancy scanning results as the remaining 80 maiden ewes) were separated and lambled in their own single age flock. Immediately after the ewes were crutched at the end of lambing, the udders of the ewes in the mixed age mob were covered with either Si-Ro-Sheep Branding Fluid (Eldorado) and vegetable oil or Oxide Cement Colour Additive (Diggers), a different colour for each age group. The ewes were then returned to their lambs. The following morning, the lambs were allocated to the various age groups to estimate lamb survival for each ewe age group. The lambs were ear tagged for later identification. They were then weighed two weeks later when marked.

## RESULTS

The older ewes were heavier, and in better condition, than the maiden ewes from the start of joining through to pregnancy scanning.

The four oldest ewe groups were scanned as having the highest potential lambing percentages, significantly higher than those recorded for the two groups of maiden ewes (Table 1).

Whilst the two oldest groups of ewes had the highest potential number of lambs, the percentages of lambs surviving to marking for these ewes were significantly lower than in the other age groups (Table 1). Despite this they still had more lambs at marking than did the maiden ewes. The live weights of the lambs from all age groups were similar at marking.

Table 1. The numbers of ewes in each age group and percentages of dry ewes, potential lambings, lambs marked, lambs surviving to marking and weights of the lambs at marking.

Year group <sup>1</sup>	Ewes scanned (No.)	Ewes dry (%)	Potential lambs (%)	Lambs marked (%)	Lamb survival (%)	Lamb weight (kg)
7	76	6.6	139.5	106.6	76.4	20.9
6	80	8.8	132.5	105.0	79.2	21.7
5	81	7.4	135.8	122.2	90.9	21.2
4	83	3.7	133.7	118.1	88.3	21.7
3	82	9.8	115.8	104.9	90.5	21.6
2a	80	5.0	103.8	96.2	92.8	22.2
2b	79	7.6	97.5	94.9	97.4	21.8
LSD (P<0.05)			16.5	18.2	8.7	

Note <sup>1</sup> approximate ages of ewes at lambing

the 2b group lambed on their own, whereas the rest of the ewes lambed as one flock.

## CONCLUSIONS

The 7-year-old ewes had the highest potential lambing percentage. However, they had the lowest lamb survival percentage and so their marking percentage was lower than the 4- and 5-year old ewes. The survival of lambs born to the older ewes needs to match that of younger ewes if the practice of keeping and mating old ewes is to be widely adopted by producers.

The lambing of maiden ewes in a mixed age flock did not increase the survival of their lambs above that for maiden ewes lambing on their own. The lamb survival for both groups of maiden ewes was very high (96.2% for those lambing in the mixed group and 94.9% for those lambing on their own).

## KEY WORDS

Ewe reproduction, ewe age, lambing percentages, lamb survival

## ACKNOWLEDGMENTS

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**Paper reviewed by:** Dr Chris Oldham, Department of Agriculture Western Australia

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# National Livestock Identification System (Sheep) in Western Australia

**Julian Gardner**, NLIS - Sheep Executive Officer, Department of Agriculture Western Australia, Esperance

## ABSTRACT

In order to help guarantee product and protect Australian access to international live sheep and meat markets, National Livestock Identification System (Sheep) is a national program designed to enable whole of life traceability for sheep. The program is based on identifying year colour tags with the brand for the property of birth and additional pink tags for each subsequent property of residence.

## INTRODUCTION

The last Foot and Mouth Disease (FMD) crisis in Britain highlighted the need for effective identification and tracing of animals. Markets are also looking for whole of life identification of animals. The NLIS (Sheep) is designed to provide this identification and traceability for sheep and goats throughout Australia. It is proposed that NLIS (Sheep) will be mandatory from 1 January 2006

The Sheep Meats and Wool Councils, in conjunction with all sectors of the Australian sheep industry, have developed the plan for a national identification system for sheep. The NLIS (Sheep) will be based on ear tags with property identifiers and vendor declarations/waybills. While electronic systems would provide a more effective system there is no current system that meets industry requirements and at an acceptable cost. Research is continuing to find a suitable electronic system, but would take some years to develop.

## REVIEW

Under NLIS (Sheep) the owner of the property of birth will use the WA year colour tag system to identify the property of birth. Subsequent owners will use a pink tag before they move the sheep off their property. In WA, the ear tags will be imprinted with the registered brand to identify the property of residence of the sheep. Other states will use the property identification code (PIC). The original year colour tag and any other pink tags are not to be removed.

Western Australia has formed an NLIS (Sheep) Working Group which has representatives from all key industry groups and government. Industry representatives provide feedback from their members and make recommendations on the implementation of NLIS (Sheep). WA will exceed the national requirements by implementing the system proposed by the WA Implementation Working Group.

Regulations in other states may vary to suit their requirements.

### **The WA Working Group has endorsed the following principles:**

- NLIS (Sheep) will be mandatory in Western Australia.
- The year colour ear tag, imprinted with the owner's registered brand, is to be used for all sheep before they are moved off their property of birth (see below for exemptions).
- A pink ear tag, imprinted with the owner's registered brand, is to be used for all sheep moved off a property that is not their property of birth (see below for exemptions).
- Pink tags are to be put in the opposite ear to the year colour tag. It is recommended tagging be done within (7) days of receipt.
- All previous tags are to be left in the ear to maintain whole of life traceability.
- Earmarks are viewed as the only permanent mark on the animal and should continue to be available.

- For Waybills, the brand of the last tag applied should be used. This will be the senders registered brand.

## ***Exemptions***

Lambs sold directly from property of birth to slaughter over the hooks (lambs purchased on the property may be boxed and will require a tag).

Previously tagged and traded sheep being sold directly from a property to slaughter over the hooks. These sheep need to be kept separate from all other stock and all the brands on the tags on the sheep must be recorded on the waybill.

### **Why is sheep and lamb identification so important?**

NLIS (Sheep) will help underpin the integrity of Australia's sheep and goat products. It will:

- ☐ Assist in rapid animal identification and traceability in case of a food safety issue or an exotic disease outbreak.
- ☐ Ensure domestic and export consumers continue to have confidence in Australian sheepmeat and lamb.
- ☐ Uphold Australia's reputation as a producer of safe, quality sheepmeat products.

NLIS (Sheep) will offer on-farm benefits such as:

- ☐ Ability to identify the whole of life movement of individual sheep for disease and quality assurance purposes.
- ☐ Easy identification of sheep if they stray or get mixed with those of neighbours.
- ☐ Unique individual identification available on tags for management purposes.
- ☐ Meet a nationally recognised standard for easy identification of age.
- ☐ The ability to recognise the breeder of the sheep and lambs that perform well on your property.

### **Australian Quarantine and Inspection Service (AQIS) requires sheep for live export to be identified to the last property of residence.**

- ☐ For sheep moving from their property of birth in WA, this will be by a year colour tag imprinted with the owner's registered brand.
- ☐ For sheep moving from a property that is not their property of birth, this will be a pink tag imprinted with the owner's registered brand, registered to the current property of residence.

## **CONCLUSION**

Traceability of sheep is becoming a significant issue for the sheep industry, impacting on disease management and an increasing market requirement. NLIS (sheep) aims to enable the industry to meet these requirements.

## **KEY WORDS**

NLIS, Sheep identification

**Paper reviewed by:** FF Dixon

# To Feed or Not to Feed – If Only Hamlet had the Calculator!

**Geoff Duddy, Livestock Officer (Sheep & Wool) Yanco**  
**Summary**

The following paper discusses many of the factors that have influenced the profitability of commercial and opportunistic feedlotting systems nationally. The development and use of a Lamb Feedlotting Cost/Benefit Calculator to analyse variables that impact on lamb feedlotting systems profitability is outlined. Infrastructure cost, depreciation and interest are not discussed but must be considered prior to undertaking a feedlotting program.

## **Lamb Feedlotting Overview**

Lamb feedlots may be defined as *'on-farm controlled space and environment systems where all feed, health, water and animal welfare requirements are met by the feedlot program manager and staff for the purpose of increasing carcase weight and quality'*.

Historically, a few lambs have been grown in feedlots, often by grain producers utilising some surplus or damaged grain (Thatcher 1994). Consumer pressure for a more consistent supply and quality of lamb has renewed interest in intensive grain feeding (McIntyre et al 2004) as have current drought conditions across NSW. (Duddy 2005).

Feedlotting enables producers to meet specific market specifications, control feed availability, limit soil erosion and seed contamination and improve stock condition (Anon 1998). Alternatives such as sale of lambs as stores, supplementation, agistment and contract feeding may however be more profitable options. To compare each system NSW DPI have recently developed a feedlotting analysis program that enables producers to accurately estimate the likelihood of feedlotting profitability.

## **Factors affecting Feedlotting Profit Margins**

While feed cost, initial and finished lamb prices will generally have the greatest affect on profitability within a feedlotting program specific lamb and management issues may also have a direct influence on profit margin. Lamb specific issues include genetic potential, sex and live weight, intake and feed conversion efficiencies, average daily gain, health and disease status; skin quality and values. Management related issues include feedlot design, ration suitability, labour availability and cost, equipment on-farm, transport and livestock commission rates etc.

It is essential that producers understand the impact many of the above have on production potential and monitor and modify if necessary specific lamb or management issues if feedlotting is to meet production objectives and ultimately improve profit margins.

## **Feedlotting Lamb Cost/Benefit Calculator**

The Cost/Benefit Calculator was developed in an effort to assist producers with their feedlotting decision making process. The Excel based program allows producers to insert known values and/or use default values for all lamb and management inputs.

Information generated includes average daily intake and liveweight gain, days on feed, live weight and carcase change, percentages of lambs in each draft, management costs including labour, feed cost (total and per lamb), ration feed values including energy, protein, effective fibre, ADF and NDF values, vitamin and mineral levels; profit (total, per lamb and per day), cost/benefit and value adding of ration component estimates.

## **So does Feedlotting Pay?**

The profitability of finishing store (16-18kg, 2 score) lambs to heavy trade (20-22kg, 3 score) weights were analysed from November 2003 to February 2005. Rations consisted of 75% barley (valued at \$80 and \$140/tonne), 10% lupins, 10% clover hay plus additives, providing



12MJ/kgDM and from 14-16% Crude Protein. Standard intake (3.5% of Lwt), feed conversion efficiency (6 to 1) and average daily gains of 280g/h/d were applied.

Store and heavy trade lambs averaged 366c/kg and 395c/kg, respectively for the period analysed, peaking at 479 and 553c/kg in July and June, 2004.

Rations with barley at \$80/t averaged \$144/t (range \$130 to \$168) or 20c/h/d. Feedlotting was profitable for 85% of the period with an average profit margin of \$15.53 compared to store lamb sale values. Profits greater than \$10 per lamb were generated for 66% of the period.

Rations with barley at \$140/t averaged \$190/t (range \$171-\$217) or 27c/h/d. Feedlotting was profitable for a 14 week period starting in mid April 2004 through to mid July, 2004. Averaged across the period analysed feedlot finished lambs lost \$9.03 compared to sale as store lambs, showing profits for only 22% of the time based on weekly sale values.

### **So what does it all mean?**

While ration costs are undoubtedly important there was little variability in ration price across the period analysed for either ration (barley at \$80 versus \$140/t). Ration price therefore had less of an effect on profitability in feedlotting systems compared to the initial and finished values for lambs finished within feedlot systems.

The analysis clearly shows the impact that recent high store (unfinished) lamb prices have had on the profitability of feedlotting systems since November 2003. An increased confidence in prime lamb production has conceivably pushed store lamb values to record highs (compared to finished lamb values) at a time when seasonal conditions continue to undermine the ability of producers to finish lambs on traditional pasture base. Increased availability of store lambs has failed to keep prices well below finished lamb values.

Profit margins, while important, are however not necessarily the main driving force behind the recent surge in feedlotting systems. Producers have used feedlotting as a 'vehicle' to value-add their on-farm grain and fibre reserves. When barley was priced at \$80 per tonne in the above analysis value adding of all ration components was as high as 300% and averaged greater than 175% during the period analysed. There were also periods when it was profitable to feedlot lamb using dearer (\$140/t) grain on a value adding basis but these periods were irregular and greatly influenced by the store to finished lamb price difference and are difficult to predict.

### **The Future**

Grain finishing in feedlots is now firmly entrenched as management tool within NSW. Producers and industry however need to critically analyse the profitability of these systems before embarking on a full feeding program. Producers are urged to consider all input costs and to seek contracts before undertaking a feedlotting program. In many cases sale of store lambs is likely to be the better option when costs of production are known.

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# **WormBoss - a national Australian computer-based sheep worm control tool**

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## **ABSTRACT**

WormBoss is a national information package, available via [www.wormboss.com.au](http://www.wormboss.com.au) or on CD-rom, that provides convenient access to the latest information about efficient and sustainable sheep worm control.

## **THE DEVELOPMENT OF WORMBOSS**

With internal parasites estimated to be costing the Australian Sheep Industry in excess of \$300 million per year, it was decided to try to develop a single national comprehensive package of the latest sheep worm management information. This needed to be readily accessible, easily updateable and of use to producers on both a national and regional level Australia-wide.

A national project, funded by the Australian Sheep Cooperative Research Centre and Australian Wool Innovation Limited, invited leading sheep parasitologists from Qld, WA, NSW, SA, Vic and Tasmania to contribute to and review the product design and content. Input was also obtained widely from other members of the sheep industry including private veterinarians and consultants, animal health companies, other members of agribusiness and producers.

Funding allowed the employment of professional writers and website designers and a communications company to manage the launch and ongoing promotion of the product and this was always considered a key component of an effective product.

Support from rural merchandisers and animal health product manufacturers was also deemed vital. To date three major merchandising companies have offered considerable support and Avcare (The National Association for Crop Care and Animal Health) has endorsed the product and provided financial assistance for the work.

The final product took approximately two years to complete, is aimed primarily at producers and includes two key components:

- i) a decision aid tool ("Ask the Boss") to guide producers on the major issues involved in making sound decisions about the monitoring and treatment of sheep for worms
- ii) the latest revision of key sheep worm and worm management information for Australia.

The official national launch was held at the Wagin Woolorama in Western Australia on Friday the 11<sup>th</sup> of March 2005.

## **FUTURE PLANS**

Extensive industry communication and liaison is on-going to promote the awareness and utilisation of WormBoss. Key components of this will be the training of rural merchandisers about the product and the continued support from the reseller and animal health product companies.

The WormBoss product will also continue to evolve with ongoing management and review by a national technical committee. This committee will also coordinate the evaluation of awareness of and impact from the product over the coming years.

## **KEY WORDS**

WormBoss, sheep, parasites, worms, sheep worms, sheep worm control, drench resistance.

# **‘Eye in the sky’ takes guesswork out of farmers pasture decisions**

**Richard Stovold, Department of Land Information**

For generations, farmers in Bill Webb’s neck of the woods have relied on historical weather patterns, a look out the window or some old-fashioned guesswork to determine how many animals should graze on their paddocks.

Now they log on to a computer, and check images taken by a satellite orbiting 700 kilometres overhead, then make a much more accurate call.

Bill uses ‘Pastures from Space®’, a service which utilises data from the MODIS satellite orbiting the Earth twice daily.

MODIS can detect how much pasture cover (biomass) there is and uses weather data to predict current and future pasture growth rates.

“It gives me more confidence with decision-making,” says Bill.

“You can look out the window and see if the grass is growing or not but the more confident you are in making the decision, the easier the decision is to make - and it’s less stressful.”

Bill, his wife Vicki, and their family run 2100 arable hectares near Kojonup.

“I’ve been farming here all my life,” says Bill. “Seventy per cent of our income is from sheep and the rest is cropping – canola, wheat and barley.

“We’ve increased our overall sheep gross margin by \$25 per hectare by using feed lots to increase sheep production and pasture utilisation per hectare. The satellite derived PGR data which I’m using as part of my production risk management, can detect degrees of pasture growth rates not detectable by the eye and gives me two to three weeks lead time.

“I also use the information to decide on my grazing rotations, stocking rates, feed budgeting and fertiliser applications.”

‘Pastures from Space®’ was developed by a consortium involving Western Australia’s Department of Land Information (DLI) and Department of Agriculture, CSIRO Livestock Industries, and licensee Fairport Technologies International. It utilises CSIRO research and development, the Department of Agriculture on-ground measurements and feedback from producers.

The Department of Land Information’s Satellite Remote Sensing Services is responsible for capturing and customising the satellite data, and the farmers access it using Pasture Watch® software provided by Fairport Technologies.

According to Richard Stovold, of DLI’s Satellite Remote Sensing Services, this farm management tool gives farmers greater control in making pasture decisions and is a distinct improvement over traditional methods.

“Farmers are achieving increased pasture utilisation using Pasture Growth Rate and Feed On Offer maps, resulting in more wool and profit per hectare,” he says.

“For larger farms, the most popular use of the data is to help with enterprise planning.

“Other major uses include budgeting on feed and managing poorly performing paddocks, stocking rates and stock movement.”

‘Pastures from Space®’ data allows Bill Webb to make paddock-level decisions with greater certainty.

“It’s better than lying awake in bed at night wondering whether you’ve made the right decisions,” Bill says.

“Being able to make good decisions reduces stress and makes you a better person to live with for the family!

“As the stocking rate gets higher, you get closer to the paddock’s optimum level and the need for accurate decision-making becomes greater. The closer to that optimum level you are, the more conscious you’ve got to be in making the correct decision because the ramifications of an incorrect decision are more dramatic.

“In 1996 we made some fatal errors because we didn’t react quickly enough to the adverse season. It cost us a lot of money.

“Now by being more aware of what’s happening, we can develop a production risk management plan that takes into account adverse conditions and we can set trigger dates for events and take appropriate action.”

This is the fourth year Bill has been using the ‘Pastures from Space®’ service.

“I’m pretty happy with it, especially in the earlier part of winter. Once we get over a tonne per 1500 kilos of dry matter to the hectare, it’s not quite so critical. From May to possibly August – we use it weekly”, he says.

“We have Pasture Watch software loaded into our computer so it’s just a matter of downloading the data via the Internet to look at maps of the farm with various pasture growth rates shown in different colours – each colour indicates a different growth rate.”

Farmers across southern Australia can sample and view ‘Pastures from Space®’ images relating to their property for free at [www.pasturesfromspace.csiro.au](http://www.pasturesfromspace.csiro.au)

And they can download the Pasture Watch® software and subscribe to the service at [www.fairport.com.au/pasturewatch](http://www.fairport.com.au/pasturewatch) or call 1800 500 195.

For more information call **Richard Stovold** from the Department of Land Information on **(08) 9387 0343** or e-mail [Richard.stovold@dli.wa.gov.au](mailto:Richard.stovold@dli.wa.gov.au).