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Finishing Pastoral Lambs

Peter Tozer¹ Patricia Harper² Janette Drew², Department of Agriculture, Geraldton¹ and Moora²

ABSTRACT

The Australian lamb industry is growing, both in the domestic and export sectors. Recently the West Australian Meat Marketing Co predicted a growth in demand for lamb meat of 50% in the next three years. Where will these extra lambs come from? Most of the pastoral regions of WA already produce large, healthy sheep, so it is possible to increase the production of prime lambs from stations. However, finishing lambs is not feasible in our pastoral regions, so it may be practical to finish these lambs in agricultural zones. This paper analyses the feasibility of such an enterprise and considers the economics of selling these weaners, agisting or profit-sharing and takes into account the costs of various finishing systems.

AIMS

To investigate the relative profitability of different finishing systems for pastoral lambs in the Northern Agricultural Region (NAR) and to compare the returns to pastoralists and producers in the NAR from different marketing systems.

METHOD

In this analysis four feeding systems were studied:

1. feedlotting; hay plus grain supplementation (growth rate 250g/hd/d);
2. pasture and grain supplementation (growth rate 125g/hd/d);
3. spring pasture only (growth rate 200g/hd/d); and
4. a combination of all four feeding systems to replicate annual forage production and the availability of different forages and growth rates over the year.

Data on lamb growth rates on different feed sources at different times of the year were used as the basis for this analysis ("The Good Food Guide for Sheep", Department of Agriculture WA, (2001)). Growth rates were assumed to be 250g/hd/d in the feedlot, 125g/hd/d on pasture and grain, and 200g/hd/d for spring pasture. The estimates for lamb growth rates are for Merino crossbreds. In the analysis lambs arrive on property in the NAR at 35 kg liveweight and are finished and marketed at 55 kg at a dressing percentage of 43%. Feed intake is set at 3% of bodyweight and an allowance is made for intake to change as the lambs grow.

In the combination system, lambs arrive in the NAR in November and go directly onto cereal stubble, with some grain supplementation. On this type of feed, the lambs are estimated to grow at an average rate of 75g/hd/d. They remain on the stubble until January; then are fed oaten hay with grain supplements. The lambs stay on on this feed until mid-April when pasture begins to grow after the seasonal break and remain on pasture, with supplementation until late July when they are marketed.

Three different marketing systems were included in the analysis. The first is a traditional system, where the pastoralist sells weaner lambs on the open market. The second involved a marketing alliance, where the pastoralist sells weaner lambs directly to a producer in the NAR. The final system is a profit share arrangement, where the pastoralist maintains ownership of the weaner lambs until sale, but the lambs are fed on a property in the NAR that is not owned by the pastoralist. In the profit share system the profits are assumed to be split 1/3 to the pastoralist and 2/3 to the producer.

The analysis is based on a partial budget showing only variables that may change in the different feeding or marketing systems. Also, capital costs have been excluded; however, the opportunity cost of capital is included to account for cost of money due to the different lengths of time in each feeding system.

RESULTS

The economic comparisons of the feeding and marketing systems are presented in Table 1. Beginning with a comparison of the feeding systems, these results show that there are differences between feeding systems, but it is important to also keep in mind the length of time animals spend in

that feeding system. For example, lambs in the feedlot grow at a faster rate than those in other systems; therefore, they spend less time in the system. The lambs in the feedlot generate a lower gross margin than do lambs in other feeding systems. The pasture-only feeding system generated the highest returns, as pasture is the cheapest forage to produce on a per kilogram of dry matter basis. However, it is important to note that lambs will only grow at the rates used in this study for a short period of time, when pasture nutrition is highest during the spring. At other times of the year, the growth rates of the lambs would be lower and hence returns would also be lower.

Table 1. Returns to Pastoralist and Northern Agricultural Region producer for each feeding and marketing system.

Marketing System		Pastoralist			NAR Producer		
Feeding System	Days Fed	Traditional	Alliance	Profit Share	Traditional	Alliance	Profit Share
Feedlot	80	\$31.75	\$33.50	\$35.91	\$9.62	\$9.62	\$9.22
Pasture + grain	160	\$31.75	\$33.50	\$38.90	\$18.07	\$18.07	\$15.19
Pasture	100	\$31.75	\$33.50	\$40.90	\$24.45	\$24.45	\$19.19
Combination	212	\$31.75	\$33.50	\$36.25	\$9.79	\$9.79	\$9.89

When comparing the single feed systems to the more realistic combination system, the returns to the producer in the NAR are relatively low for the number of days that the animals are in the system. However, these returns can be increased by changing the feeding regimen to increase growth rates, to turnoff a heavier animal (and generate a market premium), or turnoff the animals at a younger age.

Comparing the marketing systems also provides some interesting insights. Firstly, in all feeding systems and the first two marketing systems, the returns to the pastoralist are identical, as the pastoralist no longer has any financial stake in the animals. However, the returns to the pastoralist are increased in the profit share arrangement, as the pastoralist retains ownership of the animals and changes in growth rates or final value are reflected in the return to the pastoralist. In all cases the pastoralist can reap a higher income by participating in a profit share arrangement. However, this higher income can be affected by variability in prices received for the final product and the costs of feed and other incidentals. If animals do not perform as expected the pastoralist may be worse off in a profit share arrangement than with the other two marketing systems.

From the table it can also be seen that the returns to the producer in the Northern Agricultural Region, in most cases, do not differ by any substantial amount, thus in each case the producer is really no better or worse off than any other marketing arrangement. The only difference is shown in the pasture-based systems where the feed costs are much lower than in the other systems. In these situations the NAR producer is better off finishing and marketing lambs using a more traditional marketing arrangement. In the profit share scenario, the pastoralist and the producer share the risks throughout the production process, whereas in the alliance or direct purchasing situations all of the risks are borne by the producer. In this case the difference in gross margins can be thought of as the risk premium paid by the pastoralist for assuming some of the risks of retaining ownership of the animals through to the final sale.

CONCLUSION

The results show that it is economically feasible to bring lambs out of the pastoral regions of WA to grow and finish them in the agricultural regions. The scale of returns to either producer or the pastoralist depends on the feeding system and/or the marketing system. Returns to the pastoralist are also affected by the costs of initially producing the lamb. These costs were not included in this analysis. In any case, the best choice for the pastoralist or the producer in the NAR depends on their individual preferences and the ability to establish either a profit share or an alliance-type marketing arrangement. Other costs and benefits, such as income deferral or taxation issues are not included but needed to be considered when deciding if undertaking one of the marketing methods discussed.

KEY WORDS

Pastoral, sheep, profit share, marketing, feeding systems.

Paper reviewed by: Don Telfer

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Coating Improves Wool Quality under Mixed Farming Conditions

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ABSTRACT

Coating fine wool animals in the lower north area of South Australia has shown to improve wool quality and quantity. Over the three-year trial significant improvements were seen in clean fleece weight, wool yield, staple length, staple strength and reduced dust penetration for coated animals. Coating has negligible influence on mean fibre diameter, coefficient of variation in fibre diameter, mean fibre curvature and liveweight. This trial has shown that, based on mid-side samples, coating has the potential to make fine wool produced under mixed farming conditions competitive in the market with fine wool from more traditional areas. A full economic analysis is yet to be undertaken.

AIMS

Historically the lower north region of South Australia has been confined to medium to strong woolled, large framed sheep. These sheep were thought to be the most profitable animals for wool production under mixed farming conditions in the region. The Selection Demonstration Flock (SDF) Project has challenged this perception with the Fine Wool Flock aiming to use genetic and management strategies to produce profitable fine wool in the lower north of South Australia.

Sheep coats were identified as a management tool to overcome low yields and variable staple strength initially experienced in the SDF Fine Wool Flock. Previous studies into the impact of coating have shown improved wool style resulting from a whiter fleece, reduced tip weathering, lower levels of dust and reduced vegetable matter contamination (1). A three-year coating trial was initiated in the Fine Wool Flock with the aim of evaluating the impact coating had on wool quality and quantity.

METHOD

Animals.

Data was collected on 539 July-September born progeny of the SDF Fine Wool Flock from 2002 to 2004 inclusive. Approximately half the animals in each year were covered with a UV resistant nylon coat for 6 months over summer until their first shearing in April. A total of 245 animals were coated.

Wool traits measured on 8-month midside samples were wool yield (yld), mean fibre diameter (mfd), coefficient of variation in fibre diameter (cvfd), staple length (sl), staple strength (ss) and mean fibre curvature (mfc). Greasy fleece weight (gfw) was recorded at shearing. Dust penetration at the hip mid point (dust) was taken immediately prior to shearing and animals weighed off-shears (bwt). Clean fleece weight (cfw) was calculated by multiplying yld and gfw. Publications on the flock structure and management of the Fine Wool Flock can be found on the SDF website (2).

Data Analysis.

Least squared means were calculated using SAS with adjustments made for sire, birth and rearing type, date of birth and sex.

RESULTS

Table 1 shows the least squares means for coated and uncoated animals. Coated animals had significantly higher yld, cfw, sl, ss and lower dust than uncoated animals. Uncoated animals had significantly higher gfw than coated animals, while mfd, cvfd, mfc and bwt were essentially equal in both treatments.

Table 1: Least squared means (with standard errors) of coated (n=245) and uncoated (n=294) animals for economically important fleece traits and body weight at 8-months of age

	gfw (kg)	yld (%)	cfw (kg)	mfd (μ m)	cvfd (%)	sl (mm)	ss (N/ktex)	dust (%)	mfc ($^{\circ}$ /mm)	bwt (kg)
Coated	2.8 ^a (0.1)	71.5 ^a (0.6)	2.0 ^a (0.1)	16.7 (0.1)	20.5 (0.2)	67.0 ^a (1.5)	36.3 ^a (0.8)	17.6 ^a (0.8)	100.3 (1.2)	34.4 (0.7)
Uncoated	3.1 ^b (0.1)	55.0 ^b (0.6)	1.7 ^b (0.1)	16.8 (0.1)	20.1 (0.2)	64.6 ^b (1.4)	34.1 ^b (0.8)	70.3 ^b (0.7)	99.8 (1.1)	34.4 (0.7)

^{a,b}Means within traits with unlike superscripts are significantly different ($P < 0.05$)

The quality of wool produced by coated animals is higher than in uncoated animals. Although mean fibre diameter, co-efficient of variation in fibre diameter and mean fibre curvature are unaffected by coating, determinates of quality such as yield and staple strength are significantly improved by coating. Seasonal variations imply that the magnitude of coating effects on staple strength and yield may vary, but over a three-year period this trial has shown significant improvements in wool quality as a result of coating sheep.

The quantity of wool produced has significantly increased with coating. Although uncoated animals had heavier greasy fleece weights, this is likely to result from increased dust penetration and lower wool yield. The 18% increase in clean fleece weight in coated animals must be interpreted with caution. The 4% increase in staple length can account for some of the increase in clean fleece weight. The remainder is likely to result from inaccuracies in measuring lamb tip staple length or by estimating clean fleece weight from midside yield and total greasy fleece weight, where 20-30% of the fleece is not covered by the coat.

Coating had no effect on body weight. This result contradicts other reviews on coating (3). It follows that coating in our environment does not confer an increased ability to thrive and increase liveweight. An economic analysis of coating is to be completed in the near future.

CONCLUSION

Covering fine wool weaner sheep with coats has, based on midside samples, improved the quality and quantity of wool produced. Overall significant improvements in clean fleece weight, wool yield, staple length, staple strength were observed, although the magnitude of the effect of coating is likely to vary with each season. Mean fibre diameter, co-efficient of variation in fibre diameter mean fibre curvature and body weight were unaffected by coating, suggesting that these traits are more strongly influence by other environmental or genetic factors.

These results indicate that coating can increase the of quality fine wool by improving wool yield and staple strength under mixed farming conditions. Coating has the potential to make fine wool from these production systems competitive in the marketplace with fine wool produced under more traditional conditions.

KEY WORDS

Fine wool, sheep covers, mixed farming

ACKNOWLEDGMENTS

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Paper reviewed by: Simon Maddocks (Chief Scientist, SARDI Livestock Systems)

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Data Retrieval from Walk-Through-Weighing

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ABSTRACT

Walk-through-weighing systems have been developed as a means of easily capturing weights of individual animals without the need for mustering. The precision of an individual weight will be lower in such systems but compensated for by many repeat observations. A process of screening recorded weights is currently being investigated using data from a pastoral grazing property in Bourke, NSW. The opportunities of using such data for management decisions are discussed.

AIMS

Walk-through-weighing is a system for capturing weights of individual animals as they walk over a weighing platform to get to water or some other incentive. The Sheep CRC has developed a prototype walk-through-weighing system by modifying commercially available hardware. Such systems are being evaluated in a number of commercial trials. The aim of this paper is to discuss potential ways information from walk-through-weighing could be used to enhance management decisions.

METHOD

Data from a walk-through-weighing system set up on a pastoral grazing property in Bourke, NSW, was retrieved and used for analysis. There were a total of 629 animals in the trial. The results were divided into four weighing periods ranging from early January to late February 2005. The data contained a radio frequency identification (RFID) tag number and a single weight for each weighing. There were on average 3200 recorded weights for each weighing period (after any nil weights were removed and any weights with no linked RFID tag number). Two mustered weights were taken to ensure the correct range in weight values were being achieved during the screening process.

The screening process involved removing weights of 0 kg and then an average weight was taken from weights within an acceptable range for each animal at each weighing period. This information was then examined to determine what benefits could be achieved with having these multiple weights of each animal for management decisions. Observations can be made about their growth rates over time.

RESULTS

The raw weights ranged from 0kg to 115.5 kg (SD=14) and after the average weight per animal calculation the weights ranged from 14 to 70 kg (SD=9). The earlier results were more variable, but improved in later weighing periods. A settling period is needed for the animals to adjust to the new environment so they move more freely through the system and more accurate weight measurements can be taken. Adjustments were made to the system and setup as problems occurred, which reduced the variation in the data. While the data editing process is still being refined, initial results from the whole mob over time are summarised in table 1.

Table 1: Average weights over time

	8/1/05- 24/1/05	24/1/05- 26/1/05	26/1/05- 12/2/05	10/2/05*	12/2/05- 17/2/05	19/4/05*
Average wt (kg)	38.6	41.2	39.7	45.3	45.3	42.3
SD of wt	9.5	8.1	9.9	8.8	8.8	6.9

*Mustered weights

The average growth rate of the mob up to 10/2/05 was 168 g/day reflecting the feed available after a long period of destocking with some modest summer rainfall at Bourke. Between 10/2/05 and 19/4/05 the mob average declined by 49 g/day as the region slipped back to drought conditions. Over the whole period of observation the average growth rate was only 25 g/day. Simply separating the mob into two groups on growth rate showed that the top 50% grew at 85 g/day whilst the bottom 50% lost 36 g/day over the whole period.

DISCUSSION AND IMPLICATIONS

Within such an extensive grazing system in the Bourke area, effective animal performance data has not previously been possible. It is too difficult, costly and time consuming to muster the animals to obtain even irregular information on the animals. Even if this event is attempted it is unlikely to obtain all animals in one muster. Using this walk-through-weighing system all animals will eventually need to come for water and so a record of every animal will be obtained with little time and labour from staff and with little stress on the sheep to monitor their performance. The development of suitable software will be required to process the information and so aid in management decisions on farm.

Initially the data is useful to monitor the whole flock. The weights can be used to identify when the sheep require moving to another area of feed. Individual growth rates can be used to aid in the detection of ill health in a group of animals and can also be used to make predictions on their future growth and therefore weight. The predictions would be used to determine when animals will meet the market specifications (target weight) or can be used to predict what weight the animal is likely to be on a certain date. This is useful for producers in determining when to order a truck for slaughter and how many animals will be ready on this date. From the animals that do not meet market specs on the predicted date it is useful to see whether they will meet the target within the specified period or whether early sale might be required to reduce costs.

If sold early they may not achieve a high market value but it may still be an advantage to reduce the cost of maintaining them when pastures are limiting. Without individual records, these animals may go unnoticed as they never reach the target saleable weight. This animal performance information can be used in combination with pasture assessment. Growth rates of the animals can be used to determine, under the current nutritional conditions, how long this number of animals can be retained, or it can be used to determine how many may need culling to reduce the need for hand feeding when feed is limiting. In this case the animals needing to be culled can be identified to ensure the animals retained are the most suitable. If the same number of animals are to be retained their growth rates can be used to determine how long the current feed will last and how much feed will need to be brought in if they continue to grow at the current growth rate.

As the walk-through-weighing system continues to be improved a drafting capacity will be developed. This will achieve an even greater benefit as the animals can be selected on these growth rates and drafted off into a holding yard for trucking to slaughter or for treatment if the drafter detects a reduction in growth of the animals. It may also be useful to draft off the animals that are identified as losing condition to give them supplementary feed whilst the heavier animals do not get access to the additional feed, saving money by only feeding the animals that need it. Only treating animals that need to be treated (such as identified as losing weight) will also reduce costs.

This paper has looked at the benefits of walk-through-weighing in an extensive grazing system where it was previously impractical to collect weights of animals. The benefits were clearly shown in this situation and there may be benefits in other systems not discussed here, such as lamb finishing. In these more intensive grazing systems regular weights are usually collected to monitor the lambs progress and “readiness” for slaughter. Walk-through-weighing would provide a system for capturing these weights without the need for regular mustering. This would reduce labour and potentially improve growth by not holding in yards for extended periods of time. Potential benefits have been noted for two sheep systems, there would be similar benefits in many other systems.

KEY WORDS

Walk-through-weighing, data management

ACKNOWLEDGMENTS

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Paper reviewed by: Cheryl Pope

Strategic Risk Management in the Sheep Industry

Mr JRL Hall, ICON Agriculture (JRL Hall & Co)

For sheep farmers, risk management is a very one sided thing. Downside risk associated with prices, inputs and seasonal risk is understood and frequently addressed. Forgotten, or never taken into consideration, is upside risk. As a consequence, farmers tend not to take sufficient advantage of opportunities as they present themselves.

Nowhere is this more clearly demonstrated than in the lack of adoption of economic stocking rates. It is well known and has been extended to the sheep industry ad nauseam that stocking rate is THE key performance indicator, yet stocking rates on farms are typically well below any economic potential. To compound the problem, or perhaps because of it, there is a lack of understanding of this by most players in the industry who have influence on farmers decisions, hence emphasis on per head outputs rather than per hectare. The apparent paradox of less per head being more profitable continues to confuse and is the single greatest constraint to profit in the industry.

This situation had probably arisen through a variety of factors in combination:

- Classical extension informed woolgrowers what to do but not how to do it.
- There was little follow up of the extension message for the individual.
- Lack of benchmarking in the industry allowed myths to maintain prominence.
- The legends of failure are all too well known.

Many who tried to adopt higher stocking failed, usually because of adverse seasons, resulting in dead sheep or property degradation. This failure was wrongly attributed to the higher stocking rate and farmers generally reverted to a protected zone of a stocking rate that would work without problems every year. In adopting that level of stocking rate, farmers miss out on extra profit for the majority of seasons when conditions are not adverse. We believe this to be in the region of four out of five years and what better example of this than of the current 2005 season?

The poor season will occur and planned strategies need to be in place to cater for it. This is planned action to a situation rather than a tactical response which is usually implemented when it is already too late. We have named the strategy for dealing with the bad break the 'Back Door'. A similar strategy for summer is the 'Summer Bucket'.

With our Mediterranean climate, it is clear that it is the time of the break, rather than the total rainfall, that dictates the utility of the grazing season. We know that there is little pasture growth in mid winter and that without pre winter growth, there will be too little feed on offer over that time. Strategies are therefore required to deal with late breaks. These can be prophylactic: the flock mix, pregnancy testing, feed supplies or cash for feed; or more reactive depending on the time of the break. They all cost money, but the cost in a bad season will be more than defrayed by the extra profits obtained in the good seasons that are the majority.

The 'Back Door' is a sequential reaction to the very time of the break of the season with the following as an illustration:

- An April break is GREAT. Perhaps trade up sheep numbers or crop more.
- 01 May break. Still OK, but no increase.
- 14 May break. Start action – preg test ewes, isolate twinners, feed.
- 21 May break. More action – sell dries, draft up, feed differentially, look for agistment.
- 30 May break. Really get serious – sell sheep, feed, agist, less crop, nitrogen on grass.
- 14 June break. Get really radical.
- 30 June – all possible actions in place.

The above are merely examples, there are over 50 actions that can be taken to suit the individual. Farmers will select their own solutions within this wide range. As in most things, early action is best, sometimes wasted but seldom wrong.

Much extension effort over the years has been less than value because of non adoption of the messages, hence The Sheep's Back.

The Sheep's Back is the WA extension program funded by AWI. It is group delivery of these messages to small groups of around 15 farm businesses, encouraging them to not only accept the extension messages but more importantly, to implement them. Each group has a trained facilitator for organisation and a mentor (consultant) to provide back up. The program:

1. Demonstrates the importance of stocking rate.
2. Obtains a written commitment from the individual to increase their stocking rate.
3. Develops the participants written strategies for adversity.
4. Benchmarks the enterprise to reinforce the message and demonstrates the added value.

Participants will pay under \$500 for the course, after kind assistance from FarmBis. This has an excellent cost benefit analysis for, even at current prices, a mere extra 34 DSE for just one year (\$15 gross margin per DSE) will repay the minor outlay.

The Sheep's Back will champion the sheep industry, illustrate that sheep do pay and further, that sheep can pay even better. It issues the challenge for achievement and aims to generate more enthusiasm for the industry. Most importantly, it will train others in the industry to understand and appreciate the basics of profit in sheep enterprises.

We would invite all associated with the industry to encourage farmers and other industry participants to embrace the training that it offers and accept the challenge it presents. We are fortunate in WA to have the backing of AWI, along with strong support from allied industries and the Department of Agriculture for the project.

Joining Prime Lambs for the Northern End of the Market - a Systems Approach.

Chris Carter, Peter Tozer, Department of Agriculture, Geraldton

ABSTRACT

There have been price premiums for lambs sold in June, July and August. Over the last 6 years, lambs with a dressed weight between 18 kg and 22 kg have attracted a 17% premium when sold in these months. Lambs above 22 kg dressed weight have received a 16% premium. This analysis looks at whether it is profitable for producers in the Northern Agricultural Region to adjust their lamb production system to capture these price bonuses. Three production systems were analysed; Standard management practice with joining in October and sale of lambs in November; early joining in June and sale of lambs in July with supplementary feeding; early joining and sale of lambs in August on reduced supplementary feeding.

INTRODUCTION

Systems in the Northern Agricultural Region

There is a shorter growing season in the Northern Agriculture Region than the South West Agricultural region of Western Australia. Wheat is the prime source of income and sheep fit in around the cropping part of the enterprise. Harvest commences earlier, and the feed gap is longer in the region. In order to target the higher price mid-year markets, changes in the lamb system could place the high management periods of lambing and joining in conflict with high cropping labour demand.

REVIEW

Assumptions

By bringing joining back from October in to June, there is an extra two months of feeding required in the feed gap – one month of weaning and one month of lamb growth (See Figure 1). A feed budget was used to generate the cost of feed for each different lamb system. The costings were based on the following daily rations,

Weaning Month: 500g lupins + 1kg Oats

Lamb Growth: 3kg Oats + 1.5 kg lucerne hay (available) weekly

Finishing: 1.4kg lupins + 2.1 kg Oats

at 35c/kg for lupins and 25c/kg for oats.

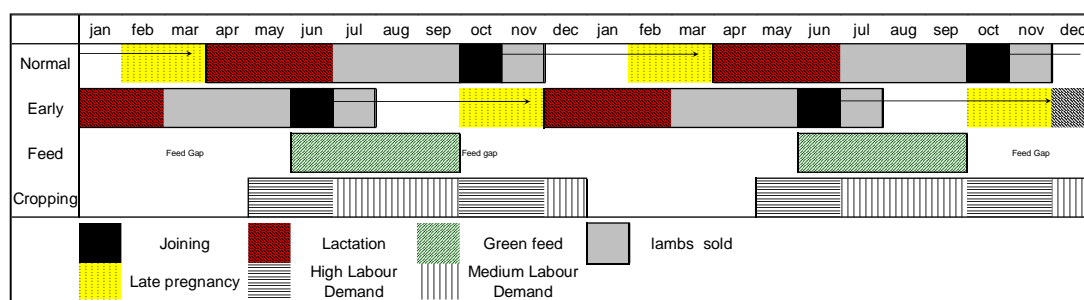
To ensure ewes in the early joining system are in good condition, there is also an extra weekly ration of 0.25 kg/d of oats over the month pre-joining. Despite the extra feed, it is assumed there will be an incidence of ewes not cycling reflected in a lower lambing percentage, dropping from 75% down to 70%. In the existing (October joining) system, the ewes would be in prime condition at the end of the pasture growing season.

If lamb sales are delayed until August, there could be a 50% reduction in the feed required for finishing as this will be done on pasture. However, this may mean a lower carcass dressing percentage.

System Effects

Current sheep management practice in the Northern Region fits around the cropping regime. It minimises high demands for labour at peak cropping times. An earlier joining would require higher demand for labour over the summer period and coincides with the cropping peak demands through May (seeding) and November (harvest).

Figure 1 Overlapping systems with two times of joining, and cropping requirements.



Weed control (for cropping) may be a complication under an early joining system. In the current system, the maximum stocking rate occurs through the pasture growing season allowing grazing pressure to be placed on paddocks going into crop the following year. Under an early joining system, there would be a lower stocking rate on pasture through the end of the growing season – because the lambs have been moved off the farm.

Financial Benefits

The higher returns in the June to August period are only available on the heavier lambs. The lambs under 18kg dressed weight show no premium in the Midland Market during these months. In Table 1 the net benefits of restructuring the sheep system to sell lambs earlier is compared with the current lambing system.

Figure 2 Returns and Difference in Three Systems

Scenarios		\$/ kg	Total ewes	Lambing %	Lamb Revenue/Ewe	Feed Costs	Other costs*	Gross benefits	Diff. Returns
November Sale	<18kg	\$ 2.48	100	75%	\$ 31.50	\$ -	\$ -	\$ 31.50	
	Standard System 18-22kg	\$ 2.51	100	75%	\$ 37.06	\$ 2.10	\$ 0.60	\$ 34.36	
	>22kg	\$ 2.31	100	75%	\$ 39.04	\$ 4.73	\$ 1.35	\$ 32.97	
July Sale	<18kg	\$ 2.27	100	70%	\$ 27.06	\$ 7.23	\$ 1.67	\$ 18.16	-\$13.34
	Early Joining High 18-22kg	\$ 3.42	100	70%	\$ 46.28	\$ 11.73	\$ 2.60	\$ 31.95	-\$2.41
	Input >22kg	\$ 3.20	100	70%	\$ 49.61	\$ 13.76	\$ 3.02	\$ 32.84	-\$0.13
August Sale	<18kg	\$ 2.39	100	70%	\$ 28.37	\$ 7.23	\$ 1.67	\$ 19.47	-\$12.03
	Pasture Finished 18-22kg	\$ 3.17	100	70%	\$ 43.13	\$ 9.77	\$ 2.72	\$ 30.64	-\$3.72
	>22kg	\$ 3.00	100	70%	\$ 46.69	\$ 11.58	\$ 3.47	\$ 31.64	-\$1.33

*Other costs include freight costs of feed, and extra labour costs.

For the 18-22kg lambs and the +22kg lambs sold in July, the producer is worse off by \$2.41/ewe and \$0.13/ewe respectively when compared with the current system. For the 18-22kg lambs and the +22kg lambs sold in August off the lower feed rations, the penalty is even greater - by \$3.72/ewe and \$1.33/ewe respectively.

CONCLUSION

The short green feed growing season in the Northern Agricultural Region means an increased requirement for supplementary feeding of sheep over the summer months. Possible extra income to be gained by marketing lambs into the peak price mid-winter period is eroded by the high cost of supplementary feeding. There are no financial benefits to producing prime lambs in the north to capitalise on this premium under the feeding systems studied. Moreover, in order to do so would mean farm labour would need to be diverted from the more profitable cropping enterprise.

KEY WORDS

Economics, Lambing, Systems, reproduction

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Lifetime Wool – Dry feed budgeting tool

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ABSTRACT

Draft guidelines from the *Lifetime Wool* Project, which describe the optimum nutritional management of ewes, are based on ewes being managed to condition score targets through pregnancy and lactation (1, 2). To achieve these targets for ewes grazing dry pasture or stubbles, graziers will need to calculate adjustments to the rates of supplementary feed supplied. Feed budget programmes do exist but depend on inputs for the amount and quality of feed on offer. Obtaining these inputs is time-consuming and expensive, and will not necessarily be a good indication of animal performance due to the selectivity of grazing animals. A new feed budgeting tool has been developed which uses the change in animal condition score over a defined period, and known supplementary feeding rates, to estimate the quality and daily feed intake from a dry pasture/stubble feed-base. The tool then estimates the feeding rate required to match a target change in condition score for the next period, allowing for predicted declines in the quantity and quality of dry feed.

METHOD

The basis of the 'Let the Sheep Talk' (LST) spreadsheet is to use the ewes' change in condition score (CS) or live weight (LW) over a known period to determine adjustments to supplementary feeding rates for the next short-term period. That is, LST employs a 'Looking Back - Looking Forward' approach.

Background inputs (sheep genotype, nutritional quality of supplements to be used, reproductive calendar and strategic animal performance targets) for an individual farm are entered. The average CS or LW from 25 randomly selected animals is then entered and compared to the targets in a graphical representation of 'actual' versus 'target' CS (Figure 1). The graph illustrates the annual strategic CS profile, plots the average 'actual' CS from the monitored ewes, and presents the new short-term target CS for the next period.

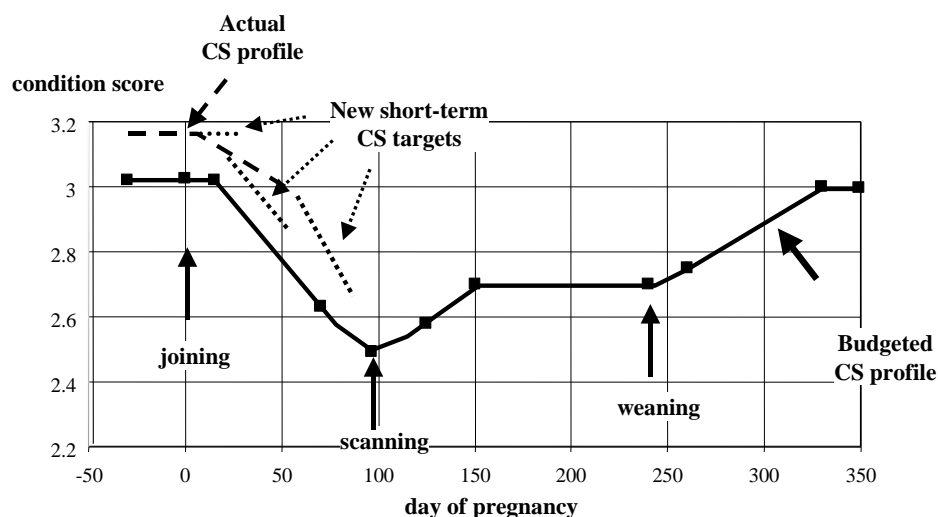


Figure 1. Graphical representation of actual (solid line) and budgeted condition score (CS) profile (dashed line) for single bearing ewes in the "Let the Sheep Talk" feed budget tool. Dotted lines represent short-term target CS..

The tool uses calculations from GrazFeed® to estimate the daily metabolisable energy (ME) intake required that would result in the measured change in CS or LW. The spreadsheet assumes all supplementary feed is eaten and then calculates the residual ME that must have been ingested from the pasture/stubble. From this the quality of the pasture or stubble is estimated. Feed intake in the

following period is then estimated making allowance for changes in quantity and quality of the dry feed base and substitution with supplement (Table 1).

The new target CS is calculated and constrained at a maximum loss of 100 g/h/d (a level which will not cause undue stress to the maternal ewe). The feed budget then calculates the rate of supplementary feeding necessary to meet the new target.

Table 1. Components of the 'Let the Sheep Talk' spreadsheet where changes in CS ('Looking Back') and allowances for declining pasture quality and quantity ('Looking Forward') are used to predict supplementary feeding rates to achieve a target CS.

	Looking Back	Looking Forward
	Oats:Lupins	Oats:Lupins
Initial CS or LW		
Date	28/2/05	27/3/05
CS	3.2	3.0
Final CS or LW		
Date	27/3/05	21/5/05
CS	3.0	2.78
Supplement fed ('Looking back') or supplement required (('Looking forward') (g/h/d)	259	187
Rate of supplement required if no paddock feed available (g/h/d)	596	
Pasture Quality/Quantity		
Digestibility (%)	53	48
FOO (t DM/ha)	1.5	1.2
Proportion of legume (%)	40	35

CONCLUSION

Short-term changes in CS or LW of an animal directly reflect its ME intake from pasture/stubble residues and supplementary feed. Estimating the ME derived from dry feed residues allows adjustments to supplementary feeding rates to meet production targets for pregnant ewes. Thus, regular monitoring of ewes could become a useful method of managing animals grazing dry feed residues and allows feed budgeting without the necessity to assess the amount and quality of dry feed residues.

For regular animal monitoring to be used practically on farms, accurate time-efficient procedures for monitoring CS and/or LW will be required. Operators will need to be calibrated for CS, and automatic electronic eartag weighing systems will need to be corrected for conceptus growth.

KEY WORDS

Feed budgeting, Lifetime Wool

ACKNOWLEDGMENTS

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Influence of ultrafine wool fibre curvature and blending with cashmere on attributes of knitwear

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ABSTRACT

Both blend ratio and wool type affected the attributes of tops, roving, yarn and knitted fabric. The differences in raw wool attributes of low crimp ultrafine wool, compared with standard high crimp ultrafine wool, were translated into numerous different knitted fabric physical properties. It was demonstrated that most of the properties of knitted fabrics were crimp dependent. The blending of cashmere with wool resulted in a reduction of the mean fibre curvature of the blend compared with the unblended wool, with a resultant change in physical properties of the textile materials. The present work demonstrated that the physical properties of pure low crimp ultrafine wool fabrics were closer to the properties of pure cashmere knitted fabrics than were knitted fabrics made from pure standard ultrafine wool. Increasing the content of cashmere in a wool/cashmere blended knitted fabric generally resulted in a change in the measured fabric attribute in the direction of pure cashmere fabric.

AIMS

To evaluate the impact of blending Australian cashmere with ultrafine wool and to determine the effect of wool type on the attributes of knitted textiles.

METHOD

The study was a replicated experiment: nine treatments each of three replicates. The design was: Blend / (WT * BR) x 3 replicates. **Blend** was analysed as: **Control (CM)**, specified as 100% Australian cashmere; **Blends**, blends of cashmere with wool and the pure wool treatments. **WT**, wool type had two levels: **SW**, standard high crimp fine wool tops; **LCW**, soft handling low crimp fine wool tops. **BR**, referred to blend ratio and had four levels specified as: 75, 50, 25 and 0 referring to the percentage of cashmere in the blend. In the graphical presentation of results, BR 100 refers to the control, CM.

The mean fibre diameter of the greasy wool was 16.9 μm and the cashmere 16.6 μm . Low fibre curvature wool (LCW) had a lower fibre curvature; 74 vs 114 $^{\circ}/\text{mm}$ ($P < 0.001$); and a lower resistance to compression (R_c); 7.4 vs 10.4 kPa ($P < 0.001$); than the standard high fibre curvature wool (SW). Cashmere had lower fibre curvature 48 $^{\circ}/\text{mm}$ ($P < 0.001$) and R_c 3.7 kPa ($P < 0.001$) than LCW. All fibre was processed into separate tops and following combing, but before gilling, was allocated at random into three replicates and treatments. Following blending rovings were spun and plied into 2/18 tex yarn. Knitted plain jersey fabrics were constructed on a circular 23 gauge knitting machine to three different tightness factors of 14.0, 15.5 and 17.0 $\text{tex}^{1/2}/\text{cm}$ by altering the loop lengths. Testing followed international standards (McGregor 2001, McGregor and Postle 2004). Fabric compressibility was determined as $(T_0 - T_m)/T_0$, converted to % (McGregor and Postle 2002).

RESULTS

Differences in raw wool were translated into different attributes of the tops as described elsewhere (McGregor and Postle 2002). The present work demonstrated that many fabric attributes were crimp dependent including the fabric mechanical properties of compression, bending rigidity, shear rigidity and tensile strain, and also the fabric attributes of thickness, width (and indirectly mass per unit area), air permeability, resistance to pilling and appearance change, hygral expansion and relaxation shrinkage. Examples are provided (Table 1).

The degree of crimp dependence detected in the present work is much greater than previously reported. Some of these relationships are reported for the first time. Thus differences in raw wool attributes of cashmere, compared with low or high crimp ultrafine wool, and low crimp ultrafine wool compared with standard high crimp ultrafine wool, were translated into numerous different knitted fabric physical properties.

Significant effects of blending were also detected. Two examples are given in Figure 1. Compressibility (softness) was greater in LCW compared with SW but CM had higher compressibility than LCW so as blend ratio increased so did the compressibility of the knitted fabrics. The reverse was observed for relaxation shrinkage of knitted fabrics.

Table 1. Examples of the differences in fabric mechanical properties and other physical attributes of fabrics knitted to a tightness factor of $15.5 \text{ tex}^{1/2}/\text{cm}$ from low crimp wool (LCW) or standard high crimp wool (SW) including fabrics made from their intimate blends with cashmere (CM)

Attribute	CM	LCW	SW	$\text{sed}_{\text{CM-WT}}$	sed_{WT}	P_{WT}
Fabric thickness T_m , mm	2.62	2.79	2.92	0.065	0.042	<0.01
Compressibility, %	62.9	58.8	56.9	1.24	0.83	<0.05
Air permeability, $\text{cm}^3/\text{cm}^2.\text{sec}$	178	151	127	7.4	4.7	<0.001
Hygral expansion, course %	0.13	1.18	2.53	0.2	0.13	<0.001
Resistance to pilling and appearance change ¹	3.8	3.8	2.7	0.2	0.15	<0.01

¹ Higher score is better. Maximum visual score = 5.0 when no change is detected.

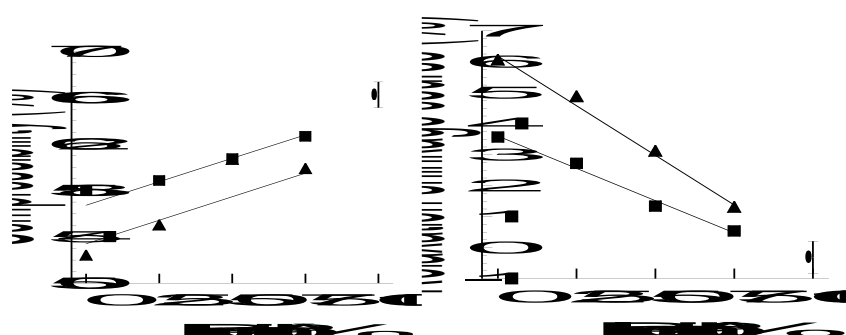


Figure 1. The affect of wool type and blend ratio on the compressibility of fabric knitted $17.0 \text{ tex}^{1/2}/\text{cm}$ and the relaxation shrinkage of fabric knitted at knitted $14.0 \text{ tex}^{1/2}/\text{cm}$. The effective standard error is plotted as an error bar with pure cashmere. Symbols: ■ Low crimp wool; σ Standard wool; λ pure Cashmere

CONCLUSION

It was demonstrated that the physical properties of pure low crimp ultrafine wool fabrics were closer to the properties of pure cashmere knitted fabrics than were knitted fabrics made from pure standard ultrafine wool. Increasing the content of cashmere in a wool/cashmere blended knitted fabric generally resulted in a change in the measured fabric attribute in the direction of pure cashmere fabric.

KEY WORDS

crimp, curvature, cashmere, blends

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