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Agribusiness Sheep Updates - 2004 - Part 1

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AGRIBUSINESS SHEEP UPDATES 2004

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PROCEEDINGS OF THE 2004 AGRIBUSINESS SHEEP UPDATES

Foreword

On behalf of the Department of Agriculture I would like to welcome you to the 2004 Agribusiness Sheep Updates.

This year's event will again be a gathering of International and Australian experts in sheep production and marketing, providing the latest information and an excellent networking opportunity for any agricultural professional.

The last couple of years have seen the WA sheep industry move forward in leaps and bounds and there are now many options available for farmers to choose from in order to establish and maintain profitable and sustainable sheep management systems.

Agribusiness Sheep Updates 2004 has been designed to build on this momentum, and to deliver the information farmers will need, to make the 'Smart' choices.

For this year's event we have again selected a range of topics that cover the most important issues out there. These topics were highlighted by industry stakeholders and 2003 delegates as key issues for the sheep industry.

These proceedings contain the high quality research and review papers and posters presented at the Sheep Updates and will be a valuable resource for all those with an interest in the sheep industry.

The Agribusiness Sheep Updates is an initiative of the Department of Agriculture and is proudly supported not only by the Department but by Meat and Livestock Australia and Australian Wool Innovation.

A team of dedicated professionals within the Department of Agriculture has been pleased to organise this key annual event and we all look forward to your active participation and feedback

Dr Mark Dolling
Manager, Sheep Industries and Pasture

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Australian Wool Innovation Limited

DR LEN STEPHENS

AUSTRALIAN WOOL INNOVATION LIMITED (AWI) IS A RESEARCH AND DEVELOPMENT (R&D) COMPANY OWNED BY, AND WORKING ON BEHALF OF, AUSTRALIAN WOOLGROWERS. ITS ACTIVITIES FALL INTO THE FOLLOWING PROGRAM AREAS:

- **Wool Production** – helping woolgrowers reduce their costs and improve the profitability of their enterprises.

- **Textile Technology** – ensuring Australian wool is processed in the best possible way and expanding new markets through the development and application of novel products.

- **Trade Development** – ensuring the movement of raw materials and products along the global wool textile pipeline occurs as efficiently and effectively as possible.

- **Information and Education** – informing and educating woolgrowers and other industry stakeholders about AWI's developments, innovations and R&D findings and helping them to adopt these results.

Wool Production program area

The cost-price squeeze on primary producers will continue and AWI must continue to look for opportunities for woolgrowers to improve on-farm productivity and sustainability, to find new and better solutions to old and ongoing problems.

The overriding objective of AWI's Wool Production program is to find ways to help woolgrowers reduce their costs and improve the profitability of their enterprises.

AWI's on-farm investments cover the key areas of:

- animal health
- genetic improvement technologies
- pasture development and improvement; and
- wool harvesting and measurement.

Key projects in the on-farm area

In the animal health area, research is well underway to develop a pain-free, cost-effective **alternative to mulesing**. This involves treating the breech with a protein to contract the skin – no surgery and no animal welfare issues. Early trial results are encouraging and AWI is pulling out all stops to deliver this commercially as soon as possible

The **Integrated Parasite Management (IPM)** project is now underway with many of the 20 demonstration farms already established, including in Western Australia. This involves working with woolgrowers on real farms to develop and demonstrate the ability of IPM to minimise chemical use and residues and reduce annual losses and costs associated with internal and external parasites.

The joint $30 million five-year AWI-MLA **Sheep Genomics** Program launched last year aims to identify sheep genes and their functions in order to improve animal health, welfare and productivity. We plan to deliver practical tools such as gene markers that allow you to select for improved wool quality, parasite and disease resistance, and efficiency.

In another joint effort with MLA, we are developing the **Australian Sheep Genetics Database**. This will allow stud breeders, sheep classers and woolgrowers to easily compare Merino sheep from different flocks on genetic merit using data from a single consolidated database.

The **Lifetime Wool** project, begun by the Department of Agriculture WA and Victorian DPI three years ago, is now being expanded nationally and will provide woolgrowers with precise grazing and supplementary feed guidelines to optimise the lifetime wool production from ewes and their progeny.

The **Land Water Wool (LWW)** program, a joint initiative with Land and Water Australia, focuses on the important issue of natural resource management and sustainability. The largest of the seven LWW sub-programs is Sustainable Grazing on Saline Lands. This sub-program was launched two years ago in Western Australia where, according to a benchmarking surveyed by LWW, dryland salinity directly affects 78 per cent of woolgrowers.

Finally, **shearing** remains a major challenge for Australian woolgrowers and one of woolgrowers' biggest costs. Delivering new, improved shearing systems, better equipment for shearing and crutching operations and training for shearing staff remains a key priority for AWI.

AWI's role is to invest in this research, development and innovation that individual growers and companies are not able to do. AWI will continue to invest your levy money in areas designed to maximise the benefits to woolgrowers.

Commercialisation of Sheepmeat Eating Quality Outcomes

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Key Messages

The objective of the Sheepmeat Eating Quality (SMEQ) research program is to define and improve lamb and sheepmeat eating quality; increase demand and product consistency; and to provide tools and cost effective systems that deliver a world-class product.

Research conducted under the program has identified pathways and interventions that improve the eating quality of lamb and sheepmeat. These innovations have then been validated through commercial pilot projects.

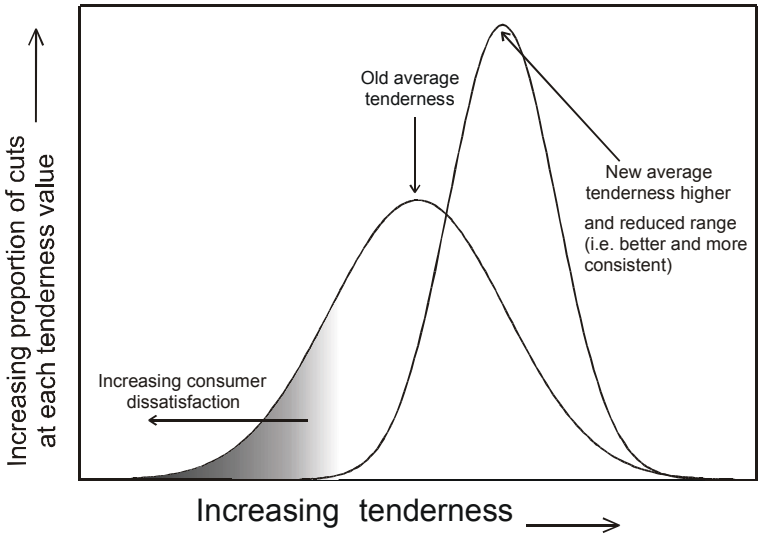
MLA is now seeking comments from industry prior to commercialising outcomes from the research.

Introduction

This research program is being undertaken in three stages - industry consultation; research, experiments, development of systems and recommendations; presentation of results to industry; and finally commercialisation of results.

A range of production, processing, age and other attributes were tested in a large-scale sensory evaluation study where 45,000 consumers rated samples of sheepmeat for tenderness, juiciness, flavour and overall liking. The outcomes form these trials have been used to identified interventions and pathways that can be implemented by each sector to maximise sheepmeat eating quality.

The figure below shows a diagrammatic representation using the example of tenderness of how consumer satisfaction increases as more cuts achieve a higher tenderness score. If we can improve the average eating quality and consistency of sheepmeat by adopting practices recommended by the program a higher "average" eating quality and a tighter range (i.e. better and more consistent eating quality) will result.



Pilot implementation and validation of eating quality systems has been pursued through five supply chains. MLA is now moving to fully commercialise the outcomes of the research to benefit the Australian lamb and sheep industry.

Key Research Findings

The SMEQ program has identified practices and processes that will further improve consistency and quality in sheepmeat eating quality, the key finding include;

- Lamb produced and processed under best practice recommendations remains the "premium" product,
- Lamb is a superior eating quality product under best practice production and processing,
- Approximately 20% of lamb produced and processed under standard conditions fails consumer expectations; SMEQ practices can reduce that failure rate to around 5%.
- Sheepmeat eating quality varies between processing treatments, age classes, feeding strategies and cuts, therefore control of these can lead to improvement,
- Over a broad range of animal age, loin tenderness declines with increasing animal age in a predictable way but liking of flavour, juiciness and overall liking are less affected resulting in acceptable consumer scores even for older sheep (mutton),
- Hogget loin cuts, processed under best practice conditions, have a lower eating quality than lamb loin processed under the same conditions,
- Produced under best practice conditions, the mutton loin is basically as good as the hogget loin, but leg cuts are inferior,
- The eating quality of lamb is maintained during teeth cutting (during eruption but not in wear),
- Finishing (or growing) sheep pre-slaughter is an important component of assuring eating quality as it affects intramuscular fat, muscling, colour and keeping quality,
- The type of finishing system should be dictated by cost of production and seasonal constraints and not perceived affects on the flavour of sheepmeats,
- Processing regimes are now known which will improve the eating quality and consistency of all age classes of sheepmeat
    - Aggressive chilling can increase toughness,
    - Carcases hung conventionally by the Achilles tendon and subject to electrical stimulation need to enter rigor (pH 6) between 18 and 25°C for product destined for medium or short term ageing,
    - Electrical stimulation, applied correctly, will ensure sheepmeat enters rigor at the correct temperature,
    - For the domestic or export chilled markets where longer ageing can be employed (10 or more days), electrical stimulation is not required where carcases enter rigor (pH 6) between 8°C and 18°C.

Commercialisation Options

- The options for commercialising the research outcomes include:
- Modifying existing industry systems for describing lamb and other sheepmeat to better reflect eating quality, and/or;
- Introducing a new SMEQ trade mark underpinned by technology and quality systems to differentiate “best practice” sheepmeat, and/or;

- Working with companies and supply chains in a more flexible way using a combination of any of the other options to improve their eating quality.

Some of the specific changes to be considered under these options include;

1. The potential to change the current dentition of lamb;
2. The opportunity to change the AUSMEAT language to identify product produced under endorsed eating quality pathways;
3. The potential to use a SMEQ trademark to identify and differentiate SMEQ sheepmeat from non-SMEQ sheepmeat within the trade;
4. If a trademark is adopted, one option is the Meat Standards Australia (MSA) trademark;
5. That MLA provide in-kind support to nominated supply chains to implement and validate SMEQ technology and recommendations over the next twelve months;
6. That MLA works with new and emerging supply chains to implement SMEQ technology on a full cost recovery basis;
7. That MLA provide funding support for brand initiatives of individual enterprises who wish to promote SMEQ hogget and mutton; and
8. That further SMEQ research include, as a matter of priority, measurement of the performance of commercial cuts across a range of animal age groups, cuts and cooking methods.

Conclusions

A range of research and validation trials have identified and confirmed pathways that can be adopted under commercial conditions to improve the eating quality of lamb and sheepmeat.

A discussion paper has been developed that provides a range of options for the commercialisation of the outcomes from the program. MLA is seeking comment from industry in relation to these options prior to commercialising the technology.

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The Fitness of the Future Merino

Norm Adams and Shimin Liu, CSIRO Livestock Industries, PO Wembley WA 6913

ABSTRACT

'Fitness' in the Darwinian sense is recognised by an animal's ability to thrive, grow and reproduce. Genetic correlations show that sheep selected for high fleece weight have less fat and a lower total weight of lambs weaned. Selecting for high meat production probably also reduces fitness. The effect of loss of fitness will be greatest in environments where nutrition is most limiting. Breeding approaches need to be modified to develop the most profitable sheep in terms of both production per head and capacity to survive and reproduce.

INTRODUCTION

Fitness depends on the extent to which an animals' genetics enables it to adapt to the environment. Fitness is particularly important for sheep in WA, where animals deal with harsh and variable seasonal environments.

The cost-price squeeze forces farmers to breed highly productive animals for food and fibre. However, studies across several species of domestic animals show that strong selection pressure for productivity can reduce fitness and increase the incidence of disease (Rauw *et al.* 1998). For example, highly productive dairy cows usually have impaired reproduction; fast-growing broilers have impaired immune function and greater incidence of disease; big lean pigs can have impaired reproduction and health; Angora goats that are very efficient at producing fibre are more subject to cold stress.

Is the sheep industry facing similar problems, as breeders achieve more wool and faster lamb growth rates?

REVIEW

Modern genetics gives us enormous power to quickly improve the productivity of our domestic animals. The emerging capacity to select for single genes with molecular genetics will allow even more rapid changes to populations. We need to use this power carefully, in case unexpected consequences emerge before we recognise them.

Higher productivity can occur if sheep eat more, or alternatively, if they are more efficient at turning their diet into product. Most of the gains come through greater efficiency, but the question is, what do the 'inefficient' animals do with the energy they get from their feed? Evolution has ensured that inefficient animals do not survive, so in fact by breeding animals to be more efficient producers we are re-directing the feed energy that was used by primitive sheep for 'maintenance' towards greater wool or meat production.

Most of the energy in the feed is used by sheep for 'maintenance'. For example, a 50kg sheep must eat 1.36 kg of a good quality dry feed a day just to maintain its normal bodily functions. The remainder of the energy consumed is available for productive activities like growth, fetal development, lactation, etc.

Maintenance energy is used for things like breathing, blood circulation, continual re-building of the body (protein turnover), maintaining homeostasis ('ion pumping'), maintaining immunity, etc. These costs can be substantial; for example, recent research on Rylington Park Merinos has proven that sheep that are genetically resistant to internal parasites do not grow more wool in the presence of parasites. We believe that resistant sheep use the nutrients normally lost to the parasites to mount their immune response.

Fitness and Wool Growth

We are starting to realise that growing wool has a greater impact on the sheep than previously thought. Thus, sheep with a high genetic capacity for fleece weight have a smaller meat turnoff, when compared with low fleece weight sheep at the same liveweight (Cloete *et al.* 2002). Similarly, high fleece weight sheep lay down less fat (ie, the genetic correlation is negative), again indicating that growing wool has a significant effect on energy reserves.

We think the drain on energy caused by growing wool comes about because wool growth rate does not depend on the skin alone. Similar genes control protein turnover in skin and muscle, so selecting sheep with a high protein turnover in skin (resulting in greater wool growth) results in sheep with a higher whole-body protein turnover, requiring more energy than previously thought. We need to take account of this when defining appropriate feeding regimes for wool sheep, to enable them to maintain their fat reserves.

While we are starting to understand the impact of fleece weight on reproduction and growth, we still do not understand the role of fibre diameter. Meat sheep seem to have no problem in growing a lot of wool if the fibre diameter is broad enough (eg, the Romney). More research is needed.

Fitness and Behaviour

Part of the maintenance energy cost comes from the sheep moving around and interacting with its environment. An interesting study by Schutz and Jensen (2001) compared modern broilers with the original jungle fowls from which they were derived. They found that the jungle fowl spent time investigating its surroundings and indulging in 'social interactions', whereas the modern chicken just sat and ate. Indeed, a jungle fowl would ignore food placed in front of it in favour of exploring the environment. The additional energy spent walking around reduced their capacity to gain weight, but Schutz and Jensen suggest that natural selection has ensured that "the energy spent obtaining information from more unpredictable food sources is likely to be outweighed by a long-term more efficient feed intake".

To what extent are these observations applicable to modern sheep production? Early sheep breeders sought constitution, which included demeanour, alertness and vigour (Massy 1990). These could well be important in pastoral areas, but in the agricultural areas we need a highly productive sheep that will just stand and eat between July and February, and a 'primitive' sheep that will seek out feed for the rest of the year. Which part of the year is more important for profit?

CONCLUSION

Some sheep breeders respond to the competition for nutrients between wool and fitness by placing a limit on fleece weight. The dairy industry uses a more sophisticated approach, including fitness traits in their breeding objectives. Many sheep breeders take this approach, although often not in a formalised way. There is huge scope for collaboration between quantitative and traditional approaches to sheep breeding to address this issue.

In summary, the power of modern genetics to alter the genetic makeup makes it urgent to match production with fitness. We need to:

- determine the key fitness characteristics for specific operations: is survival over autumn the key factor, or is it lamb survival, lamb growth, etc? We need to define the economic benefits of these traits for specific environments, so we know how much emphasis to put on each.
- learn the best measures of associated characteristics: what is the role of fat reserves, *vs* body size generally? How important is behaviour?
- define the relationships between the most useful fitness characteristics, productive characteristics, and profitability.

A question outside the scope of this discussion is whether these issues apply in the beef cattle industry. Breeding for low residual feed intake reduces the amount of feed energy that cattle 'waste'. This is undoubtedly more profitable in the feedlot, but does it reduce the capacity of cows to withstand infections or to forage for scarce feed? The jury is out.

KEY WORDS
Adaptation, production, fleece weight, fibre diameter

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PAPER REVIEWED BY: DR A C SCHLINK, MS E N BERMINGHAM

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Ovine Johne's Disease – Managing the Disease, Managing the Issues

PETER BUCKMAN, CHIEF VETERINARY OFFICER, DEPARTMENT OF AGRICULTURE WESTERN AUSTRALIA

ABSTRACT

The finding of Ovine Johne's disease (OJD) in a number of sheep flocks in 2003/04 changed the face of the disease in Western Australia. OJD is now considered to be endemic in the state's sheep flock and not eradicable with current technology. OJD is a slow moving disease that owners can economically manage through biosecurity measures in uninfected flocks and vaccination and flock management in infected flocks.

INTRODUCTION

Ovine Johne's disease (OJD) is a slow moving bacterial disease that infects the intestines of sheep and sometimes goats. Infection is transmitted through animals ingesting feed or water that is contaminated by faeces from infected animals. The disease is seen in a flock as a loss of weight and condition in a proportion of older sheep that do not respond to feeding or treatment.

The disease spreads between from flocks through sheep movements, stray sheep, and the washing of infected faecal material during heavy rain or along slow moving waterways. Only a small proportion of infected sheep develop signs of the disease. In animals that develop signs, the disease is invariably fatal, with death generally occurring three to four months after the onset of clinical signs.

REVIEW

The challenge of OJD

OJD does not behave the same in all flocks. In the most severe cases, it tends to become apparent five to ten years after infection and can lead to annual losses of 20 per cent (1). In less severe cases it may become apparent after 10 to 20 years and is some cases it may not become very apparent at any time.

The nature of OJD means that it can be present in a flock and spread to other flocks before the disease becomes evident in the first flock.

The tests for OJD cannot detect the disease until it is well established and thus a negative test is not a guarantee that a flock is free of the disease.

Western Australian OJD history

Western Australia was declared a Free Zone for OJD in September 1999 under the criteria of the National OJD Standard Definitions and Rules.

Isolated cases of OJD were found in 2000 and 2001. These cases were eradicated by destocking the infected properties and quarantining and testing neighbour and trace properties for up to three years.

Between November 2003 and April 2004, 11 flocks in Western Australia were detected with OJD. As a result, Western Australia no longer met the criteria for a Free Zone.

The 11 infected flocks included a cluster of five neighbouring properties and six properties that purchased sheep from the five properties. None of the 11 flocks is known to be the source of infection in Western Australia.

Between November 2003 and April 2004 the Department of Agriculture invested some $400,000 in investigation, tracing and OJD communication activities, compared to its committed annual investment of $50,000. The evidence from the investigations and disease modeling indicated that OJD had been present in Western Australia for more than ten years and that there was likely to be other infected flocks and hundreds of trace flocks throughout the state.

THE FUTURE

The six year national OJD Control and Evaluation Program terminated on 30 June 2004. The national framework for OJD from July 2004 includes abattoir surveillance to assess area prevalence of OJD, the fee for service flock Market Assurance Program, the availability of vaccine, and a nationally agreed vendor declaration called an OJD Animal Health Statement to describe the risk of sheep being moved.

Nationally, there are varying views on the most appropriate level and proportion of industry and government involvement and funding in the control of OJD. The views range from full- scale abattoir surveillance and an active control program, to no investment of public or industry funds other than for an initial education program.

In April 2004, Western Australia's key industry organisations agreed that the eradication of OJD from Western Australia was not feasible with current technology and favoured a risk based trading management option that harmonises with the national framework.

CONCLUSION

Flock owners can economically manage OJD. The disease does not cause market or production failure, is not considered by health authorities to be a public health issue, and does not affect the environment. As with other manageable production diseases, such as sheep lice and internal parasites, there is no public good economic benefit in public investment in a state control program.

The regulatory control of OJD in an area where the disease has become established is considered to be inappropriate, impractical, uneconomic, and unhelpful. Regulatory control programs in other areas have failed to prevent the spread of OJD and have resulted in severe economic, personal and social stress to owners and all involved.

It is appropriate for the Department of Agriculture and the sheep industry in Western Australia to invest in communication and education to assist the industry adjust to the new environment of OJD being endemic in the state. The risk based trading approach appropriately puts the responsibility for biosecurity measures and risk and disease management with individual sheep owners and their agents, advisors, and stock carriers.

Deciding on the most appropriate prevention or control measures for an individual property will be a business decision based on an assessment of the property's risk of infection for uninfected flocks or level of infection for infected flocks, the flock structure, management and markets, and the owner's aversion to, or acceptance of risk. It is recommended that owners consult their veterinarian on the most appropriate biosecurity risk management procedures for their enterprise and consult their farm management advisor on the level of economic investment to manage their level of risk or disease.

KEY WORDS: Ovine Johne's disease

Acknowledgments: Staff of the Department of Agriculture Western Australia

Paper reviewed by: A.R. Mercy, Manager Animal Health, Department of Agriculture Western Australia

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Animal Welfare – Changes in Latitudes Changes in Attitudes

Michael Paton and Dianne Evans, Western Australian Department of Agriculture.

ABSTRACT

Western Australia now has some of the strictest animal welfare laws in Australia. Western Australian farmers need to be aware of the standards in Codes of Practice, for their own benefit and that of their industry. Standards for the management and transport of sheep are contained in Codes of Practice referred to in regulations of the *Animal Welfare Act 2003*. Animal welfare issues that need to be addressed for the sheep industries include live export, tooth grinding, mulesing, drought strategies and fitness for transport. There issues are important in WA but can also impact on how wool and meat products are perceived by welfare sensitive markets overseas.

INTRODUCTION

During the last 50 years there has been a very significant change in society's concern about animal welfare. This has been most noticeable in Northern Europe. This is significant to Australians from two standpoints. The discussion and actions on animal welfare issues in Europe have lead to like–minded people expressing the same concerns or carrying out the same actions here. Western Australia exports three times the proportion of its lamb to Europe compared to Australia as a whole and animal welfare is an issue that concerns some buyers of lamb and other sheep products.

The scientific assessment of animal welfare involves diverse elements that need to be considered together and weighing these elements often involves value-based assumptions. One of the more practical solutions to advance animal welfare is to accept existing benchmarks and embark on a sustainable program of incremental improvement based on scientific knowledge. This is a positive approach to address legitimate concerns and demonstrate a commitment to welfare rather than to be forced to adopt changes promoted by activists based on philosophy.

REVIEW

Legislation

In 2003, WA's new Animal Welfare Act was enacted. This replaced the badly outdated *Prevention of Cruelty to Animals Act 1920.* The new act set very broad definitions of cruelty and then moderates these with a series of defenses. Critical in this series of defenses are the Codes of Practice, which are documents authored by the Animal Welfare Working Group. This group has membership from all Australian States and Territories and New Zealand.

This new legislation is largely enforced by General Inspectors (GI) who are employed by the RSPCA, Local Governments, the Department of Agriculture (DA) and others. The DA has appointed 10 GIs in pastoral areas where their primary role is to ensure codes of practice are being adhered to in interstate transport. Five of these inspectors inspect stock for interstate transport and others for intrastate transport. One GI has also been appointed in the metropolitan area to monitor livestock transport to Fremantle Port.

Codes of Practice

Codes of Practice are developed by using the most recent scientific knowledge and an extensive consultation process with industry bodies and animal welfare groups. The principal codes of interest to the sheep industries are the current Codes of Practice for sheep and sheep transport. The transport code for sheep is currently being reviewed and it is likely that the sheep code will be reviewed in the next 2-3 years. Farming groups in Western Australia have already provided input into the sheep transport code and this process is continuing and the opportunity for further input will occur.

The code of practice for sheep transport and its enforcement were highlighted in a 60 Minutes TV program on the live export industry shown in March this year. This program indicated that maximum travel times in the code of practice were being exceeded in some sheep coming from Queensland for live export. This focused attention on how these codes were being enforced. Sheep being exported from Western Australia are rarely trucked for more than 7 hours to a feedlot. However, there are public perceptions that

transport of sheep from feedlot to wharf sometimes leads to unnecessary injury or other welfare problems. The surveillance of this section of the live export industry is being carried out by the DA.

Fitness for Transport

One issue that is the subject of a number of complaints from Midland and other saleyards is 'fitness for transport'. There are several conditions, which are described in the Code of Practice, which preclude an animal from being transported. For example sheep that are more than four months pregnant or cannot stand up cannot be transported except for emergency treatment. Following a joint industry, Department and RSPCA forum held in Katanninng in March to discuss this issue, a ute guide has been designed and should be available this year.

Present and Future Risks

The future of live exports of sheep and cattle from Australia is at risk because of several incidents in this industry in recent years. The Keniry Report has made 8 recommendations, which the Federal Government is in the process of implementing. These include a comprehensive review of the standards and codes of practice in the industry.

Other animal welfare risks for the sheep industries include some practices which are allowed in codes of practice such as mulesing and practices which are not allowed or discouraged by codes of practice such as tooth grinding.

Mulesing project

Mulesing has been identified as one of five extremely important animal welfare issues following an extensive consultative process involving industry, welfare groups and scientists undertaken by the Animal Welfare Centre based at Werribee, Victoria (1). The focus on mulesing has increased recently mainly due to the campaign undertaken by the US based animal rights group, PETA (People for the Ethical Treatment of Animals) which has demanded that the Australian government take action to ban both live sheep export and mulesing by October 2004 (2). There are short, intermediate and long term aspects that need considering in relation to mulesing.

It is important that mulesing is performed by competent, skilled and trained operators as assessments of adult sheep indicate there is wide variation in mulesing, with a small proportion being mulesed to the recommended standard. Formal training programs have been developed in NSW and will be extended to other states over the next three years as part of a national project funded by Australian Wool Innovations. Essential criteria for accreditation include not cutting bare skin and muscle fascia, docking the tail at the third joint and leaving a 'v' piece of wool bearing skin 1/3-2/3 down the tail. With most producers now likely to be retaining ewes longer, tail length and vulval protection from cancer are likely to become increasingly important.

Another important component of the national mulesing project is to determine the most cost-effective options for managing blowflies without mulesing. Providing technical information explaining the practical aspects of manipulating key management factors that influence flystrike susceptibility, may decrease the reliance on mulesing. Very little work has been done to determine the feasibility and potential costs of not mulesing and incorporating other changes to the production system. This information would be very useful in the event of mulesing becoming restricted in the near future, as well as for those producers who voluntarily wish to reduce their reliance on surgical mulesing. Efforts to replace surgical mulesing are being undertaken by CSIRO in Queensland and a University of Adelaide project showing some promise of an alternative option becoming available commercially within the next five years.

In relation to long term solutions, genetic selection may offer some benefits (3). It is unlikely that genetic improvement alone would provide the ultimate solution to this issue but in combination with other strategies, it may greatly reduce ongoing costs of blowfly control. Research done in New Zealand has demonstrated a reduction in flystrike incidence as well as significant cost savings through selecting for bare breech and short tail characteristics (4). Despite a reduction in wool cut (mainly of lower value wool), significant cost savings can be made by shearing sheep with clean points, belly and breech, as the time taken for shearing can be reduced by about half.

Tooth Grinding

Tooth grinding is a practice that is discouraged by the current sheep code of practice. Significant research has been done on this practice. Many farmers are convinced that it will help sheep, particularly full mouthed and broken mouthed sheep. Research conducted in Victoria, NSW, WA, NZ and the UK has failed to show any justification for tooth clipping or grinding of sheep (5). The procedure is banned in NSW under the Prevention of Cruelty to Animals Act, because it has no demonstrated benefit and it does cause some low intensity discomfort.

The WA and national Codes of Practice for the welfare of sheep state that 'Both teeth grinding and teeth trimming have the potential for causing acute and chronic pain in some animals. In the absence of sound evidence on the benefits of teeth grinding and teeth trimming, they cannot be recommended as routine flock management procedures. ' Therefore anyone practising teeth grinding or trimming on sheep in WA may be at risk of prosecution, as they cannot look to the Code of Practice as a defence for this procedure.

CONCLUSION

There is clear change in public attitudes towards animal welfare. The sheep industry needs to be aware of the current animal welfare risks to a successful future. This will involve significant investment in research and development into such issues as mulesing. The development and implementation of codes for the welfare of sheep during live export will help to give this industry a more certain future.

Animal welfare policy makers need to avoid following some European countries in setting animal welfare standards that make industries unviable. This can result in countries with the highest animal welfare standards having to import products from countries where production systems have much lower welfare standards. This can result in an overall decrease in global animal welfare standards.

At present the industry could assist in ensuring that codes of practices are being adhered to in the transport and other areas. The industry could also ensure that it is familiar with the changes proposed for the Code of Practice for the land transport of sheep and any review that may occur of the code of practice for sheep.

KEY WORDS

Animal Welfare, Codes of Practice, Live export, Mulesing.

Paper reviewed by: Richard Norris

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Live Sheep Exports

JOHN EDWARDS. CHAIRMAN, WESTERN AUSTRALIAN LIVE SHEEP EXPORTERS ASSOCIATION

Much has been written in recent times about the competency and execution of the live sheep export trade to the Middle East.

The trades pivotal importance to sheep producers in Western Australia cannot be under estimated. In 2003 this state supplied 64% of total numbers (4.75 million) exported live from Australia, worth $ 219 million to the W.A rural economy.

The economic significance of the trade whilst it highlights the success of the industry in the promotion and marketing of Australian livestock, the year 2003 was nevertheless one marked by major difficulties and stresses for the trade.

An article published by a European animal rights activist published in the Australian Veterinary Journal, followed by three 60 Minutes programs aired nationally alleging mistreatment of Australian live sheep onboard livestock vessels, in land transport in the Middle East and in abattoirs throughout the region along with the unjustified rejection of 57,000 sheep aboard the Cormo Express by Saudi Arabian authorities have all been a series of events potentially having catastrophic effects for the future of the trade.

The fallout here in Australia has been extensive and has been greatly aggravated by an intensive and ill-informed and ill-directed campaign in the media and by the Animal Welfare Sector. This vindictive and irresponsible campaign included many inaccuracies much of which centred around their media publicity which indicated that mortality rates on livestock shipments to the Middle East had sky rocketed in recent years. Figures forthcoming in this presentation will show the facts of course are quite different. There was also a blatant disregard of the earlier broad and very effective programs driven and funded by Australian Industry, with Government support directed towards the improvement of animal welfare and handling practices in our various customer countries.

Whilst our industry continues to be in the glare of the public and political spotlight, let it be known that these series of events were as disturbing to us as exporters as they were to you (assembled guests). The livestock export industry does not shirk its responsibilities in any manner or form towards upholding the highest standards of care and attention to any livestock shipment and apart from the obvious commercial incentive for exporters to be obligated and committed to animal welfare, there is also our moral and ethical commitment. There is no financial incentive to mistreat livestock as exporters are only paid on the number of live and healthy animals delivered.

Our industry strives for improved animal welfare outcomes in every aspect of the live export business. The major measure of this would be mortalities on ships and since the early 1990's there has been a strong trend in reducing mortalities as evidenced by Table 1.

The total death rate for all sheep exported to all destinations (including south East Asia) from Western Australia during 2003 was 0.77% (see Table 2).

For voyages to the Middle East, if the deaths on the Cormo Express after it was rejected in Saudi Arabia are included the discharge mortality for all shipments from Fremantle was 0.38%.

Table 1.

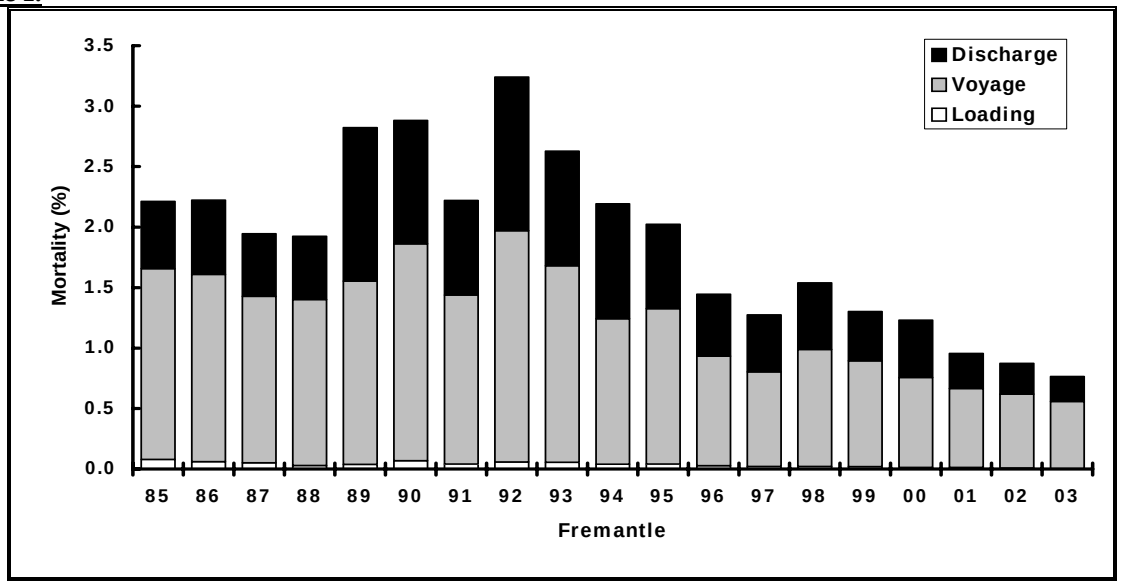

Table 2.

		Death rate (%)			
	Year	Load	Voyage	Discharge	Total
Fremantle	2000	0.01	0.74	0.47	1.23
	2001	0.01	0.65	0.29	0.96
	2002	0.01	0.61	0.26	0.88
	2003	0.00	0.56	0.21†	0.77†

† Excludes deaths on the MV Cormo Express after it was rejected at Saudi Arabia

These measurements indicate a very respectable level of operational competence and it is clear from the figures that the industry is getting better each year as to its performance in this area.

This is not surprising, as the industry must comply with a large number of standards and regulations governing operational competence.

Combined with an oversight by AQIS and co-regulation with Government Authorities, the live export industry through rules and standards embodied in the Industry's Quality Assurance Program (LEAP) and ALES (Australian Live Export Standards), governs the manner under which all exporters must operate.

These compliance and standards measures have been developed from a combination of practical industry experience and scientific knowledge gained from decades of research involving the live stock export trade.

Exporters must also adhere to rulings determined by the Federal Governments Australian Maritime Safety Authority's Marine Orders 43, which governs ship related requirements for the safe carriage of livestock as cargo. The detail in these orders has been determined through consultation with industry at large, the RSPCA and federal and state veterinary specialists.

In the face of the fallout from recent adverse media campaigns, industry has moved very quickly to address positively defects in LEAP and ALES and the demands of Government and broader industry for a totally independent organisation to set, maintain and administer an effective set of standards for live export.

After broad consultation with government and industry an expanded Standards Management Group (SMG) has been put in place and includes representation from the production sector, AQIS, Animal Welfare, State Government and Exporters.

There will also be a Compliance Group, which will be responsible to the SMG for investigation of non-compliance with industry standards with ultimate responsibility for disciplinary action resting on AQIS.

Similarly; arising from the Governments Independent (Keniry) review of the Livestock Export Trade earlier this year, an expert reference group in consultation with industry stakeholders have developed The Interim Australian Code for the Export of Livestock.

The Codes will provide a framework for the development of national standards that will apply at each stage of the export chain from property's of origin to discharge of animals in importing country's. To ensure that the interim codes and supporting standards (namely LEAP, ALES, AMSA Orders etc) are uniformly applied, the standards will be underpinned by State, Territory and National legislation, together with the appropriate regulatory and administrative systems of audit and verification.

These codes will be further developed with a view to completing a final code and supporting standards by the end of 2004.

In all of this, the live export industry remains very pro-active and has had ongoing Research & Development programs for many years now researching ways of perfecting operational performance especially in the fields of animal welfare.

Amongst the upheaval of 2003, it has been a matter of disappointment to all exporters in the lack of recognition of the very responsible and positive programs which the industry has financed and implemented and continues to implement.

None are more conscious than live exporters of the need for and adoption and maintenance of the best possible animal welfare practices, and the absolute importance of such practices to the their own businesses.

Since 1999 over $ 4.5 million in joint funding (Livecorp & MLA) has been spent addressing shipboard ventilation efficacy, animal heat stress, minimisation of ammonia production, odour and noise on ships, use of electrolytes, risk management computer modeling and animal disease control (salmonellae in feedlots) including best practices procedures to name a few.

This truly innovative and coordinated approach to R & D has seen the program deliver more outcomes in the last three years than has ever been the case.

The industry is also putting major effort and money into collaborative programs with our live export customer countries to ensure that animal welfare standards are improved significantly. Skills and technology transfer initiatives are being undertaken in close collaboration with Middle East authorities and customers as a means to bringing about change in the way animals are treated, handled and processed.

Improvement programs throughout the Middle East sheep markets are ongoing and have included:

- Provision of sheep unloading facilities for vessels at ports of discharge
- Assistance in building, modification or management of feedlots and abattoirs.
- Training programmes to assist in the transfer of skills and experience in animal handling and processing
- Technology transfer to assist with improved methods of restraining live stock and humane slaughter.

At the same time industry is mindful that we cannot impose on our customers, Australian values and culture and so the "philosophy of progress through collaboration" is adopted as a means to steadily improving animal welfare in countries supplied by Australia's live sheep export trade.

THE FUTURE OF THE TRADE

For sure we will have a different trade in the future. It will be governed by more science and research than ever before, the result of the millions of dollars of producer and exporter funds being directed into research and development.

Industry standards will continue to be reviewed and updated with the objective of not only having good QA and accountabilities, roles and responsibilities along the whole export chain but also to have good risk management processes to ensure that unacceptably high risk shipments are never loaded.

Animal welfare will continue to be a priority for the industry, it has to be or there would be not be an industry.

Forecasters are predicting a gradual increase in numbers produced and numbers exported, however it will take a resilient industry to realise those projections especially given the impact of recent years drought on the size of the flock and constant variables in an uncertain trading environment.

Our sheep markets continue to be buffeted by a myriad of different factors and as the live sheep export trade continues to endure:

- fluctuating currency values
- economic downturn in some of the various customer country's
- supply difficulties in securing the volumes of animals needed to sustain economic shipping activity
- stronger competition from the African and South American Livestock Trade.
- substitution of goat, beef and poultry for high priced Australian sheep,

Such impediments will continue to impact on the growth and opportunities of trade in live sheep between Australia and the Middle East.

At the same time the trade is and will continue to be vulnerable to changes in disease status and on volatile economic and political environments, particularly wild swings in oil prices and disruptive conflict.

In combination with recent events, the most significant being the cessation of exports to Saudi Arabia, the outlook is for subdued market prospects in live sheep sales throughout the Middle East well into 2005.

No new market opportunities for live sheep have been identified and existing markets have limited capacity to improve, though it is felt that possibly with Saudi Arabia out and export sheep prices back, some markets may now have opportunities to better compete for available numbers.

Like waves, future challenges keep rolling in but it is comforting to know that Australian sheep producers and exporters have a strong relationship and a good reputation within the Middle East and that while certain incidents may have dented our image, it is up to all participants to be proactive towards sustaining the trade.

If Australia was to cease exporting live sheep, our customers in the Middle East because of cultural and religious sentiments are not going to stop buying live sheep - they will simply purchase their requirements from other countries. Country's such as Sudan, Somalia, South America and others all supply sheep to the Middle East but do not invest in programs to improve the welfare of livestock imported into the region. Should Australia withdraw from the livestock export trade, the biggest loser will be animal welfare in our customer countries.

Customising to the Needs of the Customer – Insights from the New Zealand Merino Experience

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Background and Introduction

For the past 8-9 years, New Zealand's Merino growers have invested in and developed a distinct identity for their fibre. This has been achieved through relationships with key commercial partners, within specialised market segments.

To drive this strategy a distinct ingredient brand was developed and is used to differentiate 100% New Zealand Merino product in some of these markets. Other partners have developed 100% pure New Zealand Merino ranges within their overall programmes, while some have used the fibre in blended form.

During this time, the vehicle and mechanism for driving this marketing activity have changed dramatically. Starting life as a levy-funded marketing organization, the then 'Merino New Zealand Limited', was fully commercialised into 'The New Zealand Merino Company Limited' (NZM) three years ago. It now generates its revenue not via levy, but via commercial wool selling activity. Currently, NZM sells approximately 65-70% of the Merino wool produced in New Zealand.

The New Zealand Merino Model

NZM has three key areas of business activity; commercial (wool selling and grower servicing), marketing and innovation. Central to NZM's success has been the integration of these areas of activity, ensuring innovative outcomes with respect to the products and services it delivers. More importantly, this integration ensures the generation of demand 'pull' for New Zealand Merino fibre, providing enhanced services to NZM's two customer groups: Merino growers and post-farm Merino users.

Of the Merino fibre sold by NZM, 60% is sold through auction and 40% is sold via direct supply contracts of up to 3 years to a number of partners at various stages throughout the wool textile supply chain. The proportion of forward contract sales has increased dramatically over the last 5 years and NZM wishes to see this grow further.

This change in transaction method from auction to contract is central to NZM's innovative business model, which is built around the power of relationships and knowledge in the value chain. The approach underpins NZM's ability to add and capture value through processes of customisation of raw wool supply to end-user requirements. The approach is a significant shift from the 'averaging' which has characterised the wool industry and undermined wool's competitive position as a textile fibre.

Marketing activity centres on the development of collaborative marketing programmes with key commercial partners in the value chain. It is designed to generate demand for New Zealand Merino wool at point of sale through a demand 'pull' strategy, developed in conjunction with the retail/brand partner. Marketing support is linked to the supply of raw material through NZM's commercial activities.

Between NZM's marketing and innovation activity, lies the growing area of technical marketing, which draws on input from both. NZM works with end-user partners and with science and technology providers to identify the Merino fibre's attributes and benefits, and to develop tools which explain these effectively to the consumer. NZM then supports its customers, their staff, distributors and agents, through integrated training and education programmes both domestically and offshore.

NZM's research and innovation programme seeks to develop new uses for, and develop new products from, Merino fibre. The model is similar to that used by NZM for marketing support in that we link with key supply chain partners to generate market focus for the innovation and development work. Once key research questions are determined through this process, we partner with appropriate research providers to address these.

Research and innovation also supports grower servicing activity through the development of education and training initiatives for both growers and classers, and the development of various grower tools. These may take the form of hard-copy analyses and workbooks or pieces of software to assist with business decision-making.

Summary and conclusion

Through the vision of New Zealand's Merino growers and their sustained support over a significant period of time, NZM has been able to develop a distinct identity for it's Merino fibre, within specialised market niches. Through linking to partners via direct supply contracts, the transactional benefit from these relationships can be delivered back to New Zealand's Merino growers. Finally, through the development of high quality services to accompany these transactions, long-term relationships with valuable, growing markets, can be established.

Agribusiness Sheep Updates Conference -Economic and Financial Market Update

Alan Langford, Economist, BankWest

The global economy, including

- Geopolitical risks
- Wall Street
- Bond markets
- **Realignment of major exchange rates**
- Japan's renaissance?
- Europe
- China
- Trade reform

The national economy, including

- The interaction of monetary and fiscal policies in an election year,
- Inflation
- The influence of the US bond market
- **The Australian dollar**
- **Commodity prices**

Breeding Wool to Address Consumer Requirements in Fabrics

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ABSTRACT

It is possible to breed directly to reduce fabric shrinkage. A huge variation of 41.8% was found between individual sheep in fabric shrinkage. A selection program would enable wool growers to overcome one of the main consumer complaints about wool, without the need to use the current, environmentally-unfriendly chemical processes.

INTRODUCTION

When asked about fabrics preferences, consumers require soft next to skin (19%), machine washability (13%), shape retention (12%), light weight fabric (11%), resists pilling (10%), soft to handle (10%), crease resistant (9%), easy ironing (9%), tumble drying (6%), and other factors (1%)[1]. There is a disconnection between wool breeding strategies and consumer requirements from fabric. Sheep are selected for fleece weight and fibre diameter (effecting fabric softness and weight) plus parameters effecting top making, not directly for factors that affect consumers. Felt ball diameter (FBD) is generally used by the textile industry to screen shrinkproofing treatment [2]. For Romney's there is a significant correlation between FBD and yarn shrinkage. Sire effects accounted for 6% and 12% of the variation in FBD and yarn shrinkage, respectively [3]. Since 2000 [4], we have investigated the feasibility of breeding for fabric traits of interest to consumers.

REVIEW

FBD of wool has a heritability of 0.62 in Merino sheep [5]. However, FBD is strongly correlated with fibre diameter, fibre curvature and other fibre traits that are also heritable. Adjustment of the heritability of FBD for these correlated raw wool traits resulted in a moderate heritability of 0.38. This indicates that wool FBD is heritable and that it is independent of other wool and fibre traits and should respond to selection.

Studies with Romney wool [3] found that FBD was a significant predictor of shrinkage in hand-spun yarn. In addition, significant differences were found between sire progeny groups that indicate genetic differences exist for yarn shrinkage. In the discussion of this work [3] it was also pointed out that there was considerable debate in the literature of the relationships between loose wool felting, yarn and fabric shrinkage outcomes. Hunter *et al.* [6] in a study of the processing performance of wool lots found that incorporation of FBD resulted in a better prediction of fabric shrinkage than when either staple crimp or resistance to compression were used. These wools had an average felt shrinkage of 40.8% with a coefficient of variation of 30.6% for single jersey fabric.

A bench-top rotor spinning system was used to process 45 mid-side wool samples (30 g clean, scoured fibre) to yarn (Schlink *et al*., unpublished). The yarn produced was 10 Nm with 658 tpm and was knitted as a single jersey fabric for wash shrinkage testing using Wascator, and fabric pilling using the Atlas random pill tester. The washing felt shrinkage is reported for two 5A wash cycles, equivalent to the Woolmark's requirement for machine washable knitted sweaters.

Fabric shrinkage averaged 11% with a 41.3% coefficient of variation. Figure 1 illustrates the variation within this population. Fabric shrinkage was correlated with fibre diameter, curvature and FBD. Multiple regression analysis found that only FBD and curvature made a significant contribution to prediction of fabric shrinkage and accounted for 32.3% of the variation.

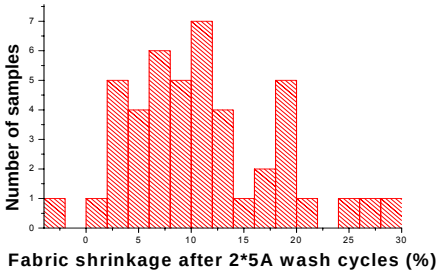

Figure 1. Histogram of the variation in fabric shrinkage from 45 mid-side fleece samples.

Breeding directly for fabric performance

A simulation study was carried out to determine the genetic gains in fabric shrinkage by selecting on FBD or on FBD adjusted for fibre diameter and fibre curvature as compared to selection on fabric shrinkage given the variation in Figure 1. A selection intensity of one standard deviation was assumed, equivalent to the top 34% of the flock. The genetic gains in FBD were used to predict fabric shrinkage using known relationships [Greeff *et al*., unpublished]. These results were then used to predict the heritability for fabric shrinkage to obtain the same genetic progress in fabric shrinkage (Table 1).

Table 1. Predicted genetic gains for fabric shrinkage using FBD or fabric shrinkage measurements.

	Selecting on Unadjusted FBD	Selecting on Adjusted FBD	Selecting on fabric shrinkage
Mean	25 mm	25 mm	11 %
SD	2.25 mm	1.13 mm	4.56 %
Heritability	0.68	0.38	0.095
Genetic gain in FBD/generation	1.53	0.43	----
Genetic gain in fabric shrinkage	-0.84	-0.45	-0.45

Predicted genetic response in fabric shrinkage was –0.84% per generation when FBD was not adjusted for other correlated traits (Table 1). However, as FBD is strongly correlated to fibre curvature and moderately to fibre diameter, it is predicted that correlated changes will occur in these two traits. Using adjusted FBD parameters, fabric shrinkage is predicted to reduce by -0.45% per generation, assuming no unfavourable correlated responses in these two traits. Table 1 indicates that heritability of fabric shrinkage needs to be 0.095 to achieve the same response in fabric shrinkage. Thus, heritability estimations higher than 9.5% will result in faster genetic gains in reducing fabric shrinkage.

KEY WORDS

Breeding, fabric shrinkage

ACKNOWLEDGMENTS

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Paper reviewed by: N. Adams, E. Bermingham

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Price Penalties for Dark Fibre Contamination

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ABSTRACT

Dark fibre contamination as indicated by a Y1 qualifier in the AWEX-ID discounted the clean price paid for Merino fleece lots by 7.6%. This is equivalent to a loss of $580 over a 10 bale lot. Therefore it is imperative that potentially contaminated wool be isolated to avoid the discount being applied to the entire clip.

INTRODUCTION

Since the introduction and use of exotic sheep breeds in Western Australia, there has been considerable concern over the impact of dark fibre contamination on the price achieved for white Merino wool. This paper estimates the discount applied to Merino fleece lots identified as containing black or grey fibre (Y1 in the AWEX-ID) and sold at auction in Fremantle.

METHOD

Along with the lot description (brand, number of bales etc.) and raw wool measurements (diameter, yield, vegetable matter, staple length and strength etc.), sale lots presented for auction are described by the industry standard AWEX-ID. The AWEX-ID, or Australian Wool Exchange Identification, describes the breed, category (fleece, pieces, etc.), style and vegetable matter type for a sale lot. Appended to these mandatory components of the ID are qualifiers that describe other characteristics of the lot. These include both unscaled qualifiers like scourable colour (M), and necks (E) plus scaled qualifiers like unscourable colour (H), dark stain (S), black & grey (Y) and Kemp (P). Scaled qualifiers include a 1 (light/odd), 2 (medium) or 3 (heavy/line of …) so, for example, a Y1 means light black & grey fibre observed in the display sample.

A price model was estimated using fully measured un-discounted (no qualifiers) Merino fleece lots of best and good topmaking styles for all sale weeks between January 2003 and March 2004, and sold in Fremantle. This model took account of week of sale, style, diameter, length, strength, etc. Lots with qualifiers were excluded to avoid confounding the analysis.

The price model was then used to estimate price for each fleece lot with a Y1 qualifier and no other qualifiers. The difference between this price, the price expected in the absence of a Y1 qualifier, and the actual price achieved at auction is a measure of the discount attributed to the presence of light ‘black & grey’ fibre. It was not possible to estimate meaningful Y2 or Y3 discounts due to a lack of measured lots with these qualifiers and no other qualifiers.

This analysis excludes non fleece lots and lots sold by tender.

RESULTS

For the 15 months of data analysed, over 23,000 sale lots were suitable for inclusion in the price model. A further 143 sale lots were found to be fully measured, of best or good topmaking style and with a Y1 qualifier only. The average discount due to Y1 (‘black and grey’) by quarter and diameter is presented in Table 1. Across all diameters and periods, the average discount was 7.6% or 55 cents per clean kg (based on Western Market Indicator (WMI) = 727, 2-Apr-2004).

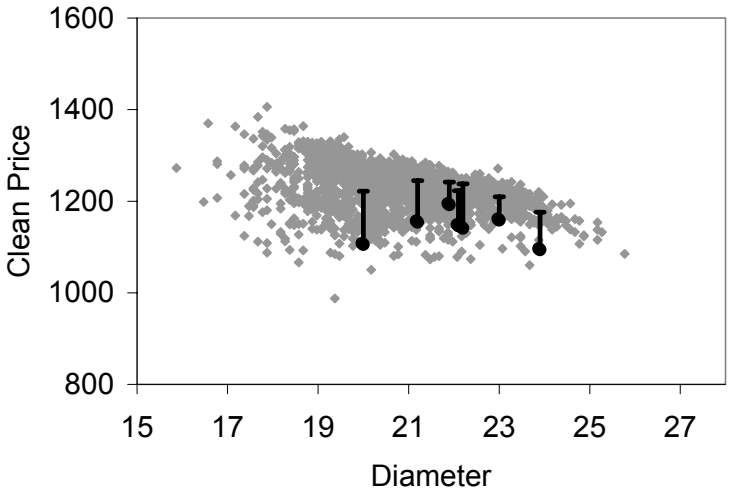
The discounts estimated appear to have declined over the period analysed, though the low number of lots available means this cannot be stated with confidence. A similar analysis of lots presented for auction between July 2000 and October 2002 had discounts of 15% at 20 µm, 16% at 21 µm and 8% at 22 µm.

Figure 1 shows the variation in price for individual Merino fleece lots. Each grey dot on the figure is a single sale lot sold during February 2003. The slope of the upper surface of the grey area indicates the variation in price due to diameter. The vertical spread reflects differences in style, length, strength etc. These differences are taken in to account by the pricing model used to estimate prices for the Y1 lots (black dots). The vertical bars show the difference between the estimated price and the actual price, that is the discount due to the Y1 qualifier.

Table 1. Average discount attributed to Y1 (black & grey) by diameter.

Diameter	19 µm	20 µm	21 µm	22 µm	23 µm	24 µm
Jan-2003 to Mar-2004	**9%**	**8%**	**8%**	**7%**	**8%**	**5%**
Jan-Mar 2003	16%	10%	**12%**	**7%**	**13%**	7%
Apr-Jun 2003	10%	**15%**	**13%**	**12%**	8%	
Jul-Sep 2003	14%	**7%**	**6%**	**6%**	**8%**	8%
Oct-Dec 2003	**5%**	**4%**	**5%**	**10%**	**6%**	9%
Jan-Mar 2004		**8%**	**7%**	**5%**	**8%**	**4%**
Count	6	20	49	49	19	11

Figure 1. Clean price versus diameter for all Merino fleece lots offered at auction (shown in grey) and Y1 ('black & grey') lots (shown as black dots). The vertical bars represent the estimated discount, the top of the bar being the price estimated for that lot using the pricing model. Data for February 2003.



For a 10 bale fleece line valued at 727 cents/kg clean (WMI, 2-Apr-2004), a Y1 qualifier reduces total value by $580. Isolation of contaminated wool is crucial to avoid the entire clip being discounted.

CONCLUSION

For Merino fleece lots, it is possible to estimate the discount associated with a 'black or grey' Y1 qualifier. For the period January 2003 through February 2004, this discount averaged 7.6% but varied over time. It is therefore imperative to identify and isolate any wool that may be at risk of containing dark fibre contamination to avoid having the entire clip discounted.

KEY WORDS

Black or grey wool; Dark fibre contamination;

ACKNOWLEDGMENTS

The skilled technical support of Lindy Coss in completing the statistical analysis is greatly appreciated.

Paper reviewed by: John H Stanton

Fibre Contribution to Retail Demand for Knitwear

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ABSTRACT

A benchmark study of 168 knitwear garments was undertaken to determine if manipulation of fibre properties would increase garment demand. Consumers detected fibre property differences between garments. Wool producers can modify fibre properties to increase consumer demand for a garment.

INTRODUCTION

Wool producers and retailers share a common and unambiguous goal of increasing demand for wool garments. For demand to increase, wool producers need to understand the contribution of fibre properties to consumer demand. Retailers need to understand the contribution of fibre properties to consumer evaluation of garments in order to reengineer product lines to increase demand. Therefore wool producers and retailers need to identify fibre properties influencing retail demand of a garment.

Essential target information from retail markets is not being provided for production and marketing decisions that wool growers need to make. "Market requirements" are poorly represented in auction price signals, where signals are transient at best, and are often confused by the trading environment. Hence there is a need to develop a system that directly links market requirements to the wool producer. Benchmarking of retail garments offers one link to market requirements.

Next-to-skin knitwear has been identified as a significant and growing retail market segment. Naylor (1995) has shown that some fibre properties generate wearer responses. This market is reported to have a preference for reduction in average fibre diameter, and lighter weight fabrics.

It is our hypothesis that manipulation of the fibre properties can increase the demand for wool garments in the next-to-skin knitwear market segment.

METHOD

A benchmark study was undertaken to examine fabric, yarn and fibre properties of garments in demand by mainstream customers. Knitwear garments with next-to-skin design elements were bought from the UK, Italy, USA, Japan, China and Australia. Design elements included high turtle neck collars, zippered collars, labels indicating active wear to be worn under heavier garments or underwear. Both menswear and womens wear garments were sourced from casual wear, active wear and underwear ranges. The collection was restricted to garments with wool content greater than 85%. A total of 168 garments were purchased, 148 being pure wool.

Appraisal of fabrics (swatches cut from each garment) was undertaken to determine consumer preference for the fabrics. Appraisers were untrained. Each appraiser compared 3 fabrics and one standard fabric that was common to all appraisers testing fabrics from the collection. Handle and comfort were appraised without the appraiser seeing the fabrics. The appraiser was then shown the fabric and asked to judge appearance and then rank fabrics on the overall response to the fabric.

Physical testing was done to determine fabric and yarn properties. Fibres were extracted to determine fibre diameter and curvature properties. Fibre length measurements were not undertaken in this study. Statistical analyses of the relationship between appraisal results and fibre properties are reported. A set of desirable 'target' fabrics based on appraisal were identified by cluster analysis - appraisal averages were high and ranges low for all appraisals (handle, comfort, appearance, overall).

RESULTS

Fabrics were partitioned into appraisal classes based on overall appraisal average. Differences in fibre measurements of fabrics between appraisal classes are significant and change across all classes (Table 1). This allows fibre specifications to be to be used to predict overall appraisal class. However the interaction between fibre measurement and fabric results are not simply related to appraisal. For example, target fabrics which are highly desirable to appraisers are not constrained to low average fibre diameter or lightweight fabrics (Figure 1).

Table 1: Mean fibre measurements for overall appraisal classes from -2 (worst) to 2 (best) (n=168).

		Overall appraisal class					
Fibre measurement		-2	-1	0	1	2	All fabrics
Average fibre diameter	µm	22	20.9	20.8	20	19.7	20.5
Std Dev of FD	µm	5	5	4.8	4.6	4.6	4.8
CV of FD	%	22.9	24.2	23.3	22.8	23.8	23.3
D5%	%	9.6	9.4	9	8.5	8.6	8.9
Prickle factor	%	7.9	6.1	5.3	3.7	3.2	4.8
Spinning fineness	µm	21.8	20.9	20.7	19.8	19.6	20.4
Curvature	Deg/mm	90	88	92	96	100	94
Count		3	22	79	43	21	168

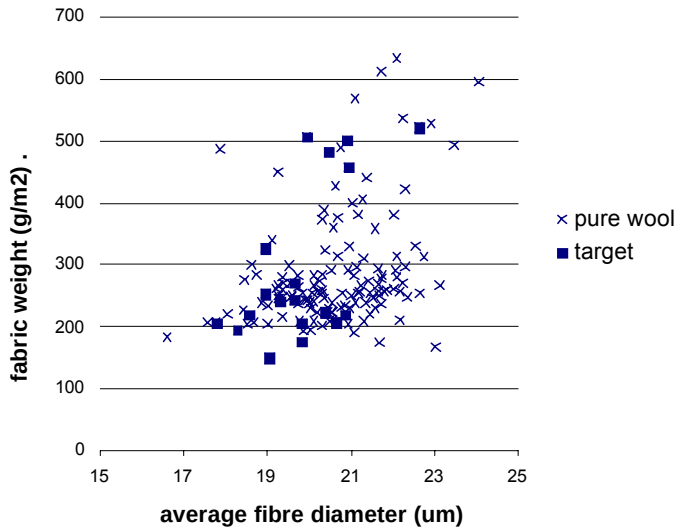

Figure 1: Average fibre diameter and fabric weight for 148 pure wool fabrics, target fabrics are identified.

CONCLUSION

Untrained appraisers can detect differences in fibre characteristics when handling fabrics even across a wide range of fabric weights and structures. Fibre characteristics are different between the different appraisal classes. The mechanism acting between fibre and fabric results is not explained simply.

We acknowledge that appraisals in this paper were conducted on garment fabrics and this is only one component considered by a consumer at the point of sale. Hence appraisal by wearing a garment is now a target for our research program.

KEY WORDS

Next-to-skin knitwear; benchmarking; appraisal; fibre characteristics; wool;

ACKNOWLEDGMENTS

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Paper reviewed by: Kimbal Curtis

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Sustainable Merino, is this the Future for Merino?

Stuart Adams, iZWool International P/L

ABSTRACT

During 2003 a joint project between iZWool International Pty Ltd, an Australian private merino wool marketing and supply chain management company, and CSIRO Division of Fibre and Textile Technology was successful in producing three merino wool jersey fabrics in compliance with the European Union Ecolabel, a worldwide first. The initiative was part of a process to establish an environmental assurance program for Australian merino wool. The project demonstrated the mechanism and success of a proactive merino wool supply chain community and the opportunities for an intelligent approach to developing sustainable markets for merino wool.

INTRODUCTION

The core business for iZWool is to promote sustainable merino wool under the brand of “i-merino” (abbreviation of intelligent merino) into the European and North American outdoor and adventure apparel market. We understand the need for responsible use of our natural resources, and combining the correct use of production, we deliver merino garments that leave small environmental footprints. We believe this is an intelligent approach to producing high quality performance based merino wool garments.

There is growing demand for sustainable and organically produced fibre in the general apparel market, and at the same time there is a steady increase in the use of merino wool in the outdoor market. Merino wool is a natural fibre with unique performance characteristics that make it very desirable for performance outdoor apparel. We believe merino wool is the most sustainable performance fibre available.

The process of delivering the fibre to the market is the key to developing the opportunity. This requires production transparency and consumer education. Consumers must be confident in the process of the production.

The impetus behind the project for sustainable merino concentrates on the opportunity to supply certified “Eco” friendly merino wool into the global outdoor industry. iZWool has created a series of three base layer fabrics suitable for outdoor apparel and complying with the EU Ecolabel criteria, the fabrics were certified to carry the label in December 2003. This is a great start in the direction of achieving a certified sustainable merino fibre.

The EU Ecolabel has appealed to us because of the practical approach and the consideration of the entire life cycle of the product. The establishment of the EU Ecolabel criteria is achieved with the input of industry and non government organisations including Europe-wide consumer and environmental groups, providing the label with independence and credibility.

REVIEW

iZWool has been supplying merino base layer fabrics to global outdoor clients for the last three years. Our clients have made it quite clear they want a certified sustainable line of merino fabrics. We had the choice of creating our own standards or working with an established standard. CSIRO has investigated many global “Eco” type labels and selected the EU Ecolabel for the reasons mentioned above.

The process of complying with the EU Ecolabel involved an eighteen month process of auditing our supply chain, sourcing and developing / modifying the processing capability, in collaboration with the CSIRO.

The fabric production relies on a complete supply chain approach with each member committing to iZWool production quality standards and the EU Ecolabel criteria. Unique online supply chain systems are used to oversee the entire production process. The online system is the guarantee the integrity of merino wool is maintained throughout the entire manufacturing process, from merino woolgrower to fabric. The systems provide the accountability and transparency required by our client base.

Eight tonnes of Ecolabel compliant greasy wool was sourced. A trial batch of 300 kilograms of Ecolabel yarn was produced and then converted in to fabric. The garments were then distributed around the world to selected clients for feedback on the quality and the production story. A supply chain debrief was held in

Melbourne in November of 2003 to update the supply chain on our progress, a critical process in any modern supply chain.

During production we incurred two major issues;

The first was two growers signing statutory declarations for chemical residues meeting our requirements, and their clips tested positive to the restricted substances.

The second was vegetable matter contaminating the fabric as result of the top not being recombed, the high VM count was not noticed by the quality control officer as the quality test certificates were transferred electronically as part of our new system instead of facsimile.

In both cases the issues were resolved as we could trace back to the origin of the problem using our system. This was an important lesson in educating supply chains on their responsibilities and commitments.

The feedback on the performance of the Ecolabel fabric range from our client base has been excellent.

We are now in the process of securing commercial orders for the Ecolabel range. The fabrics are priced at a premium, above standard non-Ecolabel merino fabrics, due to the processing in Australia and compliance with the Ecolabel. The premium price is making it difficult to gain market share. To gain market acceptance now relies on our ability to educate the manufacturer / consumer on the merits of Ecolabel merino fabric, an expensive exercise indeed.

CONCLUSION

The world western consumer is demanding more transparency in production chains and environmental accountability in production. Social responsibility is becoming a driving force behind company ethics and policy.

There is opportunity to establish merino wool as the most sustainable fibre in the world. There must be transparency, product quality and value. The entire supply chain must be aware of their commitments, because product quality is paramount as is reliable delivery. The process of delivering sustainable merino is a complete team approach, we cannot decide half way through production we want to produce a sustainable line of merino wool.

There is also growing debate amongst international animal welfare groups about the treatment of sheep on Australian farms. Portraying good news stories such as successful compliance of merino to well recognised “Eco” programs assists our cause significantly.

Even though we have some of the best merino fibre in the world and have processed it to comply with strict environmental standards and distributed it to leading outdoor companies, without adequate promotion the premium fabric will have little chance of gaining market acceptance.

KEY WORDS

Certified sustainable, intelligent, merino

Paper reviewed by: Melanie Ladyman

Meeting lamb Market Specs from Crossbred Ewes

Dr. Neal Fogarty, NSW Agriculture and the Australian Sheep Industry CRC

ABSTRACT

Genetics of the ewe flock has a dramatic impact on $ returns and gross margins for lamb enterprises. The national maternal sire central progeny test (MCPT) has shown that profitability is driven by turnoff rate in the lamb enterprise with carcass weight and carcass fat and muscle affecting the proportion of lambs meeting specifications which affects price/kg. Results show that:

- the sire of the 1stX ewe dramatically affects production and gross margins ($50/ewe/yr)
- there is considerable variation between sires within the breeds
- high lambing rates are required for high $ returns from 1stX ewes
- genetics of the maternal sire affects:
    - lambing rates of crossbred ewe progeny (>50% lambs slaughtered)
    - growth of 1stX and 2ndX lambs (>6 kg slaughter weight)
    - carcass fat (>3.5 mm GR) and muscle (5% eye muscle area)

AIMS

To evaluate maternal sires and demonstrate the genetic variation (between and within breeds) in lambing rate, wool production and lamb growth and carcass performance of their 1stX and 2ndX progeny and the contribution to profitability of lamb production.

METHODS

The MCPT is testing 91 maternal sires that have been mated to Merino ewes by AI at 3 sites (Cowra, Hamilton and Struan) over 3 years. The sires were entered by seedstock breeders throughout Australia from several breeds, including Border Leicester (BL), East Friesian (EF), Finnsheep (Fi), Coopworth (Cp), White Suffolk (WS) and Corriedale (Cr). Common link sires have also been mated.

The MCPT is focussed on evaluating the performance of the crossbred ewe progeny by the different sires. The survival, growth and carcass performance of the 1stX progeny is also being evaluated.

The first phase is complete - growth and carcass performance of the 1stX wether progeny.

The second phase involves growing out and mating the 1stX ewe progeny to terminal sires over 3 years for 2ndX lamb production. The lambing rate and wool production of the 1stX ewes and the growth and carcass performance of the 2ndX lambs is being evaluated.

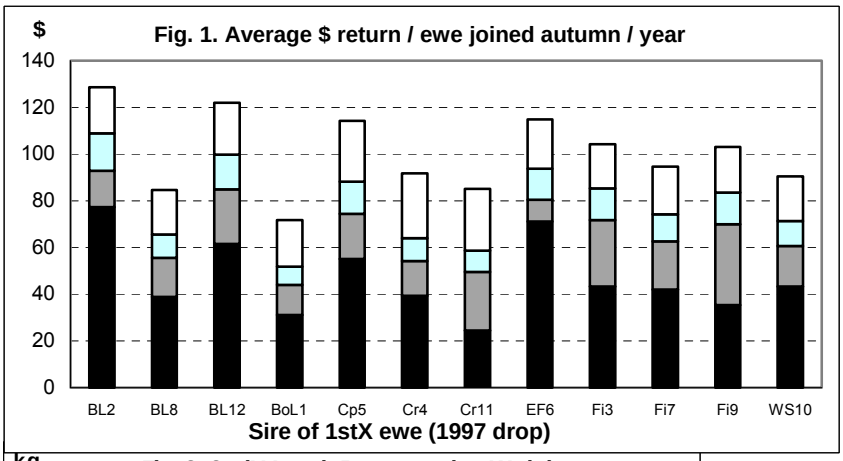
Over 3000 1stX wethers have been slaughtered and 3000 1stX ewes (approximately 20-30 per sire) are being evaluated with their 2ndX lambs slaughtered. The results are for the the first group of 1stX ewes (progeny of 12 maternal sires, 1997 drop and mated to Poll Dorset rams) at Cowra.

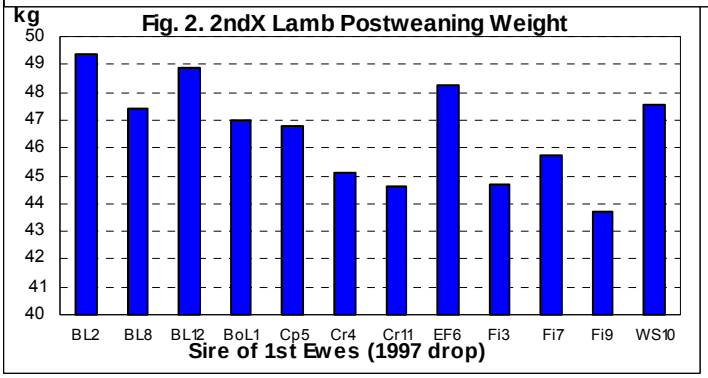
Further details and results from other groups are available at: http://www.lambplan.com.au/mcpt/

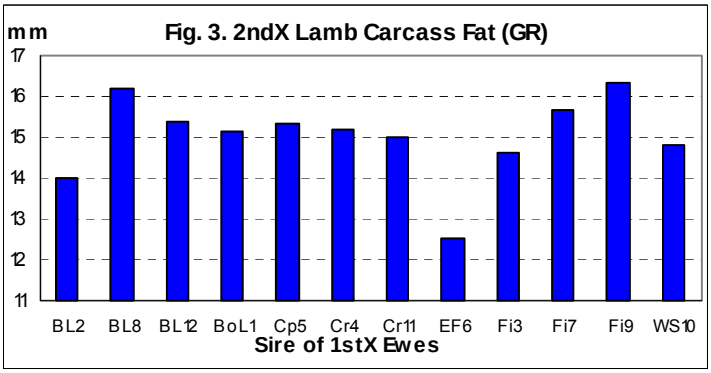
RESULTS

There were differences in average $ returns (and gross margins) of $50 per ewe per year between the 12 groups of 1stX ewes (Fig. 1). The sires of the 1stX ewes were from several breeds (letter code) and there was considerable variation between sires within breeds. Contributions from each of the components of the $ returns (value of lamb carcasses in and out of specifications, lamb skins and ewe wool) are shown. The top groups of ewes all had a high percentage of lambs with good survival that grew rapidly to heavy weights at slaughter. There were also large differences in the proportion of carcasses that met the specifications to achieve the highest grid price.

Lambing rate varied considerably between the 1stX ewe groups. The average lambing % (lambs weaned per ewe joined over 3 years with first lambing at 12 months of age) for the 12 groups of 1stX







ewes ranged from 82% to 133%. There were large differences between sire groups within breeds. Some groups had over 180% lambs born with large differences in survival. The relative lambing rates for the 1stX ewe groups was reasonably consistent over the 3 years.

There were differences of up to 6 kg in live weight of the 2ndX lambs prior to slaughter (Fig. 2), due to the sire of the dam alone (after accounting for age and birth/rearing type). This was due to both the genes for growth passed onto the lamb and the milk production and maternal environment provided by the ewe.

There was a large range in fat levels, muscling, conformation and dressing % between the 2ndX lambs from the various 1stX ewe groups (Fig. 3). This can have a dramatic impact on the success in meeting particular market specifications. The range of 4 mm GR shown (at the same carcass weight) represents almost a full fat score due to different 1stX ewes alone, with variation between sires within breeds.

CONCLUSION

Careful selection of the sire mated to Merino ewes can pay handsome dividends. The right sire can produce heavier 1stX slaughter lambs that better match market specifications and earn higher prices. The right sire can also result in more productive and valuable 1stX ewe progeny for breeding. If you have a crossbred ewe enterprise you can earn greater profits by ensuring the 1stX ewes have the right genetics for the production system and enterprise. This means genetics for high lambing rate (in your lambing season), maternal traits (mothering, milking, growth and carcass) and wool. Developing an alliance or contract mating with a high performing Merino flock is a way to ensure some control over the genetics of the1stX ewes and regularly source the best genetics for the enterprise.

KEY WORDS

Genetics, crossbred ewes, lambing rate, lamb carcass, gross margin

ACKNOWLEDGMENTS

MCPT is run at Cowra by NSW Agriculture, Hamilton and Rutherglen by DPI (Vic) and Struan by SARDI, with support from Meat and Livestock Australia and the Australian Sheep Industry CRC.

Paper reviewed by: James Skerritt

Use of Serial Body Weight Measurements in Prime Lamb Finishing Systems

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ABSTRACT

This paper examines the key features of modern lamb finishing systems, most notably the emergence of drafting systems that enable producers to target increasingly narrow weight and fat grids. We studied the operations of an intensive finishing system and found that 83% of the carcasses hit premium QLAMB specifications (18-24kg carcass and 6-12mm fat depth). We then discuss the potential for utilising individual animal management to improve profitability in such production systems. Electronic tags (E-ID) may be the catalyst for wider adoption of individual animal management systems. In this paper potential areas where electronic tags, in combination with drafting systems, that might lead to greater profitability of lamb production systems through better-informed management decisions are highlighted. Preliminary results suggest improved efficiency may be possible by using early weight records to determine when to start an individual on a finishing ration.

INTRODUCTION

In WA, new production systems are being developed to cater for the reliable production of high quality heavy weight lambs. These lambs are produced to target increasingly stringent weight and fat grids. Lambs that fall out of specification are discounted if carcases are too heavy, too light, too fat or too lean. More significantly, the producer suffers a considerable loss from these discounted animals as much has been invested in feed and labour to get them to the point of sale.

To guarantee lambs achieve target specifications producers are using systems in which sheep are drafted onto a finishing ration at a set weight, and then sent off to slaughter when they have reached both weight and fatness targets. Without such drafting systems it is very difficult to justify the feeding of expensive rations in the finishing phase. Markets with such tight specifications are generally high quality markets, which demand product uniformity. In these markets the need for a higher standard of quality assurance and product reliability is now becoming apparent. E-ID's will enable individual animal trace back to property of origin, which will become mandatory for these markets. With lamb feeding being a marginally profitable enterprise, it is important that where additional costs are incurred for traceability or QA purposes, a corresponding productivity gain can be found to balance the costs.

REVIEW OF E-LAMB OPPORTUNITIES

Current prime lamb production systems have become very efficient at weighing and drafting lambs into groups of narrow weight ranges for differential management. The Sheep CRC collected serial weight records and carcass measurements from 12 producers as part of the E-Lamb project. The producer with the most intensive finishing system, who weighed and drafted weekly, was able to consistently hit tight market specifications. It was found that out of 373 lambs, 83% were graded premium (carcass weight 18-24kg and fat depth 6-12mm) and 99% were within QLAMB target specifications (carcass weight 17-25kg and fat depth 6-15mm). In terms of management, electronic tags currently offer little other than a speed advantage for such operations. However, the advantage inherent in electronic tagging of the lamb is that at each weighing, a weight can be attributed to a specific individual and related to previous weights recorded for that individual. With this information, producers will have the ability to monitor the growth patterns of individual animals. This occurs instantaneously when using E-ID and is not feasible in a system using visual tags due to the time required for such operations. With modern scales and drafting equipment it is also possible for decisions to be made based on all of the information available on an animal. The question arises therefore as to how an instantaneous measure of growth rate or repeated weight records can be best used to improve the profitability of a lamb production system.

To answer this question as part of the E-Lamb project approximately 5000 lambs have been tagged and weighed over the past 12 months. This project will provide base line data from several different lamb productions systems. Ongoing analysis of that data will enable us to model how best to create individual animal management systems to maximise profitability.

In the coming 12 months we will be working with three properties where we will be trialling some of these new management concepts in order to gauge the profitability resulting from the use of the E-ID systems.

Three key hypotheses are being proposed. Two of these were based on preconceived uses of the technology and the third has emerged from a preliminary analysis of the data.

1) Early growth rate may allow us to select certain individuals which can be grown to much heavier target weights without risk of fat penalties
2) Growth rates may allow efficient targeted feeding of high energy rations to certain lambs and not others and hence improve overall feed conversion ratio
3) Preliminary results suggest that using actual weights on a particular day may not be the best way of deciding when to introduce lambs onto a finishing ration. That is, gut fill introduces significant variation into lamb weights on any particular weighing day. Our preliminary analysis suggests that finishing time may be reduced significantly if a "predicted weight" based on prior live weights is used as the criteria to draft animals onto a finishing ration.

CONCLUSION

Lamb has emerged as a very different product compared to that produced a decade ago. Dedicated prime lamb producers have significantly altered their production systems to adapt to these changes, and are continuing to adapt their systems as premiums emerge for heavier weight lambs. With the high input nature of lamb finishing, and the marginal nature of the business, we believe there is potential for individual animal management to play a significant role in improving profitability of lamb finishing. We have proposed some areas where profitability of lamb finishing might be improved. We believe that those proposals are only a beginning, and look forward to working with both agribusiness and industry to lead the development of more profitable and reliable lamb finishing systems.

KEY WORDS

Lamb, drafting system, electronic identification, weights, individual animal management

ACKNOWLEDGMENTS

This work is the result of a significant interaction between a number of organisations and individuals. We would like to acknowledge the 12 producers who are collaborating with the E-Lamb project. These producers have graciously allowed us to follow their lambs through the growing season and to the abattoir at significant imposition to their normal day-to-day activities. We would like to thank the Australian Sheep Industry CRC and in particular the team in Program 2 of the Sheep CRC who are playing significant roles in facilitating the use of the technology and examining on ground implementation of individual animal management. We would like also to thank the QLamb group and the Esperance A-Sheep Group who have been instrumental in the trial of this technology.

Paper reviewed by: Sue-Ellen Shaw