



## Books, Book Reviews, Extracts

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Sheep CRC Update seminars held in eight locations across Australia between February and May 2010 provided a valuable summary of progress achieved by the Sheep CRC and our Participants in our first three years of operation. The Sheep CRC publication '2010 Sheep Focus' captures key messages and results presented in the seminars in a form that provides an easy reference document. It should be cited as:

Sheep CRC – *2010 Sheep Focus*



2010  
**SHEEP** *Focus*

*A summary of the 2010 Sheep CRC Updates*



Photo: Deb Maxwell

*Transforming wool, meat & the sheep that produce them*



Editor: Deb Maxwell  
Design: Rhonda Brooks  
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**SHEEP CRC**



Photo: Sheep CRC

## *Welcome to the 2010 Sheep Focus*

*Professor James Rowe  
CEO*

Sheep CRC Updates seminars held in eight locations across Australia between February and May 2010 provided a valuable summary of progress achieved by the Sheep CRC and our Participants in our first three years of operation. The Sheep CRC publication '2010 Sheep Focus' captures key messages and results presented in the seminars in a form that provides an easy reference document. I am confident that you will find it a useful summary of the seminars.

Conducting world-class research for the sheep industry is one part of the equation. The second is just as important—ensuring that industry knows about the research, understands how to use the new information and can apply it to improve profitability. '2010 Sheep Focus' aims to provide a reminder of some of the information presented at the update series and will hopefully trigger follow up action.

Please do not hesitate to contact the Sheep CRC, through the CEO or Program Leaders, with any questions you may have in relation to the information presented in this publication. We also welcome any suggestions you might have for further research or ways to make it easier to interpret and use the results.

We are enthusiastic about the future of the sheep industry and the role of the Sheep CRC in helping to transform wool, meat and the sheep that produce them.

I hope that you find this publication interesting and useful.

James Rowe  
CEO

### **Information from the 2010 Sheep CRC Updates**

**The Sheep CRC has prepared the information from these seminars in two additional formats:**

- **Powerpoint slides (as PDF files) can be viewed or downloaded from the Sheep CRC website: [www.sheepcrc.org.au](http://www.sheepcrc.org.au). Select 'News and Events', then 'Presentations from Past Events'.**
- **Webinars based on these seminars are to be run between July and September 2010 and recordings of these webinars will also be found on the website.**

**Additional copies of this magazine can be obtained by contacting Sheep CRC Communications Officer, Janelle Holzberger, on telephone: 02 6773 2927 or email: [sheepcrc@sheepcrc.org.au](mailto:sheepcrc@sheepcrc.org.au)**

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# SHEEP INDUSTRY OVERVIEW

## *New opportunities in a changing industry*



Photo: Sheep CRC

Graham Truscott  
Deputy CEO

The Sheep CRC aims to transform sheep, wool, meat and the rate of adoption of improved technology and practices, with research programs impacting all along the wool and meat production chains.

The sheep industry continues to undergo significant changes with increasing value of sheepmeat and decreasing contribution of wool to farm gate earnings. The decline in the flock size from 173m in 1990 to 73m in 2009 was associated with a decrease in the real farm gate value of wool from \$6.4bn to \$2.4bn. Over the same period the real farm gate value of sheepmeat increased from \$0.5m to \$1.4bn and an increase of over 40% in the number of lambs slaughtered.

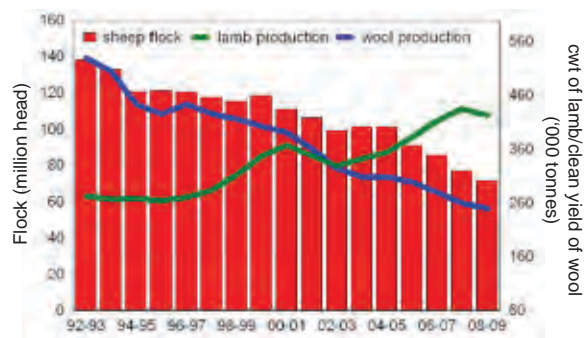
The changing focus from wool to meat in the Australian sheep industry creates challenges to improve productivity and demand for wool and to maintain or improve sheepmeat quality as growth rate and muscling continue to increase. There are also new challenges in managing parasites with increasing incidence of drench resistance and in understanding what implications there are for the sheep industry in relation to greenhouse gas emissions.

Factors leading to the decline of the Australian sheep flock include widespread drought, low wool prices compared to grain prices, higher labour cost, and variation in lamb prices over the last three years.

The availability and cost of labour is a major factor for the sheep industry and this is compounded by the relatively high average age (around 58 years) across the industry. As an industry we need to ensure that profitability and lifestyle are attractive and bring more young people into sheep production. There also needs to be more effort to increase skills levels as a means of increasing labour productivity and to breed sheep requiring less labour input.

***Genetic gain in sheep provides long-term cumulative improvement at relatively low cost.***

Source: Australian Bureau of Statistics, Meat and Livestock Australia



ABOVE: The change in Australian sheep flock, lamb and wool production

On the whole, terminal breeds have strongly utilised genetic analysis and selection for 20 years, with their rate of genetic gain over \$2/ewe/year—at least double that of Merinos—resulting in the average lamb carcase increasing by almost 4kg since 1990. However, maternal and Merino breeders are increasingly adopting new genetic tools and are catching up, with use of ASBVs greatly increasing the accuracy and precision within breeding programs.

The Sheep CRC is investing significantly in genetic improvement. This is seen as the best approach to improving productivity and profitability in a sustained and cost effective way. Delivery of the genetic outputs and products of the CRC's Information Nucleus program is via Sheep Genetics and there are already a number of valuable improvements through increased accuracy of some existing breeding values and assistance in developing new ASBVs. The CRC is also working with industry ram breeders to pilot a genomics project using DNA-based analysis on 300 young industry sires. The results of genomic predictions will help in the selection for difficult to measure traits and in the early selection of promising young sires.

The Sheep CRC Updates and the summary in this publication provide some exciting insights to promising new technologies and some ready-to-use opportunities for ram breeders and commercial producers.

*It's a great time to be in sheep!*



Photo: Sheep CRC

*ABOVE: Autodrafters and other modern equipment make sheep easier to handle and manage*



Photo: Sheep CRC

*ABOVE: Progeny groups from the Rutherglen Information Nucleus site*

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# GENETIC TECHNOLOGIES

## *Delivering permanent, cumulative gains*



Photo: Sheep Genetics

Sam Gill  
Manager, Sheep Genetics

Genetic improvement is permanent, cumulative, and cost-effective, with Australian Sheep Breeding Values (ASBVs) being an important and effective tool to make genetic gain.



Photo: Deb Maxwell

ABOVE: Look for ram sale pen cards with ASBVs

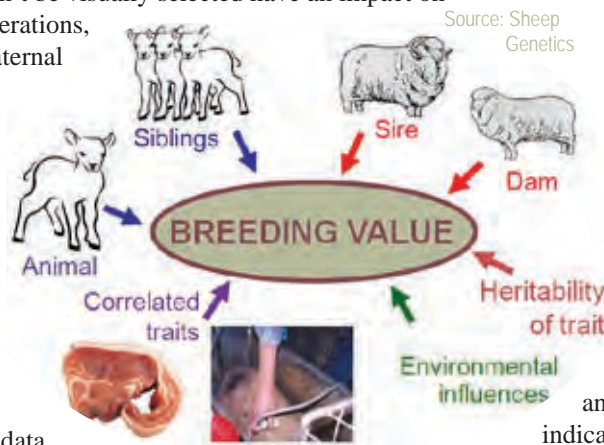
LEFT: ASBVs take into account many factors

ASBVs enable genetic selection for economically important traits in each sheep type including:

- Terminal sires: growth, fat, eye muscle depth, birth weight, lambing ease, and worm resistance.
- Maternal sires: fertility, maternal capacity, growth rate, wool traits, carcase value, and worm resistance.
- Merino sires: wool quality and quantity, growth, fertility, worm resistance, carcase traits, and breech strike resistance.

Also, ASBVs for traits that can't be visually selected have an impact on the performance of future generations, such as reproductive rates, maternal performance, lamb survival, staple strength, and internal parasite resistance.

Selection should be based on the genes the animal has, not on nutrition and other non-genetic factors; ASBVs enable an estimate to be made of the value of the genes carried. They are more accurate than using raw data or visual assessments because they take into account not only how an animal itself performs, but also genetic parameters of the trait (how heritable it is, what other traits it is correlated with), performance of ancestors, progeny and siblings, and non-genetic (environmental) factors affecting performance (nutrition, management groups, age, sex, twin/single, age of dam etc.)



All ASBVs are provided with accuracies (expressed on a % basis) that increase as more data on that trait is analysed from the animal or its relatives, indicating increased reliability in the ASBVs. Only ASBVs with accuracies above a particular threshold are published, to ensure their usefulness. Indexes, which are combinations of specific ASBVs, also now have accuracies.

To assess how an animal rates against others for a trait, its ASBV can be looked up on a percentile chart. Each ASBV has a percentile chart that shows the range of ASBVs for that trait.

The Sheep Genetics website: [www.sheepgenetics.org.au](http://www.sheepgenetics.org.au), provides producers with the capacity to do standard and customised searches of the LAMBPLAN and MERINOSELECT databases to find rams that suit various breeding objectives.

***When starting to use ASBVs, choose one or two important traits and build these into the current selection program.***



Photo: Lambpro

ABOVE: Visual assessment can be misleading—these two animals have the same genetics and ASBVs, however, the larger ram was raised as a single and the smaller as a triplet

### Some genetic terms producers should become familiar with...

The *phenotype* of an animal is what you see or measure. It is the combination of the animal's genes (its *genotype*) and its environment.

A sheep passes on the genetic portion of its phenotype to its progeny. *Heritability* describes how large that portion is as a percentage or a decimal figure, for instance, yearling body weight (YWT) is 30% heritable or has a heritability of 0.3.

Many traits are also *correlated*, so that if one trait changes, so does another. The relationship may be favourable if both change in the desired direction, however correlations can be unfavourable, such as fleece weight and fibre diameter, where a higher fleece weight is generally related to a higher (less desirable) fibre diameter.

Source: Sheep Genetics

PWT percentiles	
Top value	11.8
Top 1%	9.3
Top 5%	7.8
Top 10%	7.0
Top 20%	5.9
Top 30%	5.1
Top 40%	4.4
Top 50%	3.7
Top 60%	3.1
Top 70%	2.4
Top 80%	1.6
Top 90%	0.2
Bottom value	-5.9

ABOVE: Post Weaning Weight percentile chart

As confidence is gained more ASBV traits can be added as required or desired. Remember:

- Genetics is the only way to make permanent change to a flock.
- ASBVs use a range of information to calculate values.
- Look carefully at all ASBVs to ensure that you are selecting the better genetics.

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# INCREASING GENETIC GAIN

## *The pathway forward*



Photo: Sheep CRC

*Prof. Julius van der Werf  
Program Leader,  
Information Nucleus*

There have been significant improvements in genetic knowledge as a result of adding data from the Sheep CRC's Information Nucleus flocks to the data gained over many years from sire evaluation trials, other research flocks and the impressive bank of data contributed by industry flocks in Sheep Genetics.

The Sheep CRC Information Nucleus is a collection of 8 flocks across diverse regions of Australia with approximately 5000 Merino and crossbred ewes joined annually to about 100 sires for 5 years. Sires have been chosen from across most breeds for their diversity, high industry usage and footprint, and to gather data on key traits. Without this new knowledge breeders could be changing many traits—unknowingly to the detriment of meat and wool quality and fitness of animals.

To produce high quality prime lamb or wool, producers need to choose the right ram, get the lambs on the ground, keep them alive, make them grow, ensure they yield well and that their meat is tasty and nutritious, and also, where appropriate, produce wool that is bright and comfortable to wear.

***Every trait has a genetic base and Australian Sheep Breeding Values (ASBVs) are the most practical way to objectively assess and select for or against these traits.***

Birth Weight ASBVs are now available for breeds including Merinos and go some of the way to determining the degree of lamb survival and lambing difficulties. However, the new ASBV for Lambing Ease, which identifies the propensity of a ewe or daughters of a ram to have an easy or a difficult lambing, is also valuable to review when choosing rams so as to make lambing time less stressful and more profitable. No one can afford to lose ewes worth up to \$200 on current prices.

Most traits are correlated to other traits and often the 'non-visible' traits are also being changed when selections are made. While Sheep CRC research now shows that there is potential for unfavourable changes in



Photo: Joan Gates

*LEFT: Poll Dorset ram & ewes  
(the ram is wearing a crayon  
harness to identify  
joined ewes).*

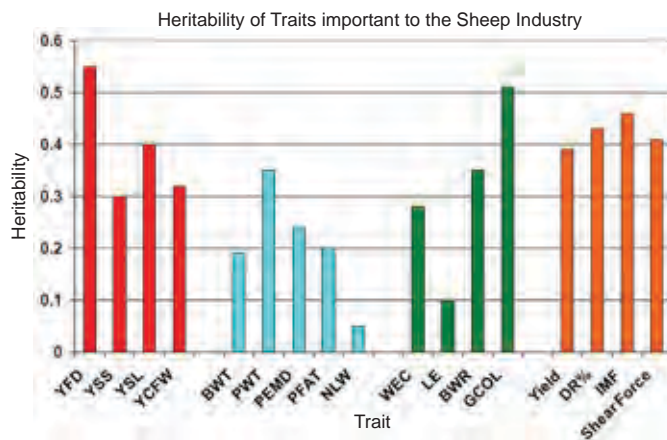
the national flock, in most cases these correlations between traits are manageable if they are known.

A positive finding is that an important wool trait, staple strength (SS), is favourably related to worm egg count (WEC) and eye muscle depth (EMD). Therefore, sheep with better staple strength tend to have better worm resistance (lower worm egg count) and better muscling (higher eye muscle depth). As the correlations are not high, some animals will be better in one trait and poorer in the others, so when selecting rams, check each of the ASBVs for WEC, EMD and SS.



**SHEEP CRC**

Source: Meat & Livestock Australia



Exciting new work in the Sheep CRC Meat Program has shown that a variety of new traits (still under development) are all moderately to highly heritable (greater than 40%). These include Lean Meat Yield (LMY), Dressing Percentage (DR%), Intramuscular Fat (IMF) and Shear Force (Shear) or tenderness.

As eye muscle depth increases and fat decreases, lean meat yield (the amount of saleable meat as a proportion of the carcass weight) and dressing percentage (the proportion of carcass weight to live weight) both increase. Unfortunately, if selection was just for either LMY or DR% alone then there would be a trend to decrease intramuscular fat (IMF) and increase shear force (Shear) making lamb drier and less tender. IMF, the fat within muscle, also described as 'marbling', is a key factor in making meat tender, juicy and flavoursome. So, when IMF drops, the shear force (the amount of pressure needed to 'bite' through meat) increases.

While there are some unfavourable correlations here, they are not totally related, therefore selection using the ASBVs for these traits will enable breeders to choose animals that bend the trend and which have a more desirable set of values.

Wool and breech traits have also been studied with the new ASBV for Early Breech Wrinkle (EBWR) released in 2009. It has taken off with a 300% increase in on-farm data since its launch and more rams with these ASBVs are becoming available. The data is a combination of breech, body and neck wrinkle because they are so strongly correlated. For commercial breeders purchasing rams, a more negative EBWR is desirable (indicating fewer wrinkles). In just one cross, a plainer sire can make a considerable difference in decreasing the fly susceptibility of progeny, and there is ample opportunity to choose plain sires that also have the higher fleece weights.

Data on other visual traits has also been collected, and for wool these include colour, character, dust penetration and weathering of the staple; all of these are moderately to highly heritable. Fleece rot has been confirmed to be correlated with visual greasy colour and wrinkle—sheep with yellower wool and more wrinkles are more prone to fleece rot (and

therefore are more susceptible to flystrike).

A new and improved suite of ASBVs is now available for use, with more to come over the next few years. These include prototype breeding values for Intramuscular Fat and Shear Force in mid-2010, followed by wool colour, other visual traits and easy care/fitness traits.

Whether a producer actively selects or not, traits will change, sometimes in undesirable directions. However, ASBVs offer breeders the opportunity to drive their production in their chosen direction, faster and with confidence.



Photo: Deb Maxwell

ABOVE: Dr Alex Ball, Manager, Lamb & Sheepmeat R&D, Meat & Livestock Australia

#### More information

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# IMPROVING REPRODUCTION

## *Increasing lamb survival & lifetime production*



Photo: Sheep CRC

*Dr Andrew Thompson  
Program Leader, Sheep  
Management*

**T**he Lifetime Ewe Management program aims to optimise production of both meat and wool from ewes and their progeny, with a key focus on reproduction and increased survival of lambs and weaners.

With declining flock numbers and high prices for sheep, it is even more critical to improve reproduction rates. This can be done by increasing conception rates, lamb survival and weaner survival.

The fundamental requirement is to ensure breeding ewes are in optimal condition (condition score 3) for joining and lambing. While a higher condition score will be more productive, it is not necessarily more profitable. Ewes in lower scores, particularly at lambing, generally lose both production and profit.

### **Key points for the breeding year are:**

Wean at about 12–14 weeks after the start of lambing: this is a good time to ‘wet and dry’ the ewes (feel udders and teats) to monitor individual reproductive performance (better performers are also likely to be skinnier; fat ewes most likely were dry or have lost their lambs).

Post-weaning: provide ewes with good nutrition to allow them to recover live weight and body condition lost over lactation in preparation for the next joining.

Pre-joining: check rams and carry out any management actions at least 7 weeks prior to joining, so as not to affect sperm production at joining. Feed rams as needed so that they are at least score 3 by joining to ensure they are ready to work.

Joining: ewes should be at score 3 and it is important to maintain their condition over the joining period. Join for 2 cycles (35 days) so that lambing, marking, weaning and later activities are more manageable.



Photo: Deb Maxwell

*ABOVE: Weaners may need supplementary feed to maintain growth*



Photo: Deb Maxwell

*ABOVE: Scan ewes at about 90 days after the start of joining*



Photo: Lifetime Wool Project

*LEFT: Assess ewes to ensure they are in condition score 3 for joining and lambing*

Weaners require special management to gain the benefits of more replacement sheep from which to select, increased wool returns and more surplus sale sheep. Being more susceptible to various health issues, weaners need effective parasite and disease management. Good quality feed ensuring at least 0.5kg growth/month is essential for survival and production (especially Merinos).

In southern areas where ewes are lambing onto green feed, they can be allowed to drop to a condition score of 2.5 by mid-pregnancy if there is good pasture in the last third of pregnancy to regain any lost condition by lambing. But where mid- to late-pregnancy usually coincides with lesser feed, their condition should not be allowed to drop from score 3, as it is too expensive to supplementary feed them back up for lambing.

***Pregnancy scanning is strongly recommended provided it is to determine twins and singles, not just wet or dry.***

Pregnancy scanning pays off by allowing the twin-bearing ewes to receive preferential feed and lambing paddocks. Also, ask scanners to identify the single-bearers that will lamb later. These often have the most lambing difficulties due to nutrition improving over the lambing period and it can sometimes be useful to restrict feed for these ewes.

Before lambing ensure that ewes are shorn or crutched. Give the ewes appropriate treatments including vaccinations and worm and fly treatments that will protect them through to early lactation. Also, have suitable low-worm lambing paddocks that provide shelter and seclusion, as well as good water and protection from predators.

Mark at no later than 2 weeks after lambing finishes. This is also a good time to identify and ear mark wrinkly lambs for later culling. Ensure that ewes have both a high quality and quantity of feed on offer to achieve high weaning weights, which will provide a base for good weaner growth and survival.



Photo: Deb Maxwell

*ABOVE: Ewes should be in condition score 3 at lambing*

**Find out about one of the Sheep CRC's workshops in your area:**

- **Lifetime Ewe Management**
- **Managing Scanned Ewes**

**More information**

**02 6773 2927**

**[sheepcrc@sheepcrc.org.au](mailto:sheepcrc@sheepcrc.org.au)**

**[www.sheepcrc.org.au](http://www.sheepcrc.org.au)**

# WOOL SHE WANTS TO WEAR

## *Next-to-skin comfort, handle & whiteness*



Photo: Sheep CRC

David Tester, Program Leader, Wool

The Sheep CRC's Wool program aims to increase the demand for Australian wool by providing measurement tools and specifications that will underpin the use of wool in the growing trans-seasonal lightweight knitwear market sector. This will extend Merino wool's use beyond traditional winter apparel, though there are a few challenges to overcome.

The trans-seasonal lightweight knitwear market is dominated by cotton and synthetics as wool is perceived as being unsuitable for next-to-skin apparel by many consumers. An AWI survey\* across 22,000 consumers found that wool was highly associated with being warm, itchy or prickly and expensive, and least associated with being comfortable, in casual styles or for all seasons. The Sheep CRC is developing solutions to these issues.

A next-to-skin Comfort Meter prototype has been created that can accurately detect differences in comfort; the results are comparable to much more expensive wearer trials where garments are assessed by consumers.

The Comfort Meter can potentially allow a retailer to set specifications for next-to-skin comfort in the finished garment. Requirements and specifications for all steps of the supply chain can then be established—from greasy wool through topmaking, spinning and knitting to garment construction.

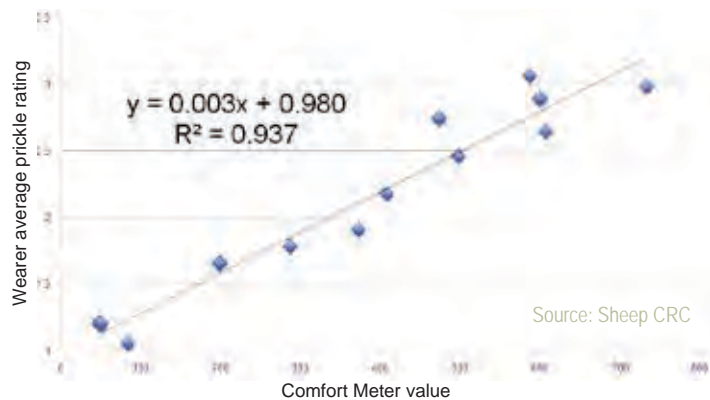
***The measurement of garment comfort will ensure the product is fit for purpose, reducing the amount of product returns and increasing the number of return customers, so increasing demand for wool knitwear.***

While the Comfort Meter has confirmed that finer wools will generally produce a more comfortable fabric, it has also found that knit structures can play an important role.

The Sheep CRC is also using another machine, the PhabrO-meter,

\* The Milward Brown Survey, 2007, commissioned by Australian Wool Innovation

COMFORT METER Vs PRICKLE RATING



Source: Sheep CRC

Comfort Meter value

ABOVE: Comfort Meter results were strongly correlated with results from the Wearer trials



Photo: Jemala Colours

ABOVE: Wool often has luxurious handle

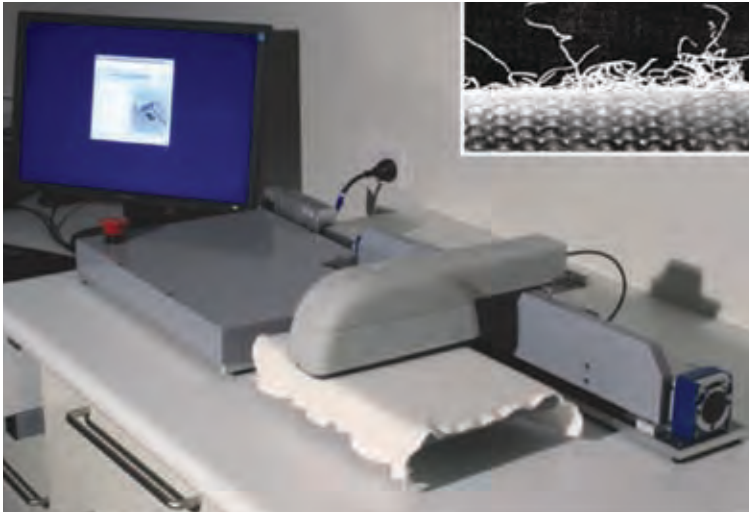


Photo: Sheep CRC

*ABOVE: The next-to-skin Comfort Meter detects differences in comfort in wool fabrics*



Photo: Sheep CRC

*ABOVE: Wearer trials where woollen garments are assessed for next-to-skin comfort*

to objectively assess fabric handle—the tactile sensation when a consumer holds and squeezes a garment. These are sensations of softness, smoothness, stretchiness, thickness and warmth. Wool often performs well in terms of luxurious handle, making objective measures important for marketing. The Sheep CRC is using the PhabrO-meter measures to engineer desired fabric handle in pilot trials with processors.

Wool is essentially a cream coloured fibre, not the pristine white needed for dyers to achieve light, bright, pastel colour shades that are popular in spring and summer. Wool's propensity to go yellower with more exposure to sunlight can also be a consumer perception issue.

Typical bleaching technology takes away much of wool's creaminess, but makes it even more prone to yellowing in sunlight. The Sheep CRC has confirmed that genetics has a strong role to play in colour and it appears that trace metals in the soil (iron, manganese, zinc and copper) may also affect wool colour. Work is ongoing to determine how wool whiteness can be positively influenced through breeding, nutrition and processing.

To ensure commercial relevance, the outcomes of the projects are being developed and trialled with a number of Australian and overseas supply chain companies.



Photo: Australian Wool Innovation

*ABOVE: Next-to-skin comfort of wool garments can be affected not only by the greasy wool, but also during later-stage processing and knitting*

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# FLYSTRIKE MANAGEMENT

## *Beating the blowfly*



Photo: Sheep CRC

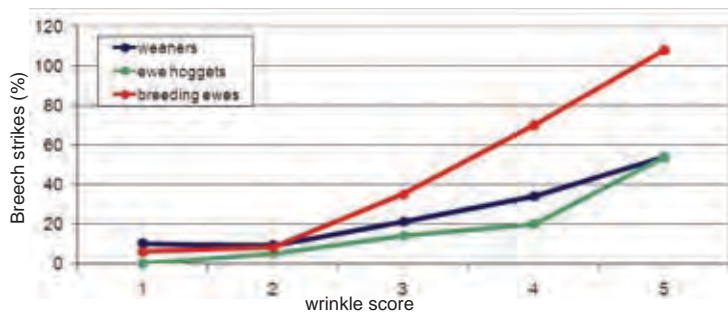
Lu Hogan, Project Leader,  
Flystrike & Industry Training

Flystrike costs the sheep industry \$280 million dollars annually in lost production and treatments, and with the wool supply chain seeking wool from non-mulesed sheep, it is timely to review breeding and management approaches to flystrike prevention.

The Sheep CRC has developed an integrated and planned approach to flystrike management that can be found on the FlyBoss website: [www.flyboss.org.au](http://www.flyboss.org.au). This approach can reduce the risk of flystrike and increase productivity through reduced mortality, more wool and lambs, and improved worm management. It may enable reduced intensity of mulesing or a phase-out of mulesing, resulting in sale of 'non-mulesed wool' for part or all of the clip.

Breath strike is highly related to breech wrinkle score and dag score, whereas body strike is particularly related to fleece rot score. The Visual Sheep Scores, 2007 guide is available to help score sheep for these and other traits: visit [www.sheepgenetics.org.au](http://www.sheepgenetics.org.au) and choose Resources.

Source: Breeding for Breech Strike Resistance Project, CSIRO Livestock Industries & AWI.  
Data from three consecutive flystrike seasons of a selection experiment at Armidale, non-mulesed sheep under flystrike challenge conditions (no chemical prevention, delayed crutching).



Breech Wrinkle - Lambs

Source: Visual Sheep Scores, 2007, MLA & AWI



ABOVE: Flocks with mostly score 1 and 2 sheep will be highly resistant to flystrike

There are a number of key actions to develop a flystrike resistant flock: start by assessing ewes off-shears for body wrinkle. Estimate the average wrinkle score and fleece rot score and aim for the flock having scores of 1 or 2 for both traits, in the long term. Also, stop breeding replacements from high wrinkle score ewes—instead, cull or use them to breed prime lambs.

When choosing rams, use the ASBV for Early Breech Wrinkle (EBWR). If EBWR ASBVs aren't available from the stud and the sheep are mulesed, ask that these scores be recorded prior to mulesing in the future. In the meantime, use the neck wrinkle of the rams as a guide to body and breech wrinkle. If worms and dags are also a major risk factor, consider sourcing rams with low worm egg count (WEC) ASBVs.



Photos: Ian McConnell, DEEDI QLD.



*ABOVE: Breed for plainness—two groups of progeny from the same line of ewes but with different sires; the two sires were similar for fleece weight and overall performance index but Sire A had a high EBWR ASBV of +0.6, whereas Sire B, with a low -0.6 EBWR ASBV, had progeny with far less wrinkle.*

With lambs, score breech wrinkle at marking and decide on-the-spot which lambs need mulesing and which don't; the latter include plainer (score 1 and 2) lambs, wether lambs and first-cross ewe lambs. Wrinkly lambs can be identified for culling at a more appropriate time. Consider different management plans for progeny based on their flystrike risk and keep wool from non-mulesed sheep separate and declare it via the National Wool Declaration (available from your broker or [www.awex.com.au](http://www.awex.com.au)).

Other management considerations include worm and scour management, shearing and crutching times and the timing of chemical treatment to control flystrike. The FlyBoss website includes a simple-to-use flystrike risk tool for your area, where district-specific shearing, crutching and chemical application times can be customised to assess which combinations are best at lowering flystrike risk.

***Finally, prepare and use a written annual management plan—a flystrike calendar—as written plans are more likely to be followed through.***

Breeding for plainness (using the EBWR ASBV) is the key long-term solution to increased flystrike resistance and while there is a slight correlation between fleece weight and wrinkles, there is ample opportunity to find plainer sires with higher fleece weights.

In just one cross, a sire with little or no wrinkle can make a very noticeable difference to the level of wrinkle in the progeny.

Using a balanced selection approach incorporating wrinkle, as well as the key profit traits of fleece weight and fibre diameter, will allow achievement of continued reductions in fibre diameter and improvement in fleece weight, whilst reducing wrinkle and flystrike susceptibility.



Photo: Sheep CRC

*ABOVE: 'Lucilia cuprina' cause most primary strikes*

**More information  
FlyBoss  
[www.flyboss.org.au](http://www.flyboss.org.au)**



**Flystrike Management training  
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# WORM MANAGEMENT

## *Efficient & sustainable control of worms*

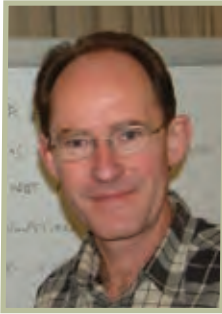


Photo: Sheep CRC

*Dr Brown Besier, Project Leader, Parasite Management*

**D**rench resistance is now very common across Australia, with resistance to several drench groups on many farms and some having no effective drenches. With new drench types to arrive soon in the marketplace, new practices are needed to limit future drench resistance.

The new drenches monepantel (brand-name ‘Zolvix’, from Novartis), and derquantel/abamectin (‘Startect’, from Pfizer) are still undergoing registration in Australia and are likely to be considerably more expensive than other short-acting drenches. They are highly effective against all major roundworms and have different modes of action to current drenches.

While new drenches will be of major benefit, the development of resistance to them is a real risk. Sheep CRC findings will help producers to slow the rate of development of drench resistance to these and any other drenches.

The development of drench resistance can be reduced by the correct choice and use of drenches, using drenches only when they are required, and importantly, by having worms in ‘refugia’. Refugia refers to a source of non-resistant (drench-susceptible) worms, either as worms in undrenched sheep or as larvae on the pasture. These dilute the population of resistant worms and therefore keep them in a minority. This marks a major change from the theory and practice of trying to totally eliminate worms.

In areas of southern Australia with hot, dry summers, resistance may increase if all sheep are drenched at this time. During summer there are few worms in refugia, and resistant worms that survive in the sheep following treatment are the major source of worm larvae on pasture in the next winter, hence increasing the level of drench resistance on the farm.

To avoid increasing drench resistance a source of refugia should be identified. Where summer conditions are typically hot and dry, some mature sheep or entire mobs should be left undrenched and treatments given—if necessary—in autumn. Once winter pasture conditions favour the development of larvae, worm eggs from the undrenched sheep

will dilute the smaller number of resistant worms from the drenched sheep.



Photo: Sheep CRC

*ABOVE: Regular monitoring with egg counts, or the Haemonchus Dipstick test (in predominantly Barber's Pole worm areas), prevents unnecessary drenching*

The Sheep CRC’s Targeted Treatment research program aims to develop guidelines regarding the percentage of a mob to drench and how to choose them in a practical way, based on a mob egg count and average mob condition score.

In areas where Haemonchus (Barber’s Pole worm) is the major worm threat, partial drenching of



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the mob is not recommended. An integrated program including use of effective drenches, regular worm monitoring (including use of the new Haemonchus Dipstick test), use of a drench decision aid (to be released by the Sheep CRC later in 2010), grazing management, and worm-resistant sires, forms the basis of the proven Targeted Treatment program.

In the colder Northern Tablelands of NSW, the program suits a spring lambing time and involves preventing contamination of lambing paddocks during March and April (by spelling, grazing with cattle, or with sheep in the two weeks after they have received an effective drench). In the period from May through August, the paddock can be grazed in any way as the conditions are too cold for development of Barber's Pole worms. In other Barber's Pole worm regions, the aim is to achieve a period of 6 months before lambing with little worm contamination of the lambing paddocks. The basis of this recommendation is that Barber's Pole worms are unlikely to develop unless minimum and maximum temperatures exceed 10°C and 18°C respectively.

***In both northern and southern areas, it is recommended that a drench resistance test is undertaken each 2–3 years.***

It is also recommended that flocks are monitored regularly (such as prior to shearing, lambing, marking and weaning), as well as at other high risk times, rather than routinely drenching. The worm resistance of the flock can be increased by breeding with more worm-resistant sires.



Photo: Sheep CRC

*LEFT: Producer, Michael Mayled, Guyra, has already saved unnecessary drenches by using the Haemonchus Dipstick Test*

In areas where dags commonly occur, these are almost always due to worms, either as high worm burdens in worm-susceptible sheep, or from a hypersensitivity response to ingested larvae (mostly in winter rainfall regions, in older sheep). A worm egg count should be conducted on scouring adult sheep before deciding to drench. If only small numbers of adult sheep scour, consider culling them as the likelihood of scouring is genetically determined.



Photo: Sheep CRC

*ABOVE: How effective are drenches on your property?*

**More information:**

**WormBoss**

[www.wormboss.com.au](http://www.wormboss.com.au)

**wormboss**  
[.com.au](http://www.wormboss.com.au)

# PRIME LAMB PRODUCTION

## *Tender, nutritious & high yielding lambs*



Photo: Sheep CRC

*Professor David Pethick,  
Program Leader, Meat*

**T**he Sheep CRC is working on meat traits to help position lamb as a premier meat that is highly valued by consumers. Key factors are lamb's lean meat yield, eating quality and nutritional value.

Lean meat yield (the amount of saleable meat as a proportion of the carcase weight) is very important for profitability, as leaner carcasses are more efficient to produce on-farm, and in abattoirs require less of the wasteful and costly fat trimming. It is also important for consumer satisfaction, as people prefer to eat meat, not bone and fat.

However, increasing lean meat yield in other animal industries has shown that its increase can have detrimental effects on eating quality and nutritive value.

The Sheep CRC is using its Information Nucleus flocks to measure new meat traits and identify the relationships between traits and their management.

Consumers desire meat that is lean, tender, juicy and flavoursome as well as having good nutritive value with iron, zinc and essential omega-3 fatty acids. So how does lamb stack up against beef and chicken?

Despite 80% of families agreeing that 'Lamb is loved by Australians' (compared to beef at 65% and chicken at 53%), only about half as many lamb meals are served compared to chicken or beef (MLA survey\* 2005).

Mums also rated lamb similar to beef and better than chicken for being 'normally juicy and tender', but chicken clearly outranked both lamb and beef on



Photo: Deb Maxwell

*ABOVE: Prime lambs with higher lean meat yield are more profitable for the entire supply chain.*

\* Meat and Livestock Australia (2005) *Marketing Australian red meat in Australia and around the globe.*



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Photo: Industry & Investment NSW

ABOVE: Edwina Toohey, Industry & Investment NSW, testing a carcass

the perception that they ‘make healthy meals’. Beef was more strongly believed to contain a ‘wide range of vitamins and minerals’ than either lamb or chicken.

A final point from the survey that illustrates why lamb is served less is its cost, with 58% considering lamb ‘expensive’ compared to 46% for beef and only 19% for chicken. Unfortunately, lamb is expensive. Take a typical Trim Lamb Rack at about \$38/kg; once it is boned out to leave only the lean meat, the price is really \$56/kg for what is actually eaten. Therefore, it is vital that for lamb to maintain its market position and price, consumers must be made aware that lamb not only tastes great, it is also good for them.

To assist, the Sheep CRC is measuring many new and traditional meat traits (from its Information Nucleus flocks), including skin traits, pH, fresh colour, tenderness (shear force and connective tissue), muscle fat phenotypes (omega-3 and intramuscular fat), Meat Standards Australia (MSA) consumer eating quality, and iron and zinc. The results of the research will be available via new ASBVs and indexes from Sheep Genetics combined with the management knowledge to improve trait performance.

***Selecting and breeding for improved meat traits is successful because they are heritable.***

Fat depth, hot carcass weight, dressing percentage, intramuscular fat and tenderness are highly heritable, while lean meat yield, eye muscle depth and growth are moderately heritable.

The king of traits in prime lambs is growth, providing more weight for age, earlier turnoff, more valuable feeder lambs and greater feed efficiency. Growth can be identified by looking for a higher post weaning weight (PWWT) ASBV, which is often related to higher hot carcass weights in all breeds. However, as higher PWWT can also be associated with higher birth weights (which can lead to more lambing difficulties) ram buyers should also look for a moderate birth weight (BWT) and high lambing ease (LE) ASBVs.

Less fat will also increase lean meat yield and the amount of fat boned from a carcass is closely related to GR fat depth (the depth of fat under the skin, over the 12th rib, 110 mm from the back midline). Fat is wasteful for all with little return for the processor, extra labour to trim off fat and extra feed cost to the producer.

The key to growing lamb carcasses with a high lean meat yield is firstly higher PWWT to get large animals, combined with moderate to lower post weaning fat depth (PFAT)—this is especially important to reduce the carcass fat. Also, increase post weaning eye muscle depth (PEMD) to increase the size of the most valuable loin muscle cuts. These trait combinations are well managed using the LAMBPLAN indexes—Carcass Plus and the newer 2020 index.

Unfortunately, increasing lean meat yield has a tendency to decrease intramuscular fat, which reduces juiciness, tenderness and flavour. However, the relationship between these traits is far from complete, so producers will be able to identify and select animals with higher lean meat yield as well as higher intramuscular fat. Such outcomes have indeed been delivered in the beef industry by forward looking seedstock producers.

ASBVs are now also being calculated for dressing percentage (DR% is the proportion of carcass weight to live weight). Dressing percentage has a high heritability and value; every 1% increase in DR% equals about \$2 more per carcass (assuming 1% = 480 g hot carcass weight @ \$4.50/kg and 48 kg live weight). These animals also tend to be heavier, with more muscle.

***To maintain and improve tenderness and eating quality, producers should ensure lambs are well finished at high growth rates.***

Merinos should be growing at least 150g/hd/day and practices and handling should minimise stress. Processors need to use an appropriate

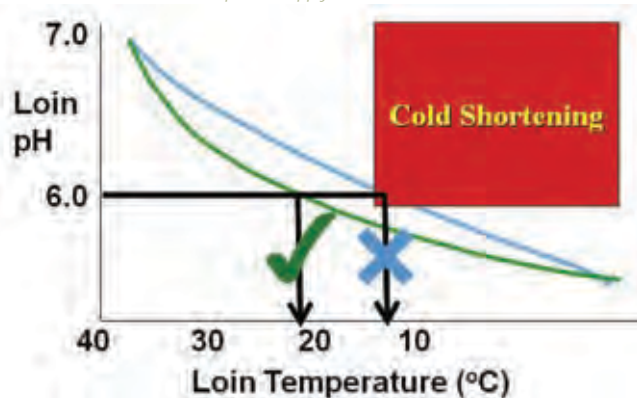
electrical stimulation system if they are to avoid cold shortening in the majority of carcasses, with the aim being a slower rate of carcass temperature drop after slaughter to reach a pH of 6.0 at 20°C.

When lamb carcasses from the Sheep CRC were processed through a number of abattoirs, the need for electrical stimulation systems to be correctly set was highlighted. It reinforced the need to manage and audit abattoirs, which is best undertaken by joining the Meat Standards Australia (MSA) Lamb system. Collaborating abattoirs are now operating well and some will adopt MSA systems.

With consumers' increasing demands for healthy foods, Meat & Livestock Australia has been running campaigns to highlight the nutritive value of lamb. Australian lamb must meet the health claims and take care not to decrease nutritive values while increasing lean meat yield.

Nutritionists allow a food to be claimed as a 'source' of a nutrient if a standard serve (135g for meat) supplies 10% of the recommended daily intake. It can be a 'good source' if it supplies 25%. The old (and limited) data states that lamb is a good source of both zinc and iron (with iron just above the claim level), whereas both pork and chicken are low in both zinc and iron.

Source: *Improving lamb & sheepmeat eating quality, a technical guide for the Australian sheepmeat supply chain, 2003, Meat & Livestock Australia*



ABOVE: Carcasses that chill too fast can become tough



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*ABOVE: Lamb is a source of essential nutrients*

Sheep CRC's very extensive and recent data shows Merinos always meet the good source claim for iron (as Merinos are older when slaughtered and have accumulated more iron). Terminal and maternal crosses reach the claim level 91% of the time, though they always achieve suitable zinc levels. For these breeds it may be possible to use genetics to prevent a decline in iron levels, as both iron and zinc levels are moderately heritable. Early indications suggest that sires that are extreme for PEMD are also low for iron, however data from subsequent Information Nucleus flock slaughters is needed to confirm this tendency.

Fatty acids are another nutrient essential for life and the beneficial n-3 and n-6 omega-3 fatty acids are found in lamb. On average, lamb can be claimed as a source of these omega-3s, but there are many lambs under the claim level, especially if finished on grain without green feed, as the chloroplasts in green feed help to make these fatty acids. Again, genetics may be a possible solution as sire effects have been isolated.

The lamb industry is in a great position to design lamb to be the 'premier meat on the planet', with the new ASBVs soon to be released. While lean meat yield is very important, it must be balanced against eating quality and nutritive value when choosing sires.

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# PRECISION SHEEP MANAGEMENT

## *Exploiting the differences between sheep*



Photo: Sheep CRC

Dr Kevin Atkins  
Adjunct Professor, UNE

**P**recision Sheep Management (PSM) is all about gaining benefits from superior animals by managing animals as groups or individuals rather than as a flock. To do this, producers need to identify each animal and take advantage of the variation that exists within all flocks. The benefits that are available will depend on production, identification method and data management systems.

Using a flock management approach, all animals are managed according to the flock average. However, if something is known about the attributes and value of individuals, then the contribution of the better animals can be maximised and the cost of, say, the bottom 25% can be reduced.

There are many opportunities for producers to use measurement on individuals to improve profitability through selection (improving current and future generations), targeted marketing and precision management.

***Many of these benefits are incremental and rely on re-using information on multiple occasions.***

In order to extract maximum benefits a producer may need to contemplate the cumulative benefits that will arise from a number of changed strategies rather than looking for a single 'big hit'.

The Sheep CRC has developed a range of decision support tools to help producers understand the amount of change that can be expected in their flocks over time, as well as some operational tools that use real flock data.

Electronic technologies and RFID (Radio Frequency Identification) have been applied in conjunction with software to allow producers to effectively obtain information that is otherwise difficult and/or costly to obtain. Collecting maternal pedigree through a system called Pedigree



Photo: Sheep CRC

ABOVE: A Pedigree MatchMaker system

MatchMaker is one example. This exploits the natural behaviour of ewes and lambs, where lambs tend to closely follow their mother. The sheep are recorded in the order they pass the reader and software identifies mothers based on how often they were followed by a particular lamb.

Another is Walk Over Weighing, a system allowing weights of sheep to be recorded daily over a period of time, without the need to bring sheep to yards.

Autodrafting is another labour saving device and improves recording identification accuracy. It uses collected information to draft according to defined criteria, without manual handling.



Photo: Sheep CRC

*ABOVE: Autodrafting—saving labour while increasing accuracy*

The Sheep CRC has extensive information about these systems available on its website and continues to conduct training events (workshops and webinars) to help producers understand how to capture benefit from these applications and others, how to set up systems and how to find people who can assist.

### PSM Decision Support Tools

- **Merino vs Terminal Flock:** calculates minimum Merino ewes needed for a self-replacing Merino flock
- **Wether Calculator:** calculates optimal proportion of wethers to ewes within a flock
- **OFFM Calculator:** determines profitability of wool clip preparation from fleece measurements
- **Selection Assist:** compares different breeding strategies
- **Ram Value Calculator:** compares the \$ value of different rams within a flock
- **Simultaneous Assortment:** sorts ewes for wool production, meat production and culls
- **Pedigree MatchMaker:** identifies the mother of each lamb
- **Walk Over Weighing:** determines weight of individual sheep in the paddock
- **Lamb Growth Predictor:** estimates lamb finishing date or weight at finishing date



Photo: Sheep CRC

*ABOVE: Sheep are individuals*

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*Find it on our web site*

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