

**INVESTMENT IN GENETIC IMPROVEMENT IN MEAT SHEEP BREEDING -
2007 AND BEYOND**

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SUMMARY

Developments in genetic improvement for lamb breeding have underpinned significant increases in lamb value and the income of lamb producers. As the use of tools such as LAMBPLAN has strengthened, the opportunities for building stronger supply-chain focused breeding and production businesses have grown. This paper outlines some of these developments and how they are being applied in a terminal sire breeding operation.

INTRODUCTION – CHANGE IN THE LAMB INDUSTRY AND ITS IMPLICATIONS

Returns for Australian lamb producers have been growing steadily over the past decade providing a profile for the industry unseen in Australia. Lamb has largely overcome many characteristics of an immature industry such as production swings, inconsistent supply patterns, and variable carcass quality. These fluctuating supply patterns were driven by the industries opportunistic attitude to lamb production.

The production systems for lamb have always been and are still primarily a by-product of wool. The wool market indicator was a key driver of lamb supply with downward movements over a sustained period resulting in number fluctuations during the 1980-1990's. This has impacted upon the viability of committed lamb producers as large numbers of 1st cross lambs from the merino flocks reduces the market price significantly and the viability of the committed (primarily second cross in Eastern States) producers.

The stability in the market prices for lamb over the past decade is supporting a new era of lamb professionalism as opposed to the traditional opportunism. A growing number of Australian producers are becoming lamb specialist producers with wool becoming a secondary component of the enterprise.

The stability in production and market demand is having a flow on effect and driving investment at all levels. Examples include:

- New processing plants are being built or upgraded
- Investment into processing technology to reduce cost of processing
- Large numbers of specialist lamb feedlots with state of the art infrastructure
- Property design and layout and management systems are being tailored to high lamb production (not merino production)
- Investment in genetics and artificial breeding is at an all time high

For producers this is changing production systems to cater for new look supply chains. The structure of the lamb industry is now becoming more specialised. These changes to structure are largely mirroring beef developments over the past 20 years. The structural changes in production include three main areas:

- **Breeding** - more producers are becoming breeders of feeder lambs as opposed to breeders and finishers. Note that there is now a distinct difference in value between finisher lambs and store lambs
- **Finishers** - an increasing number of processor owned/or aligned feedlots are emerging driving the demand for feeder lambs
- **Genetics** - seedstock businesses are slowly rationalizing with the future being in seedstock brands not breeds.

The acquisition of feedlots and finishing properties by the processing sector is the first sign of backwards vertical integration in the industry. However it is unlikely that this vertical integration will continue further down the chain as the capital to acquire land resources required to enter lamb production will make this unpractical.

The incorporation of large-scale finishing systems has increased the need to develop supply systems for feeder lambs. This has been a new market for lamb that has created its own specifications. Feeder lambs are now a specialised product and not simply small runs of lambs that producers couldn't finish (store lambs). The challenge for the industry is how to maintain a consistent supply of high performing feeder lambs to these infrastructures.

IMPLICATIONS AND OPPORTUNITIES FOR SEEDSTOCK BREEDERS - LAMBPRO

LAMBPRO Pty Ltd is a genetics company in the prime lamb industry. The company's business is focused on linking genes and markets. This is being achieved through livestock branding. Formerly Sonning Genetics the company changed its focus from the traditional model of a seedstock stud to a corporatised model LAMBPRO. The business consists of hybrid terminal and maternal genetics. The company has changed from a push business model to a pull business model.

A key opportunity was to use high performing genes as the back bone of a system to supply feedlots with high performing feeder lambs. It was clear from the start these terminal genes needed to have a balanced profit mix to maximize the value of the genes to each sector which act as a lure to be part of a branded system.

In building the brand and subsequent breeding program the following process was undertaken.

Understand the economic impact that terminal sires have on the various sectors

- Identify sires that maximize sectoral profit
- Multiply these high performing genes through the LAMBPRO flock
- Brand the progeny of these high value lambs over the generic competition
- Establish a feedback loop to improve the relationships and feedback loop with end users

Impact for commercial producers. Lamb survival and growth rate are the biggest profit drivers for producers. Simply selecting high growth genes that don't compromise lambing ease (particularly over a finer merino base) is the most critical strategy to maximize profitability using terminal genes. Progeny test trials have proven leading genes in LAMBPLAN (Banks, 1995) could increase weaning weights by 2-3kg over the average in the data base and probably 3-4 kilograms at 100 days over the average terminal sire. This represents \$5-6 in additional value for the producer from using high performing terminal sires.

Breeding Program Design Initiatives

The focus of terminal sire selection to drive producer profitability - Birth Weight, Weaning Weight (100 days), and Post-weaning Weight (225 days).

Impact for Finishers

Feed conversion is the biggest driver for the finisher. This is made up of a combination of maximizing the growth rate (the two are highly correlated) and reducing the number of shy feeders. Trials have shown feed conversion can be reduced by 1 kilogram of feed to put on every kilogram of liveweight. This equates to around \$4 per lamb finisher for export finishers. With limited profit margins (average lamb profit margins are \$8; Jolly 2007) and a turnover numbers based culture this margin is critical to breaking even

Selecting animals that maintain lean growth with increased muscle is the biggest driver of finisher profitability.

Impact for Processors

Lean meat yield and primal yield are the biggest drivers to carcass value. Lean meat yield is primarily the percentage of lean meat in the carcass with higher carcass utilisation. However with primal pricing driven by the export market's demand for rack and loin products for high value food service, the percentage of the carcass that is in these high value cuts. In many cases lamb racks are worth \$30/kg where legs are worth around \$8/kg. Increases in rack weight as an overall percentage of carcass weight drive big increases in carcass value.

Reduced fat and increased muscle drives lean meat and primal yield.

Identifying terminal sires that maximize profit

The use of LAMBPLAN has seen the evolution of balanced genetics that maximize supply chain profit. Over the past five years genes have emerged that add maximum value to all sectors where traditionally breeding sires that maximized value for all supply chain participants was a compromise. Historically high growth genes were low in muscle creating an uneven profit balance in the supply chain.

The LAMBPRO breeding program now focuses on using LAMBPLAN and an annual progeny test program to identify sires for use in the program. LAMBPLAN is primarily used to identify sires for use in the breeding program. Outside genetics are sampled widely while young sires are selected using LAMBPLAN and then enter a young sire program. While progeny testing is in its 5th year the use of the program as a young sire program is only in year 1. The aim is to expand the young sire program to 30 sires annually by 2009. With new developments in feed conversion testing the progeny test lambs are now measured for growth, carcass and feed conversion. This combination has allowed high rates of genetic gain using proven sires while also maintaining low rates of inbreeding.

Multiply these high performing genes through the LAMBPRO flock

The multiplication of these elite sires occurs through a simple set of management principles. Nearly all matings are designed using Total Genetic Resource Management (TGRM; Banks et al, 1999). This has maximized genetic gain and seen inbreeding levels minimized.

- Elite mixed age ewes are entered into the donor team. The focus often is on genetic diversity to create the next generation of seedstock

- All remaining mature ewes are artificially inseminated to the leading performing rams. Inbreeding levels are monitored with a focus on performance.
- Ewe lambs are mated to the young sire team as a seedstock link as well as capture the benefit from these unproven rams.

In addition LAMBPRO has used custom breeding with several flocks to increase the number of high performing animals for the LAMBPRO program. This process is diminishing as a percentage of the overall business but has been a key factor for growth. The cooperating flocks have used the proven progeny tested rams providing a close genetic linkage to the LAMBPRO flock. Figures 1 and 2 summarise genetic improvement in average of Sonning and Lambpro terminal sires in the key index Carcase Plus and Eye muscle depth at Post weaning ages (PEMD). They clearly show that rapid genetic progress has been made in recent years, particularly so in muscling, which is strongly correlated with carcase yield.

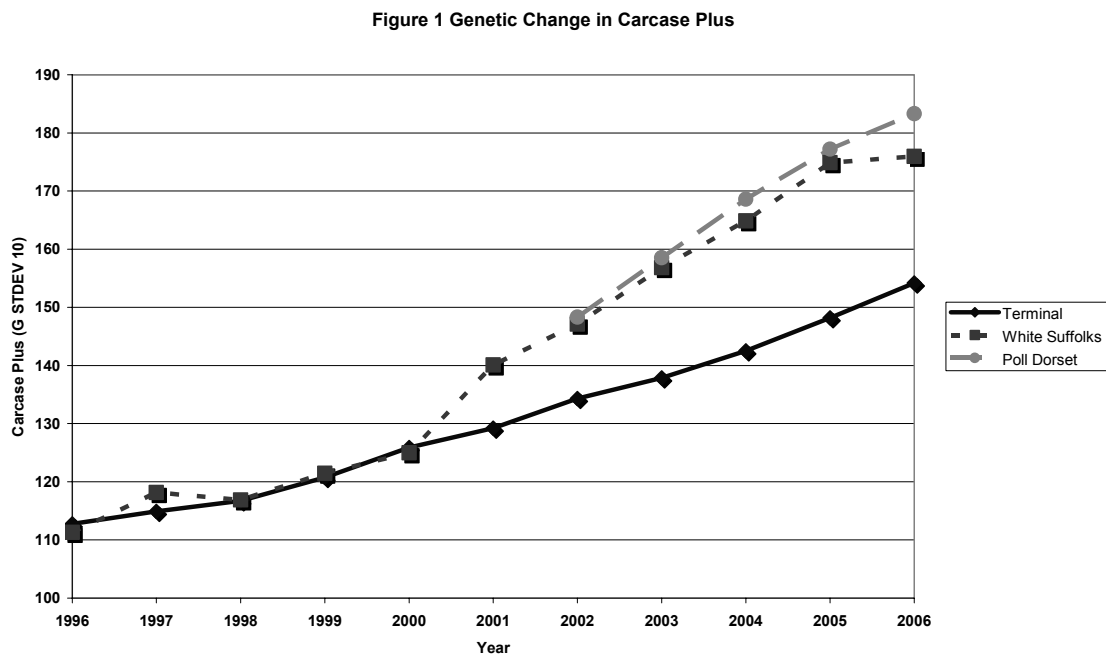


Figure 1. Genetic changes in the index Carcase Plus

Figure 2 Genetic Change in PEMD

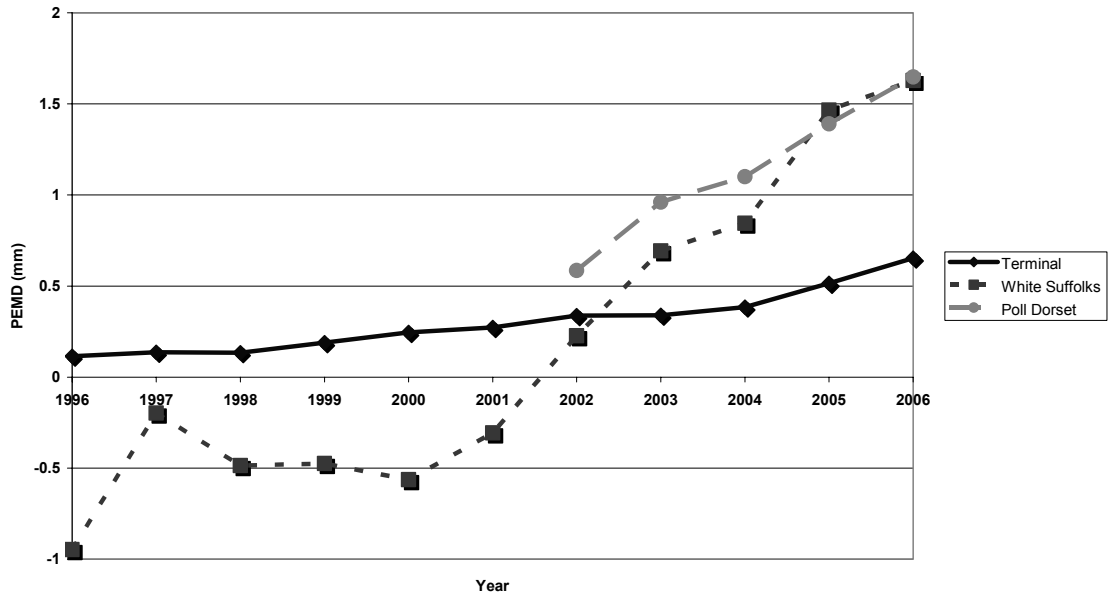


Figure 2. Genetic change in eye muscle depth at post weaning ages

BRANDING

In 2005 the business moved towards a pull based system by focusing on the development of a lamb brand as opposed to simply a ram selling business. The LAMBPRO brand is a livestock brand currently for feeder lambs to cater for the increased demand for high performing feeder lambs. The system aimed to overcome the shortfalls of the current mechanisms to purchase feeder lambs.

The previous system for purchasing feeder lambs had the following disadvantages:

- The main process was to purchase lambs in sale yard's with no information on age, genetics or health
- The time taken to go through the sale yards process had negative implications on feedlot performance
- Lambs were sold on a dollar per head basis with no information provided on actual weight
- The store lambs that hit the saleyards are often culls a producer couldn't finish (low performing store animals)
- No feedback mechanisms of opportunities to improve the system
- This system saw lambs seen as a generic article as opposed any differentiation on performance

The LAMBPRO system aimed to overcome the issues with the current system by achieving the following:

- Lambs are sold via the internet based auctions system Auctionsplus
- Lambs are sold on property with no stress from going to the saleyards
- Lambs are sold with weights and fat scores, age information, animal health information
- Comprehensive photos and live animal assessments are provided for buyers to look at lambs
- Most importantly lambs are sold with genetic information and all lambs are sired by high performing LAMBPRO terminal sires.
- Lamb sales are scheduled at strategic times to attempt to suit producer needs and feedlot demand

FEEDBACK

Feedback on the LAMBPRO feeder lamb concept to date:

- The first feeder lamb sale was held in 2004 with 4,000 feeder lambs and 26 registered bidders
- The premium in 2004 for the lambs was low compared to conventional selling systems
- In 2006/2007 selling season 25,000 lambs were marketed through the LAMBPRO feeder lamb system
- In addition 20,000 lambs were sold direct under the brand to feedlots.
- In three consecutive sales a total of 140 buyers registered to purchase
- A clear price premium has emerged with the average lamb making \$6-8 over and above the physical market
- Most buyers were repeat buyers of significant scale

CHALLENGES FOR THE FUTURE

Brand Awareness. Brand awareness is simply an ongoing educational and marketing process. Brand awareness is being created by a combination of advertising and direct communication with prospective feedlots and work of mouth. The increased scale of business will assist in creating awareness from increased involvement of more producers, agents and feedlotters.

Brand Consistency. The focus here is on increasing the consistency of performance of the feeder lambs. This is driven by not only genetics but also nutrition and management. As our understanding of the variation in feedlot performance develops further, practical QA systems need to be developed to limit variation. One issue is the longevity of terminal sires in some cases. Some producers are still using 2000 drop rams in 2007 mating where others will be using 2006 drop rams. The new genetics need to be better described to reward producers who encourage generation turnover in their sire battery as well as purchasing higher performing sires.

Supply Consistency. The LAMBPRO feeder lamb sales currently occur between October and February. Feedlots however require lambs year-round, which requires lamb systems to provide this supply. Most LAMBPRO clients lamb in July-September and wean Oct-Dec. There is a cost in keeping lambs past this time-frame and many don't wish to speculate whether they receive increased margins by keeping lambs for later marketing. This issue can only be solved by a contracting system which is needed for delayed marketing. The nature of lamb marketing into key markets makes this process speculative for the processing sector which is resisting to offer long term contracts.

Brand Expansion. LAMBPRO aims to expand the brand to finished lambs and prime lamb dams in coming years. With only 25% of the lambs sired by LAMBPRO rams going through the feeder lamb system offers the opportunity to focus on the other product categories. Both are in design stage and will offer similar benefits in product description and profit opportunities for successful purchases.

Breeding Program Design Initiatives

CONCLUSIONS

The LAMBPRO feeder lamb concept has achieved structural change in the lamb industry but still has a long way to making a significant industry impact. In 2007 it is expected 200,000 lambs will be sired by LAMBPRO rams which is roughly 1% of national production. The work ahead is assisted by the resources available particularly from Meat and Livestock Australia, Department of Primary Industries (Rutherglen Research Institute) and the passion of 140 progressive lamb producers.

There are real opportunities ahead for us, and are we committed to continuing to use both existing knowledge and new R&D to deliver more value for our partners. The lamb genetics business has a great future!

REFERENCES

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