Sheep Updates 2006 -Part 1

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A new variety of sulla (*Hedysarum coronarium*) for forage production in southern Australia

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**ABSTRACT**

Sulla (*Hedysarum coronarium*) is a highly productive, deep rooted, short-lived perennial legume with excellent fodder quality suited to both pasture and fodder (hay or silage) production systems. A new variety developed in a RIRDC supported project is highly productive and has characteristics that confer lower costs of harvest and seed processing and was released to seed growers this year. This new variety is best suited to fertile soils in high rainfall (> 500 mm), long growing season areas with a restricted summer drought period, or to irrigation. Greatest productivity will be achieved on neutral to alkaline soils but the full extent of its adaptation to WA soils is still to be determined. It is ideally suited to short-term break crops or phase pastures and offers a new option in between regenerating annual legumes and longer-term lucerne pastures. This paper will outline the development and performance of the new variety of sulla together with its potential role for forage production in southern Australia.

**INTRODUCTION**

Sulla (*Hedysarum coronarium*) is a productive, deep rooted, short-lived perennial legume currently used in New Zealand and parts of the Mediterranean region (notably Italy and North Africa) as a specialty forage plant. It can be grazed directly early in the growing season (of regenerating pastures) and cut for hay or silage in spring. It is keenly sought in intensive pasture systems for sheep milk and cheese production, where it is fed green or used for silage or as hay.

Although sulla is the second-most widely used forage legume (after lucerne) in Mediterranean Europe, it is virtually unknown in Australia agriculture. A major reason for the lack of an Australian sulla market is the constraint of high seed prices (currently in the order of $16 - $24 per kg). In addition to the requirement to import seed, these high costs are due to low seed yields and high post-harvest seed processing costs. Sulla produces a high level of hard-seeds at maturity and its segmented pods must be dehulled after harvest to remove seed, which must then be scarified to increase germinability. The dehulling process to date has been inefficient and added considerably to seed cost. The other reason for the low level of adoption is the lack of a suitable variety for Australian conditions. Two cultivars of sulla, Grimaldi and Commerciale, are used extensively in Italy, while two cultivars, Grasslands Necton and Grasslands Aokau, have been released in New Zealand. However, previous experience with these cultivars indicates that their maturity is not suited to Australian conditions. Sulla was unlikely to achieve large-scale adoption unless the constraints of low seed production and ease of dehulling were overcome.

**METHOD AND RESULTS**

Sixty accessions of sulla were evaluated in both Western Australian and Eastern Australian trials. Considerable emphasis in the selection program was placed on seed production and herbage production. HRN83-A, selected from a Tunisian accession, emerged as the most productive and highest seed producing variety. A highly erect selection, it sets pods high in the canopy, has high pod retention at maturity and is earlier maturing than other sulla cultivars from overseas. These features enable direct harvesting with conventional cereal harvesters. At Northampton (WA) 40% of HRN83-A plants had flowering by mid-October, (Table 1) compared to no plants of Grasslands Aokau and 5% of Grasslands Necton. This earlier flowering characteristic makes HRN83-A much more suited to seed production than other cultivars in the relatively short springs of southern Australia.

The outstanding seed production potential of HRN83-A, in comparison with other sulla cultivars, was also confirmed in two South Australian field trials at Petersville and Booborowie in 2004. Averaged over both sites, HRN83-A seed production was 90% more than Grasslands Necton, 273% more than Grimaldi and 339% more than Grasslands Aokau.
Table 1. Field performance data of HRN83-A, Grasslands Aokau, Grasslands Necton and Sceptre lucerne at Northampton, Western Australia in 2002. Flower abortion score: 1 = nil flowers aborted, 5 = all flowers aborted; Sown May 2002 at 10 kg/ha.

<table>
<thead>
<tr>
<th>Variety</th>
<th>Biomass t/ha</th>
<th>% of plants flowering</th>
<th>Flower abortion 1-5</th>
<th>Seed yield kg/ha</th>
<th>Biomass t/ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>HRN83-A</td>
<td>7.8</td>
<td>40</td>
<td>2</td>
<td>73</td>
<td>4.6</td>
</tr>
<tr>
<td>Grassland Necton</td>
<td>5.5</td>
<td>5</td>
<td>3</td>
<td>35</td>
<td>-</td>
</tr>
<tr>
<td>Grasslands Aokau</td>
<td>5.1</td>
<td>0</td>
<td>4</td>
<td>12</td>
<td>3.7</td>
</tr>
<tr>
<td>Sceptre lucerne</td>
<td>1.9</td>
<td>25</td>
<td>3</td>
<td>14</td>
<td>1.5</td>
</tr>
</tbody>
</table>

Sulla contains condensed tannins in the foliage, flowers and stems, conferring the additional advantages over lucerne, of anti-bloating properties and anthelmintic properties that assist in internal parasite control. Although this anthelmintic effect has not been extensively tested under Australian conditions, a small grazing trial in Western Australia found there was a very marked reduction in the amount of scouring of sheep grazing the sulla pasture compared to kikuyu / clover treatments. This is a significant finding, as scouring leads to wool fault around the hind-quarters and increases the risk of fly strike. A pasture that reduces scouring incidence would be very beneficial especially with the upcoming ban on mulesing. However, more research is needed to give recommendations about the length of time that sulla can be fed as a sole diet to animals.

This new variety is best suited to fertile soils in high rainfall (> 500 mm), long growing season areas with a restricted summer drought period, or to irrigation. Seed should be inoculated with the correct strain of rhizobia (Rhizobia hedisari) and sown at rate of 8-10 kg/ha into a firm, weed free seed bed at a depth of 10-20 mm. A new commercial sulla inoculant has been developed with better soil persistence and should improve productivity. Preferably sow in early to mid-autumn, when warm to mild conditions allows sulla to compete strongly with annual weeds during the establishment phase. Greatest productivity will be achieved on neutral to alkaline soils but the full extent of its adaptation to WA soils is still to be determined.

CONCLUSION

HRN83-A sulla is a new forage option for high rainfall pastures in southern Australia. It combines early maturity and an erect growth habit (for early vigour and ease of forage production) to maximise seed production.

KEY WORDS

Sulla, Hedysarum coronarium, forage legume.

ACKNOWLEDGMENTS

HRN83-A was developed through a RIRDC-funded CLIMA project “Seed production limits sulla and purple clover as fodders” based at the Centre for Legumes in Mediterranean Agriculture. Thanks go to Dr Hayley Norman (CSIRO) who conducted some of the initial trial work and later undertook forage quality analyses, Dr Brown Bessier (Department of Agriculture) for collaboration in anthelmintic studies.

Paper reviewed by: Dr Clinton Revell

REFERENCES

(3) C. de Koning personal communication.
(6) B. Bessier personal communication.
Mating – Short and fast is better

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BACKGROUND

Maximising stocking rate is clearly the key short-term driver of profit in wool and sheepmeat enterprises. As we consider the medium and longer terms, however, other factors become increasingly important. First, as the industry generally moves towards increases in stocking rate, there will be a need for more animals and there will be competition for those animals in the marketplace, not only among farmers but also between farmers and meat processors. Second, high rates of reproduction are essential for maximising the gain from genetic selection and for earning a good return on investments in top-class genetics.

In a prime-lamb enterprise, the need for efficient reproduction is self-evident: the ewe flock must generate plenty of lambs because they are the source of income. In a wool-only enterprise, there is less pressure on reproduction because ewes that don't have a lamb still produce wool for sale. Reproduction is usually seen only as providing flock replacements, but genetic improvement is still slowed by poor reproductive efficiency. In any case, wool-only enterprises are becoming rare and the dominant situation is now becoming a mixed meat-wool enterprise based on Merino mothers.

Efficiency can be improved at all stages of the reproductive process so it is necessary to prioritise those stages on the basis of where we can have the greatest impact. Currently, most attention is being placed on lamb survival, and for very good reasons. Lamb losses probably average 30% and are a disastrous waste of investment in labour, pasture and genetics. In addition, the associated ethical issues could lead to closure of our most profitable markets.

Addressing lamb mortality is not easy because the causes are complex, involving genetics, nutrition and management. However, most lambs are lost in the first few days after birth and most of the losses are among twins, so we know where to focus our efforts. The major causes of mortality can be rectified by clever and precise management but this is really only feasible if the mating period is restricted so that the timing of lambing is known and the duration of lambing is short. In this paper, we will look at short matings and begin by considering the arguments for and against it (see the table of “pros and cons” below). We aim to show that the arguments against are either not important in the context of the need to improve efficiency or, if they are important, we can manage them so they have minimal impact.

The Arguments For

1) Avoid the effects of the autumn feed gap

The problem with extended autumn matings in WA is that the ewes that attempt to mate late (second or third cycle) are more likely to be losing weight. They might not conceive due to the deterioration in feed quality at that time of the year, especially if the feed gets rained on. They are also less likely to have twins. None of this necessarily reflects their genetic potential … they are less likely to get into lamb or conceive twins simply because of a drop in body weight. The only way to avoid this is an expensive program of feed supplements.
<table>
<thead>
<tr>
<th>Pros</th>
<th>Cons</th>
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</thead>
<tbody>
<tr>
<td>Avoid the effects of the autumn feed gap</td>
<td>Lost opportunity to conceive, low lambing percentage?</td>
</tr>
<tr>
<td>Mate while the ewes are still in good condition</td>
<td>Yes, no “tail” … but how much is lost?</td>
</tr>
<tr>
<td><strong>Concentrated, short lambing period</strong></td>
<td>Need more rams?</td>
</tr>
<tr>
<td>Focus feeding becomes efficient</td>
<td>Yes, but it can be managed.</td>
</tr>
<tr>
<td>Feeding for twinning</td>
<td>Avoid the impact of weather events at lambing?</td>
</tr>
<tr>
<td>Feeding for colostrum</td>
<td>Yes, but only partially … still a disaster.</td>
</tr>
<tr>
<td>Lambing management for lamb survival</td>
<td>A substitute for poor management?</td>
</tr>
<tr>
<td>Marketing simplified (no “tail”)</td>
<td></td>
</tr>
<tr>
<td>Weaner management simpler (no “tail”)</td>
<td></td>
</tr>
<tr>
<td><strong>Labour management at lambing, tailing, drafting</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Increased value from scanning</strong></td>
<td></td>
</tr>
<tr>
<td>Separation of dries, singles, twins</td>
<td></td>
</tr>
<tr>
<td>Lamb survival (focus on twins)</td>
<td></td>
</tr>
<tr>
<td>Minimise autumn feed costs</td>
<td></td>
</tr>
<tr>
<td>Manage lambing as 1st and 2nd cycles (survival)</td>
<td></td>
</tr>
<tr>
<td>Strategy for late start to season</td>
<td></td>
</tr>
<tr>
<td><strong>Pressure on genetics of ewe fertility</strong></td>
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</table>

2) **Concentrated, short lambing period**

A short mating period leads to a short lambing period in which intensive activity becomes cost-effective. If the ewes are lambing in a relatively tight pattern, then the lambing environment can be managed and strategies such as “Focus Feeding” become efficient. This means that we can consider supplements that will promote twinning and increase the production of colostrum. Extra twins, as long as they are gained at minimum cost and then managed correctly at lambing, will improve profitability. Extra colostrum will probably help lamb survival. Lamb mortality can also be reduced by improving the conditions in which ewes lamb, including the provision of feed, water and shelter by, for example, the provision of “edible shelter” such as a standing oat crop or fodder shrubs. With a combination of a short mating and ultrasound scanning, this investment can be focussed on twin births in the first 10 days of lambing, with cost-effective outcomes.

A concentrated lambing period has additional benefits in that the “tail” in the lamb crop is avoided, so the cohort is of a more even size. This simplifies marketing into prime lamb supply chains and simplifies the management of weaners over their first summer and autumn.

The difficulties with farm labour in the current economical and social climate, as well as the diverse demands placed on the farmer’s time in a crop-sheep enterprise, have led to great interest in the reduction of labour inputs. In turn, this has led to the development of the concept of an “easy care ewe”. Here too, short mating can help because it leads to a short and intensive period of lambing at a known time, so labour inputs can be planned well ahead. Again, ultrasound scanning is a vital source of information for that planning process.
3) **Increased value from ultrasound scanning**

With a short mating period, all conceptions could be limited to a single cycle, perhaps two. This increases the value of ultrasound scanning because it allows the segregation of ewes into flocks of dries, single-bearers and twin-bearers. The dries can be managed as wethers, or culled to improve fertility or, if they are excessively numerous, mated as a separate flock with a slightly later (but still concentrated) lambing.

This segregation is the first step towards “focus feeding” for colostrum production, or “feeding to meet the need” so that supplements and feed resources are not wasted on non-pregnant and single-bearing ewes. This is perhaps most important when there is a very late start to the growing season. Finally, the ability of high quality scanners to detect twins and even differentiate between fetuses conceived in different cycles allows efficient planning of lambing conditions and thus excellent opportunities for reducing lamb mortality.

4) **Pressure on genetics of ewe fertility**

A short mating period gives the ewe only one chance to conceive. If she fails that test, she faces culling, particularly if it is her second year in succession. Thus, as soon as the results of ultrasound scanning are known, a strategy for genetically improving fertility can be implemented. Clearly, culling for single-cycle fertility needs to be a flexible strategy, with variations made according to ewe body condition and age. It also needs to be matched with an equally careful strategy for ram management (see below).

In contrast to traditional practice, it is important to tighten-up matings with maidens too. Provided they are of adequate weight (above 2/3 mature body weight), not losing weight when joined and have been teased (even for a post February mating), they really should be able to get into lamb with a short mating. If they don't, it may be best to be cull them since they may well become the perennial dries (barren ewes) or “laggards” (never having twins or skipping a lamb every second year) throughout their life. This needs further scientific investigation because we have no solid data for Merino ewes, but the phenomenon is appreciated for cattle so top beef and dairy producers have short matings for their heifers. It nevertheless seems sensible to avoid handicapping maiden ewes and give them every opportunity to quickly get into lamb and cull them if they don't.

**The Arguments Against**

1) **Lost opportunity to conceive, so low lambing percentage?**

It is self-evident that a drawn-out mating period will increase the percentage of ewes that conceive, simply because those that mate and fail have a second or third opportunity. Two issues are relevant here. First, as discussed above, the late conceivers may need to be culled because of their poor fertility genetics (assuming all other factors equal, such as ewe body condition and ram performance). Second, the lambs gained in the second and third cycles may actually be a cost rather than a benefit. As well as forming the “tail” of the lamb crop, there may be fewer of them than we realise. This issue is demonstrated in the figures below.

2) **Extra rams needed**

It is clear that we need to have a higher ram percentage for short matings if we are to offer the ewes a reasonable probability of conception. This is especially important in flocks mated before February because the ewes will be teased and thus synchronised. Instead of the rams having to serve 6% of the ewes every day, as happens during the breeding season (February to May), they will encounter as many as 30% of the ewes in oestrus on some days. In this situation, 4% rams might be needed.

In this light, it is essential for short matings that the rams are managed correctly so that each individual is contributing their best. This means ensuring that they have maximum mass of testes … feed them with 500 g per head per day) for 8 weeks before they go in with the ewes. It also means that they must be anatomically sound, healthy and fit. For matings before February, extra rams are needed and, if this seems excessively expensive, we may need to explore new strategies, such as sharing rams with producers who mate at a different time. This might raise issues such as concern for disease control, but such issues should be addressed not avoided.
3) Avoiding the impact of weather events at lambing

There is no doubt that we are horrified by the impact of a weather event, such as heavy rain with high wind-chill, during lambing. In fact, lambing over 6-8 weeks does not guarantee a good result because most lambs (70% on average) are born within the first 17-day cycle and a random weather event is just as likely to fall during that period as during the second or third cycles when relatively few lambs are dropped. In any case, rather than give in to this risk, we should plan for it and manage the lambing flock correctly. This brings us back to concepts such as “edible shelter”. The basic fact is that 20 cm of grass or crop is enough for a lamb to drop down out of the wind-chill zone. If the surroundings are managed so that the ewe does not need to wander from the birth site, lamb mortality will not be a major issue.

Conclusion

There are problems with short mating periods, but they are either minor or they can be managed so they have little impact. They are then greatly outweighed by the benefits.

Further reading
Breech strike protection in sheep post 2010

Scott Williams, Program Manager Animal Health and Welfare, Australian Wool Innovation Limited

ABSTRACT

AWI and its partners have made significant progress in developing intradermal injectable treatments and clips as mulesing alternatives. Genetic solutions to breech strike are also being examined.

INTRODUCTION

Mulesing has always been controversial, and many attempts have been made over the years to develop alternatives (for a summary see Rothwell et al 2006). In November 2004, responding to concerns raised by retailers of Australian wool, the Australian Sheep and Wool Industry Taskforce announced that the practice of mulesing would be phased out by 2010. An existing program of research by Australian Wool Innovation Limited (AWI) to develop viable alternatives to mulesing was accelerated and broadened in scope. This paper reports on progress.

REVIEW

AWI has examined a very broad range of ideas for modifying the breech of sheep to make it less attractive to flies. The current focus of the R&D program, however, is on three areas: intradermal injection and clip products, which offer pre-2010 alternatives to mulesing; and genetic solutions.

Intradermal injections

The current developments in intradermal treatments originated with research by the University of Adelaide into the use of collagenase as a permanent depilatory agent. The injection of collagenase into the skin caused disruption of blood vessel walls, causing local anoxia, tissue death, scab formation and subsequent contraction of surrounding skin. Alternatives to collagenase were developed because it had a number of potential weaknesses. The agents now being used are well-known chemicals with disinfectant properties. In comparison with collagenase they are stable, easy to formulate, inexpensive, and well known to regulators, all of which will simplify registration.

AWI has identified an effective needleless injector manufactured by Medical International Technologies of Montreal, Canada. The MIT device is driven by CO₂ and has a multi-pronged head specifically developed for the purpose. It has performed well in field trials, consistently delivering the fluid to the correct depth of 1-2mm across the area.

Current research is focusing on optimisation of the formula of an intradermal product, placement of the injections and the effect of operator pressure. Once the formulation is finalised, the product must undergo efficacy trials (depending on the label claim) and residue, safety and environmental studies. A commercial partner is being sought and it is hoped a registration dossier will be submitted later in 2006. This would lead to a commercial product being available in 2008.

Clips

Clipping works in a similar manner to elastrator rings. The clip creates a linear occlusal surface that isolates a flap of skin from the blood supply. The flap becomes anoxic and dies. In most cases, the clip and shrivelled flap fall off after a few weeks leaving a low-profile linear scar.
The perineum and tail are likely to require different clips because of the three-dimensional curvature of the tail and tight adherence of tail skin to underlying tissue. The breech clip design appears to be finalised. Two designs for the tail are being evaluated: the one-piece ‘dog-bone’, centred on the top of the tail; and the bilateral ‘hockey-sticks’, the crook of which capture the skin fold at the base of the tail.

Clips offer two major advantages. First, they can be immediately re-positioned if the operator is not happy with the effect achieved (e.g. asymmetry). This is in contrast to mulesing or injectables. Second, there is no introduction of agents into the body, and therefore no residues or human / sheep health concerns. Clips do not have to be registered (which shortens time to market by 18 months).

Commercialisation is expected in 2007. The major threat to this target is the identification of a suitable degradable material for manufacture. A number of materials are being tested under conditions of accelerated weathering. The option of re-usable clips, which would be removed a few weeks after application, may be a possibility in more intensive grazing situations.

Genetic solutions
AWI has been pursuing two approaches to the development of genetic solutions: breeding of sheep with desirable breech traits using index-based selection; and the exploitation of ‘extreme phenotype’ sheep found in a number of flocks. A review conducted for AWI (James 2004) concluded that ‘there appears to be significant opportunity to reduce the susceptibility of Merinos to breech strike by genetic means although it appears unlikely that breeding alone will be able to confer the degree of protection provided by surgical mulesing and tail docking, at least in the short term.”

AWI, the Department of Agriculture and Food WA, and CSIRO have established breeding flocks at Mt Barker and Armidale with the aim of testing the degree of breech strike resistance that can be bred into flocks. At each site there are: 200 randomly-selected ewes mated with randomly-selected sires; 200 randomly-selected ewes mated with sires selected for ‘desirable’ breech characteristics (high breech bare area, low dag score, low wrinkle); and 200 ‘desirable’ ewes mated with ‘desirable’ sires.

In each mob, half of the offspring will be mulesed and the other half unmulesed. Two lamb drops will be generated. A wide range of traits is being measured in all sheep (including body and fleece weights, fibre diameter, staple measurements, worm egg count) to determine what trade-offs are made when desirable breech traits are included in the breeding program. No results are yet available.

The second area of investigation is into sheep with extreme phenotypes. The focus of this work is at Calcookara Stud in South Australia where a large number of sheep with very bare breeches have been produced (although such sheep have been identified in other flocks). The sheep typically lose their breech wool at about 18-24 months of age.

Early results from the University of Adelaide suggest that the bare-breech trait is highly heritable (0.46), that there are favourable correlations with skirted fleece weight and staple strength, and that there are no correlations with fibre diameter or staple length. Results from the Mt Barker / Armidale trial will also generate genetic parameters for use in the analyses offered by Sheep Genetics Australia.

CONCLUSION
Mulesing is highly effective, quick and relatively inexpensive. Finding a replacement with all of these features is a challenge. However, AWI is confident that at least one product will be
available in advance of 2010. At the same time, our understanding of genetic resistance to breech strike is rapidly improving and may provide the most attractive longer-term solution.

KEY WORDS
Sheep; flystrike; mulesing

ACKNOWLEDGMENTS
The research described in this paper has been ably led by Ms Jules Dorrian and Prof Jim Rothwell. The concept of using intradermal necrosing agents owes much to the work of Prof Phil Hynd and his team at the University of Adelaide. The concept of clipping was developed by the Hon. Ian McLachlan AO and Dr Chris Abell, directors of AWI, and Dr Jack Coffey. All intellectual property associated with the clips was assigned to AWI.

REFERENCES

How the West can win!

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ABSTRACT

The Australian lamb and sheepmeat industries have been star performers over recent years and prospects for these industries remain strong as international demand continues to increase.

West Australian sheep producers are in an ideal position to capitalise on the sustained demand for lamb and sheepmeat due to their proximity to high growth markets and their ability to capitalise on a range of emerging opportunities within the sheep industry. These include the production of feeder lambs, breeding ewes and the live exports trade.

INTRODUCTION

Key international growth markets for sheepmeat include the USA, Japan, China and the Middle East and African regions. Meat & Livestock Australia (MLA) is focused on maintaining access and maximising consumption of Australian sheepmeat both domestically and in these and other regions while looking to develop emerging markets.

Growth across this range of diverse markets is being increasingly met by Australian exporters supplying products on a cut or item basis depending on price and suitability for traditional cooking methods in that region or country.

The West Australian sheepmeat industry has the ability to capture a large share of the growth in the Middle East and African markets due to proximity and the ability to supply the entire range of meat and livestock products. Exports to the Middle East have increased significantly in 2005, with lamb up 36% to 14,100 tonnes sw and mutton exports up 24% to 36,100 tonnes sw due to growing populations with more disposable income, improved Australian supply, higher prices for competitor products and a rejuvenated live export trade.

REVIEW

The key drivers of demand for Australian lamb and sheepmeat include international supply, prices of competitor proteins, economic prosperity, both domestically and abroad, the impact of exchange rates, disease outbreaks and access to global markets.

A 10% increase in slaughter of Australian lamb in 2005 to 18.23 million head, combined with reduced supply from New Zealand sheepmeat, has assisted growth of Australian exports throughout the year. This combined with the increased prevalence of avian influenza (AI) and outbreaks of foot and mouth disease (FMD) in some Brazilian and Argentinian states has meant that Australian sheepmeat was more competitive in international markets.

As a result, Australian lamb exports for 2005 reached 141,000 tonnes worth approximately $760 million, a 26% increase in volume and value on 2004 exports. Exports are expected to grow a further 5% in 2006; volumes are expected to increase to 173,000 tonnes by 2010 accounting for virtually all the extra increase in supply.
The USA remains the main lamb market accounting for 29% of volume, 43% of value and 40% of recent growth reaching 41,000 tonnes sw in 2005 worth $324 million. Exports, dominated by leg and loin cuts, are projected to reach 43,000 tonnes in 2006.

In Japan, the development of specialist Genghis Khan restaurants has seen consumption of lamb boom, reaching 11,000 tonnes sw in 2005. Exports, consisting mainly of bone less and bone in shoulders are expected to grow by 14% to 12,500 tonnes sw in 2006 exceeding $79 million in value.

Despite China’s large sheep population, exports of predominately breast and flap, jumped 44% to 13,494 tonnes sw in 2005 and are expected to increase to 15,000 tonnes sw in 2006.

The Middle East market is changing rapidly, stimulated largely by revenues from oil reportedly generating a net profit of US $2,000 per second or US $1.67 billion day. The region is home to 237 million consumers; approximately 70% are under 20 years of age.

Throughout the region, international retailers are opening western style hypermarkets. These are influencing the way people shop and the products they buy. This is causing a shift from frozen products, supplied to butcheries and corner stores, to chilled carcases and cuts, including legs and square cut shoulders suitable for larger scale retailing.

Consumer research shows that a focus on new factors, including flavour, convenience, and enjoyment, will play a more important role in capturing the younger generation of consumers in this region.

Growth in the number of middle income earners in South Africa has resulted in stronger exports of lamb to this market, up by 51% to 4,400 tonnes sw while mutton exports are up 21% to 13,700 tonnes sw, almost 90% of these exports are the two items of neck and breast and flap.

Live sheep exports to the Middle East provide producers in Western Australia with another option for marketing their sheep. Live sheep exports reached 4.1 million head in 2005 driven by the return of Saudi Arabia to the trade. Exports are projected to reach 4.5 million head in 2006 and expand to 5 million head by 2010 due to sustained higher oil prices and strengthening competitor prices.

CONCLUSION

The Western Australian sheepmeat industry is ideally positioned to capture growth opportunities for sheepmeat, especially in the Middle East and African markets, due to proximity and the ability to supply the wide range of products required.

The ability to supply by a cut or item basis means that exports of the ‘traditional’ higher value cuts to a wide range markets including Europe and America complements the demand from the Middle East and Africa.

Future success will be reliant on the ability of the industry to maintain high standards of production and meet year round demand, lead the change to cut or item based supply, while improving supply chain knowledge and capabilities to these regions.

KEY WORDS
International markets, Middle East, cut or item based.
ACKNOWLEDGMENTS

Paper reviewed by: Ian Ross, Meat & Livestock Australia Ltd.

REFERENCES

Mr Peter Lindford, Senior Trade Commissioner and Consul General (Middle East), Austrade, 2005.

The Merino Company (TMC) – Active marketing and supply chain management

Mark Suttie, General Manager Marketing – The Merino Company (TMC)

ABSTRACT

- The Merino Company (TMC): Marketing and supply chain management in the wool value chain
- Basic introduction into our business model
- A simple case study of how the model is being applied effectively for Tasmanian wool growers and specifically for Roberts Wool Link.

AIMS

The Merino Company (TMC) is a marketing and distribution platform designed to give wool growers and key participants stable and sustainable returns. The fundamental aim of The Merino Company is to promote consumer awareness of and demand for the unparalleled quality of Merino Wool. In so doing TMC has the express intent of bringing benefits to both buyer and seller, through the implementation of collaborative marketing aimed at building the Merino brand. TMC is a wool textile marketing entity focusing on retail marketing, demand generation, and market-linked R&D. TMC enables both producers and processing partners to generate sustainable demand, price stability, and increased value from innovative wool brand development. The end result is that we’ll better meet the needs of retailers and consumers. TMC is working in association with leading grower services providers to implement this innovative new concept; A Merino fibre initiative designed to bring about the sustained profitability of Merino stakeholders, from growers right through to retailers.

METHOD

There are two key areas of activity practiced simultaneously by TMC; the first is to take a corporate approach to marketing on behalf of Roberts Wool Link (RWL) and the second is supply chain management.

TMC – Marketing & Supply Chain Management for RWL

RWL Marketing:

A comprehensive marketing strategy has been prepared for RWL by TMC; the following are the key success factors;

2. Differentiation of Tasmanian wool brands based upon origin and ongoing innovation.
3. Relationship building with existing customers and the development of new relationships.
4. Traceability, authenticity and certification programs.

5. The relative scarcity of Tasmanian wool.

RWL Supply Chain Management (the following are the key outcomes from TMC’s supply chain management process):

1. The channel is significantly shortened, physical ownership changes much less meaning the ability to supply quality product at a fair price and ensure margin for aligned channel partners

2. Channel participants are aligned toward best meeting consumer needs and delivering customer satisfaction and loyalty

3. TMC has the responsibility of effecting greater bi-directional communication through the channel; especially focusing upon better communication of customer / consumer wants and needs

4. The entire channel is aligned towards ensuring customer satisfaction with the end result being greater loyalty

5. The channel is marketing and relationship oriented

RESULTS

The Roberts Wool Link program does not launch until July 1 this year. Even so the marketing efforts for RWL commenced in late October 2005. In fact the collaborative development of this program has been many years in the making.

There are many case studies where we can illustrate the demonstrable results that these programs have already achieved on behalf of Tasmanian wool growers and these will be prepared for the presentation in July.

CONCLUSION

Active marketing and supply chain programs are absolutely vital if wool is to become a relevant fibre in the future. In the early days of the RWL program, TMC is able to demonstrate some significant success and strong returns to wool growers.

KEY WORDS

- Strategic Marketing
- Demand generation
- Supply chain management

ACKNOWLEDGMENTS

The strategic thinking which is the basis of the TMC business model has come through the vision and experience of Lempriere (Australia) and Roberts Pty Ltd. There are many people dedicated to this program but significant credit must be given to William Lempriere (Managing Director of Lempriere (Australia)) and Eric Hutchinson, Marketing Manager of Roberts Pty Ltd who championed this project for several years.

Paper reviewed by: Eric Hutchinson – Roberts
Driving on-farm productivity: the next 20 years
Peter Fennessy and Jack Cocks, AbacusBio Limited, PO Box 5585, Dunedin, New Zealand

ABSTRACT
New Zealand now exports about the same amount of lamb as in the late-1980s from a ewe flock which is 40% smaller. There has been a major increase in productivity from 12.7 to 21.3 kg of meat per ewe, a compound rate of 3.3% per year, due to increases in both weaning percentage and carcase weight. While there are opportunities to further increase per ewe productivity, the focus must be on factors that impact on overall efficiency of the farming business, which includes both income and expenditure. A method of analysis that focuses on the drivers of profitability is described, while some of the technologies that will impact on the business of sheep farming are outlined.

INTRODUCTION
New Zealand now exports about the same amount of lamb as in the late-1980s from a ewe flock which is 60% the size. Hence there has been a major increase in productivity. While this is interesting, the real challenge is to consider the opportunities to further enhance productivity over the next 20 years. Much of the recent focus has been on individual animal productivity, but it is the overall financial efficiency of the enterprise which determines economic viability and success. Therefore the focus must be on factors that impact on overall efficiency, which also includes consideration of both income and expenditure.

REVIEW
Productivity gains over the last two decades
The comparative productivity data on a per ewe basis are summarised in Table 1.

Table 1. Productivity in the NZ sheep industry from the 1980s to 2004/05

<table>
<thead>
<tr>
<th>Components of productivity²</th>
<th>Total gain over period</th>
<th>Rate of gain per year (16 yrs)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>82-88</td>
<td>04/05</td>
</tr>
<tr>
<td>Overall lambing rate per adult ewe³</td>
<td>1.0</td>
<td>1.29</td>
</tr>
<tr>
<td>Lamb carcase weight</td>
<td>13.2</td>
<td>17.1</td>
</tr>
<tr>
<td>Ewe carcase weight</td>
<td>19.3</td>
<td>24.5</td>
</tr>
<tr>
<td>Overall productivity per ewe⁴</td>
<td>12.7</td>
<td>21.3</td>
</tr>
</tbody>
</table>

The gains in productivity are impressive but followed many years of relatively static performance. To put these gains in perspective, the annual compound rate of gain in ewe productivity over the last 16 years is 3.3%, which is due to equivalent gains in lambing percentage, lamb carcase weight and ewe

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¹ Lamb exports: expressed as bone-in carcase equivalent to allow comparisons across years; the actual tonnage is less as much is exported as processed cuts (current exports are more than 400,000 tonnes of carcase equivalent); sheep numbers: late-1980s: 45 mn ewes and 12 mn ewe hoggets; current: 27 mn ewes and 8 mn ewe hoggets.
² Source: Meat and Wool NZ Economic Service & Statistics NZ (www2.aol.obm.co.nz/meatnz/Livestock.htm)
³ Clarification: the overall lambing rate counts all lambs but counts only the adult ewes; hence lambs from 1 year old sheep (hoggets) are included in the total, but their dams are not. The actual number of lambs weaned per adult ewe has increased from 1.0 in the 1980s to 1.20 now; that is, lambs from hoggets account for one-third of the increase.
⁴ Productivity (kg of carcase weight produced per ewe) = [(Total lambs weaned per MA ewe – 0.30 for replacements) x Lamb Carcase Wt] + [Ewe slaughter rate x Ewe Carcase Wt]
carcase weight. The data do not include wool but production per ewe has not changed over the period.

What are the factors that have driven the increase in productivity? Competition for land and resources had a major impact on the decline in sheep numbers in the 1980s. While the loss of land to agriculture had an impact, the demise of wool and the relative prices of lamb and dairy milk solids were both important. However over the last 10 years, the dairy advantage in terms of price per kilogram of product has all but disappeared, with the prices of lamb and milk solids now about the same. In reality a number of factors drove the resurgence, and helped halt the decline in sheep numbers. There has been an increase in focus on farming as a business driven in part by ‘over the fence’ comparisons with dairying, while newer pasture cultivars and the progress in sheep breeding have also contributed to improvements in productivity. While these productivity gains are very satisfying, the real challenge is the next 20 years. However, the gains of the last 20 years provide a solid basis from which to go forward.

Scenarios for the next two decades: individual ewe productivity

The gain in productivity per ewe over the last 16 years is around 9kg. Table 2 presents three scenarios showing how the same gain could be achieved over the next two decades.

Table 2. Scenarios around increasing productivity in the NZ sheep industry in the next 20 years

<table>
<thead>
<tr>
<th>Year</th>
<th>Productivity (kg per MA ewe)</th>
<th>Total lambs weaned per MA ewe</th>
<th>Lambs weaned from MA ewes</th>
<th>Lamb Carcase Weight (kg)</th>
<th>Ewe slaughter rate</th>
<th>Ewe Carcase Weight (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Actual data over the last 16 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1988-89</td>
<td>9</td>
<td>12.7</td>
<td>1.00</td>
<td>1.00</td>
<td>13.2</td>
<td>0.18</td>
</tr>
<tr>
<td>2004-05</td>
<td>25</td>
<td>21.3</td>
<td>1.29</td>
<td>1.19</td>
<td>17.1</td>
<td>0.18</td>
</tr>
<tr>
<td>Actual change over period</td>
<td>8.6 (68%)</td>
<td>0.29</td>
<td>0.19</td>
<td>3.9</td>
<td>0</td>
<td>5.2</td>
</tr>
<tr>
<td></td>
<td>Scenarios for the next 20 years: Scenario 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current</td>
<td>25</td>
<td>21.3</td>
<td>1.29</td>
<td>1.19</td>
<td>17.1</td>
<td>0.18</td>
</tr>
<tr>
<td>2014-15</td>
<td>35</td>
<td>25.6</td>
<td>1.40</td>
<td>1.30</td>
<td>19.1</td>
<td>0.18</td>
</tr>
<tr>
<td>2024-25</td>
<td>45</td>
<td>30.0</td>
<td>1.50</td>
<td>1.38</td>
<td>21.1</td>
<td>0.18</td>
</tr>
<tr>
<td>Projected change over 20 years</td>
<td>8.7 (41%)</td>
<td>0.21</td>
<td>0.19</td>
<td>4.0</td>
<td>0</td>
<td>2.0</td>
</tr>
<tr>
<td>Current</td>
<td>25</td>
<td>21.3</td>
<td>1.29</td>
<td>1.19</td>
<td>17.1</td>
<td>0.18</td>
</tr>
<tr>
<td>2014-15</td>
<td>35</td>
<td>26.1</td>
<td>1.47</td>
<td>1.35</td>
<td>18.1</td>
<td>0.20</td>
</tr>
<tr>
<td>2024-25</td>
<td>45</td>
<td>30.0</td>
<td>1.59</td>
<td>1.44</td>
<td>19.1</td>
<td>0.22</td>
</tr>
<tr>
<td>Projected change over 20 years</td>
<td>8.7 (41%)</td>
<td>0.30</td>
<td>0.25</td>
<td>2.0</td>
<td>0.04</td>
<td>0</td>
</tr>
<tr>
<td>Current</td>
<td>25</td>
<td>21.3</td>
<td>1.29</td>
<td>1.19</td>
<td>17.1</td>
<td>0.18</td>
</tr>
<tr>
<td>2014-15</td>
<td>35</td>
<td>25.6</td>
<td>1.49</td>
<td>1.37</td>
<td>17.4</td>
<td>0.20</td>
</tr>
<tr>
<td>2024-25</td>
<td>45</td>
<td>30.0</td>
<td>1.69</td>
<td>1.52</td>
<td>17.7</td>
<td>0.22</td>
</tr>
<tr>
<td>Projected change over 20 years</td>
<td>8.7 (41%)</td>
<td>0.40</td>
<td>0.33</td>
<td>0.8</td>
<td>0.04</td>
<td>0</td>
</tr>
</tbody>
</table>

Each scenario involves an increase in lambing percentage, with varying changes in lamb carcase weight. The views of NZ marketers on the preferred carcase weights for international markets are always controversial, so that scenario 3 assumes virtually no change. This scenario requires an increase in weaning percentage of 33% units in adult ewes to around 150%. While this is achievable on individual farms (numerous flocks already perform at such levels), it is very challenging at a national level.
The basis of the gains in terms of the relative contributions of genetics and management is of interest in considering future opportunities. The increase in the adult ewe lambing is around 20% with an increase of about 10kg in ewe live weight. Based on the rate of genetic gain in the NZ sheep flock (Sheep Improvement Ltd, www.rampage.co.nz) and the overall impact of recorded flocks, genetic gain would account for about one-third of the live weight change. The weaning rate – ewe liveweight relationship indicates that a 10kg lift in live weight should generate about 13% increase in weaning rate. The actual increase was 20%. Hence by difference, one-third would be due to genetics independent of ewe live weight. The genetic contribution to live weight would also account for some of the effect on live weight. Therefore we estimate that about half the gain in weaning rate and about one-third of that in live weight are due to genetics.

A focus on enterprise profitability

The emphasis above is on individual animal productivity, but it is enterprise profitability that determines economic success. Therefore the focus must be on factors that improve financial efficiency, but typical analyses of farming businesses do not delve deeply enough to uncover the effects of underlying factors on earnings. Analysis of farm performance usually focuses on farm surplus (gross income less working expenses). Crude indicators such as lambing rate and lamb weights may also be included. From our perspective, the focus on outputs impedes our view of the actual root contributors to farm profitability.

A more recent approach involves an analysis that focuses on the four main drivers of profitability namely feed consumed, feed conversion efficiency, product price, and costs. A further sophistication involves breaking down the four main ‘drivers’ to their component parts, so that we can see where improvements can be made, and the effect that such improvements would likely have on profitability. We can then assess the source of our expenses and revenue and the specific areas where we are performing well, or poorly, and where there are opportunities for improvement. Therefore it is important to understand the factors or drivers that determine the ultimate output, Earnings before interest and tax (EBIT) per ha.

Secondary drivers
↓
Primary drivers
↓
EBIT/ha (Profit)

The data required for this type of analysis are commonly collected by farmers, and many are doing so with simple farm recording systems or through Farmax software. The primary drivers approach provides a new way of interrogating data. Farmax provides farmers with a number of insights about their business and also provides the ability to “benchmark” year to year, but we find that it does not go far enough. Therefore we are developing a new level of analysis to help understand the underlying factors that drive productivity.

Component drivers of productivity (The new level of analysis)
(key factors that each impact on one or more of the secondary drivers)
↓
Secondary drivers
↓
Primary drivers
↓
EBIT/ha (Profit)

In a sheep enterprise, the key secondary driver is the efficiency of the ewe flock:

Number of lambs weaned [(Lambs available – Females for replacements) x Weaning weight]/Ewe weight
The number of lambs surviving is a function of the scanning percentage, and of ewe and lamb deaths, while the number of females required for replacements is a function of the number of ewe deaths and the rate of culling in the ewe flock. The average weaning weight is a function of the ewe feeding from lambing to weaning, ewe condition and average pasture cover at lambing, and pasture quality and availability. This set of parameters and functions has lead to the development of a set of relatively simple records that a farmer can collect. Currently we use about eight key indicators including live weight at mating, scanning percentage, weaning percentage, lamb growth rate pre- and post-weaning, drafting or selling dates of lambs, carcase weight, and ewe deaths. The value comes from analysing the relationships between these factors and their relationship to profit. However the analysis is relatively complex and we are currently developing a software package to analyse and help interpret these data.

How will newer technologies impact

Technologies will continue to impact at several levels of the business. New knowledge will greatly assist in the management of higher litter sizes, and in the management of animal health. New pasture cultivars that make better use of water and nutrients will be important. Some of the newer DNA technologies will have a major impact on ram breeding enterprises and will therefore accelerate genetic gain through the industry. However the greatest direct impact at the individual farm level will come through new systems of data collection, data analysis and the use of information. While the overall impact will be cumulative across the whole supply chain, we see three types of technologies that will impact in particular. They are:

- electronic identification of individual animals using RFID (radio-frequency identification) that will enhance the links from the processor to the farmer to the breeder, and facilitate management decisions (such as recording details at pregnancy scanning, frequent recording of animal live weights);
- systems to measure and allocate feed supplies such as electronic systems to record pasture cover and growth to enable much better allocation of feed, and the assessment of performance of individual paddocks on a farm;
- systems to reduce labour, such as rapid on-farm diagnostics to identify health or disease status.

The management skill will be in the distillation and integration of these various sources of information.

CONCLUSION

The challenges to maintain the momentum of increasing productivity in the New Zealand sheep industry are not to be underestimated. However the reality is that the international market will ultimately determine the future of the sheep industry. While the medium-term market prospects are bright, an on-going focus around on-farm efficiency will be critical to a vibrant long-term future.

KEY WORDS
Sheep productivity, lamb, New Zealand, efficiency, farm profitability

REFERENCES