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Sheep Updates 2006 - part 3

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Grazing

Making better use of clover

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ABSTRACT

To make better use of the high nutritional value of clover, we need to grow more of it and utilise it more efficiently. One way to do this is to grow clover separately from grass rather than as a conventional mixture. This removes the competitive suppression of clover by the grass, and allows each species to be managed for their maximum production. Growing grass and clover separately and allowing sheep to choose their preferred diet of about 70% clover and 30% grass can also increase lamb growth rates by 20-30% compared to a mixture. The production benefit achieved by having continuous free-access to both species is due to higher intakes of clover, higher feed conversion efficiency, and possibly reduced energy expenditure as less time is spent searching for the preferred diet.

AIMS

Pastures for sheep production are typically sown with mixtures of grasses and legumes. These species are complementary to each other in many ways. The legume fixes nitrogen from the atmosphere and supplies nitrogen to the grass. They are also complementary in nutritional attributes. Clover has a high concentration of protein, which is rapidly degraded in the rumen. Grass by comparison has a higher concentration of fibre. A combination of the two species should match the nutritional requirements of the sheep or cattle more closely than either species alone.

In practice, grass-clover mixtures do not consistently perform to their theoretical potential because the clover content of mixed pastures is often less than 10 to 20% (Quigley *et al.* 1992). Maintaining a high proportion of clover is especially difficult in rotational grazing systems, and the proportion of clover varies seasonally and from year to year. When offered a free choice of grass and clover *ad libitum* both sheep and cattle consistently choose a diet containing around 70% clover and 30% grass. The high proportion of clover that they like to eat is in marked contrast to the proportion offered to them in mixed pastures. Growing grass and clover side by side in the same paddock may be an effective way to grow more clover and allow animals to select their preferred diet.

METHOD

The concept of splitting grass and clover was tested during 2002 and 2003 near Hamilton in southwest Victoria. There were four pasture treatments; (i) pure perennial ryegrass; (ii) pure subterranean clover; (iii) mixture of ryegrass and subterranean clover (85:15 mix); and (iv) side-by-side blocks of ryegrass and subterranean clover (50:50 by area). Feed on offer was maintained at greater than 2000 kg DM/ha at all times. Three replicates of each pasture system were grazed by 120 Coopworth/Corriedale ewes with two-month-old twin lambs over 7 weeks from mid-October 2002. The experiment was repeated in 2003 with 4 replicates grazed by 180 twin-bearing ewes from 2 weeks prior to lambing in August until weaning at 12 weeks of age. Pasture quantity and quality was measured 2 weekly, sheep were weighed every 1-2 weeks and feed intake was measured using the alkane technique on 3-4 occasions each year.

RESULTS

- Lambs grew faster on pastures with high clover content or where they could select more clover, than on traditional mixed pastures (see Figure 1). The boost in lamb growth rate was between 20% and 30% in each year. These growth rate differences resulted in higher weaning weights (up to 7 kg) for lambs grazing pure subterranean clover or grass-clover side by side compared to the other pasture systems.
- Ewe liveweight gains followed a similar pattern such that ewes grazing pure subterranean clover and grass-clover side by side were up to 10 kg heavier at weaning than those grazing the other pasture systems. In 2003, ewes on the choice system gained more weight than those grazing pure clover. The differences in weaning weights would be expected to have impacts on ewe reproductive performance in the following year.

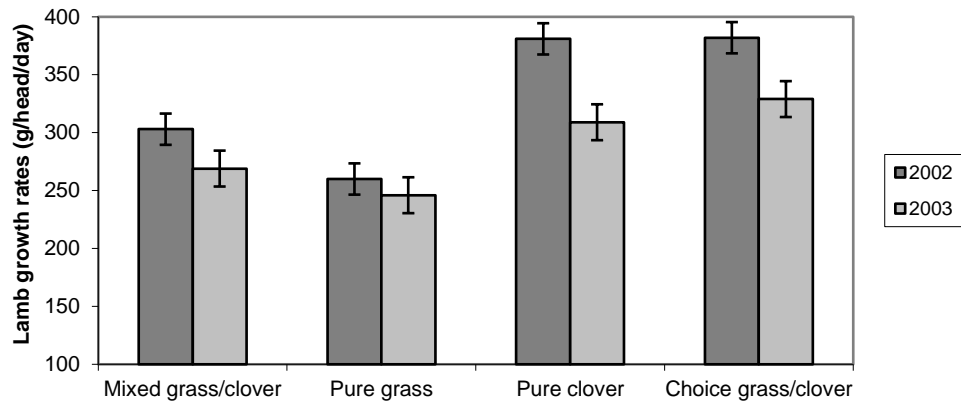


Figure 1. Growth rates of twin second-cross lambs grazing traditional mixed grass/clover, pure grass, pure clover, or the side-by-side grass/clover choice.

- The production benefit achieved by having continuous free-access to both species is due mostly to higher intakes of clover. Preliminary estimates of dry matter, metabolisable energy and protein intake suggest that the increases in animal performance on the choice pasture system were also partly due to increases in the efficiency of digestion and utilisation. Reduced searching for the preferred diets and therefore less energy expenditure may have also contributed to the production gains.

CONCLUSION

Growing grass and clover monocultures side by side can increase the proportion of clover in the diet and per head production. The growth rate and feed conversion efficiency of animals with about 70% of their diet comprising clover (30% grass) was equal to or better than that for ewes or lambs grazing mixed pastures or monocultures of grass or clover. This means that growing grass and clover separately could also increase production per hectare if total dry matter production is similar for ryegrass and clover. Cocks (1974) found minimal differences in total production from ryegrass and clover when grown as monocultures and provided with adequate water and nutrients. Indeed, clover produced more dry matter than grass when defoliated to maintain less than 2000 kg DM/ha.

Separating grass and clover allows each species to be managed more specifically to maximise their production. This could include tactics such as targeting nitrogen fertiliser to the grass component of the paddock, P and K to the clover, and herbicide use for weed control to a broadleaf or grass species background. Pure clover pastures would need to be rotated with grass pastures or crops every 2-3 years to minimise leaching of nitrogen below the root zone causing soil acidification and nitrate contamination of ground water. Growing the grass and clover alternately on each half of individual paddocks on a short-term rotation would allow the new grass or crop to benefit from the build-up of N under the previous clover monoculture while the clover should prosper in the low-N environment created by the previous grass or crop monoculture. This system implemented on a portion of the farm could improve lamb growth rates and efficiency of production.

KEY WORDS

Diet choices, perennial ryegrass, subterranean clover, lamb growth

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Grazing systems demonstration to optimise pasture utilisation and stocking rate

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BACKGROUND

Pasture utilisation under continuously set stocked regimes is generally low (<40%), especially where stocking rates (SR) are conservative and determined by poor seasons. Methods for calculating the potential SR, using rainfall (French 1991) or estimates of yearly feed intake (Grimm 1998), suggest the potential is 2-3 times the district average SR. Results from the Lifetime Wool Project suggest the potential SR could be even higher if ewes are managed to achieve target condition score (CS) during the reproductive cycle. A grazing systems demonstration comparing lamb production from annual vs. annual+perennial pastures and designed to manage breeding ewes to target CS during pregnancy and lactation has been established at Mount Barker Research Station. The "farmlets" comprise two adjacent paddocks: one containing annual pastures which are being partially replaced by perennial pastures (kikuyu, lucerne and tall fescue). The other paddock contains only annual species (sub-clover, annual grasses, capeweed). The aim of the demonstration is to compare, over 5-7 years, the increase in production, profitability and sustainability of two systems managed to optimise pasture utilisation and stocking rate using a combination of grazing management and agronomic tactics. These tactics should permit stocking rates to increase from the average district SR (9 DSE/ha) to the theoretical potential for the Plantagenet Shire (20 DSE/ha). Each farmlet is treated as a closed system, and all inputs (including labour) and outputs are recorded. Management decisions are made by consensus between a producer advisory group and research, technical and extension personnel.

AIMS

The aim of the demonstration is to emulate the purchase of a conservatively stocked property in the Plantagenet Shire and compare, over 5-7 years, the increase in production, profitability and sustainability of two pasture systems (annual+perennials vs. annual) managed to optimise pasture utilisation and SR using a combination of grazing management and agronomic tactics. Central to the demonstration is the recognition that the breeding ewe represents the 'engine room' of each system, so managing ewes to defined nutritional targets underpins all decisions. This should permit stocking rates to increase from the average district SR (9 DSE/ha) to the theoretical potential for the Plantagenet Shire (20-25 DSE/ha). Two trainees assigned to the demonstration for a 12 month period will learn valuable skills in pasture/animal production research.

METHOD

2005 was designated a 'pilot study' year where the infrastructure was established for each plot, new (perennial) pastures sown and methodologies for animals/pasture measurement developed. Feedlots were constructed in each plot to allow for destocking if groundcover reached wind erosion limits. 'Purchase' of the farm (Plot 1: Annual+Perennials, 25.5ha; Plot 2: Annuals, 18.8ha) occurred at the break of season (23 March). Merino ewes, which were mated to Merino rams, fed 'off-farm' to follow a target CS profile, and scanned at day 74 to identify single and twin bearing ewes, were randomly allocated to farmlets on day 74 of pregnancy (15 May; 110 and 85 ewes, respectively). Ewes were monitored for liveweight/condition score (CS) at 4-8 weekly intervals or at times when sheep were yarded for husbandry operations. Feed on offer (FOO, kg DM/ha) was assessed using a calibrated visual method at 4-6 weekly intervals during the growing season, and pasture cages used to estimate pasture growth rate (PGR, kg DM/ha/d). Dry matter production was estimated by summing the growth between short-term periods.

RESULTS

2005 was an atypical season for the Plantagenet Shire, with the annual rainfall exceeded on only two occasions since 1913. In summary: break of season 23 March (long-term average 15 May); annual rainfall 830mm (average 605mm); total DM production from annual pasture 17.8 t DM/ha (average 9.2 t DM/ha); potential SR 35 dse/ha (average 21 dse/ha).

In plot 1, 14 ha (56% of the total area) was sown to perennials. These contributed 37% of the total grazing days (break to break). Pasture hay was conserved from both plots (27 and 33 t DM for plot 1 and 2, respectively). Lambs were weaned on 23 November, and lot-fed using oats/lupins/hay during

autumn. Despite feed rates approaching 1.4 kg/h/d supplied from self feeders, as of June 1 only 37 (38%) and 43 (55%) lambs exceeded 40 kg in liveweight for plot 1 and 2, respectively. This slow growth and low feed conversion partly reflects a poor genetic base, thus 8 Poll Dorset rams were purchased and mated to ewes in March 2006. In addition, 230 large-frame Merino ewes mated to prime sires in December were purchased with the intention to replace a proportion of the current breeding ewes. The number replaced will depend on the seasonal conditions for 2006.

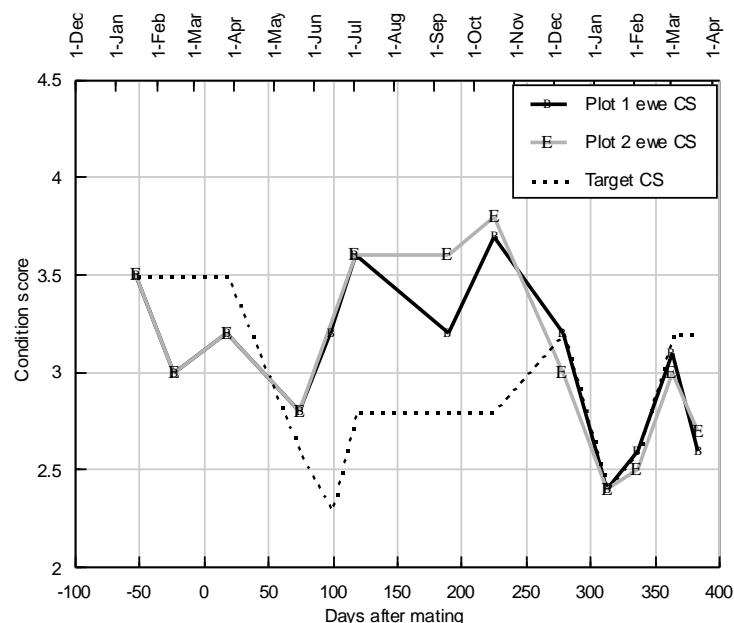


Figure 1. Target condition score profile (dashed line), and measured CS for ewes on plot 1 (■) and 2 (○)

The target CS profile, and measured CS profiles, for ewes from plot 1 & 2 are shown in Figure 1. Ewes were mated in good condition, and despite CS declining to mid-pregnancy, were well above the target condition at day 100. Scanning results indicated the reproductive rate (RR) to be 1.36, with 50% ewes single-bearing (SB), 43% twin-bearing (TB) and 7% dries. CS throughout lactation was maintained above 3 as a result of green FOO exceeding 2.5 t DM/ha. CS declined for both plots post senescence to day 300, then increased with the commencement of supplementary feeding to reach CS~3.1 by mating in March 2006. Scanning of these ewes indicate the RR to exceed 1.5 for both plots (43% and 40% SB, and 55% and 58% TB for plot 1 and 2, respectively).

CONCLUSION

The farmlet comparison will provide valuable information regarding the optimal management of breeding ewes, and give insight into the potential contribution perennial pastures could make to the productivity of a prime lamb enterprise in the Plantagenet Shire. The delayed break to the 2006 season and predictions for a dry season will ensure a range of grazing management tactics will need to be employed to reach FOO boundary levels and attain CS targets of breeding ewes.

KEY WORDS

Lifetime Wool, feed on offer, condition score, perennials, grazing systems.

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Paper reviewed by: Sue-Ellen Shaw

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Know your audience to increase their rate of practice change – Lifetime Wool as an example

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Carolyn Kabore, Kazresearch

ABSTRACT

The Lifetime Wool (LTW) project has developed guidelines that will help wool producers increase profit from Merino ewes and their progeny. A survey of wool producers has established a target audience willing to change ewe management. These wool producers are more aware of LTW and its messages and use consultants, sheep producer groups and pregnancy scanners more than those wool producers less willing to change. The most effective way increase the coverage to these willing wool producers is to include consultants, sheep producer groups and pregnancy scanners in the communication of the guidelines.

AIMS

LTW has developed guidelines to manage the nutrition of Merino ewes to meet production targets for themselves and their progeny. These guidelines will increase profit from sheep and increase wool producers' confidence when making ewe management decisions (1). Now that the research is over the priority for LTW is to communicate the benefits of these guidelines to wool producers. Historically the adoption of pasture and livestock assessment skills in Australia has been low (2). To improve the likelihood of adoption of the LTW guidelines the communication needs to target the wool producers that are more willing to change their ewe management. The hypothesis tested in this paper is that by working with wool producers willing to change, LTW can find better ways to deliver the guidelines.

METHOD

A phone survey was done with 1738 wool producers across Southern Australia. All participants surveyed had more than 500 sheep. Participants were asked how willing they are to change five aspects of their management of Merino ewes on a quantitative scale. This willingness to change was used to allocate each wool producer to the categories in figure 1. Those that were most willing to change or have already changed all 5 aspects of their ewe management were allocated to the innovators category (technology enthusiasts). Those that were not willing to change anything were allocated to the laggard category. The target audience for the Lifetime Wool project are the early adopters and the first 12.5% of the early majority (cautious and pragmatic adopters); a total of 25%. The early majority are a priority for LTW because these wool producers are willing to change but have not been involved in the project. These wool producers were also asked questions to benchmark knowledge and current practice when managing their ewes. There were also questions about where they get information about sheep management. The target audience does not include innovators because it is likely that they have already had involvement with LTW.

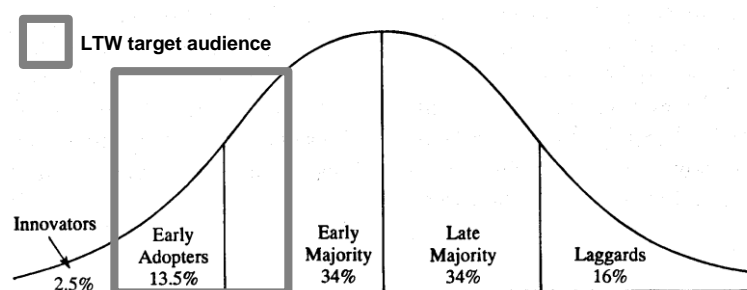


Figure 1. Adopter categorisation based on how quickly an individual adopts an innovation. Innovators are the first and laggards are the last to adopt an innovation (3).

RESULTS

The target audience for Lifetime Wool have more sheep ($p < 0.001$) than wool producers not in the target audience (table 1). They are more likely to use consultants and be a member of a sheep producer group than those not in the target audience (table 1). There are wool producers in the target

audience that are aware of LTW and doing the recommended practices but none of the target audience are doing all recommended practices (table 1).

Table 1. Comparison in the characteristics of wool producers in the LTW target audience and those not in the target audience.

Characteristic	Target audience (n = 448)	Not target audience* (n = 1243)
Average no. sheep	4594	3891
Use consultants	244 (54%)	418 (34%)
Member of sheep producer group	76 (17%)	76 (5%)
Aware of LTW project	235 (52%)	440 (35%)
<i>Knowledge (agree with the statements below)</i>		
You need to put your hands on ewes or weigh them to accurately assess their body condition	323 (72%)	449 (40%)
Improving the condition of a ewe during pregnancy and early lactation can increase the fleece weight in progeny	384 (76%)	936 (75%)
Improving the condition of a ewe during pregnancy and early lactation can decrease the fibre diameter of progeny wool	162 (36%)	286 (23%)
It is profitable to scan for twin bearing ewes and run them as a separate mob	323 (72%)	499 (40%)
<i>Current practice</i>		
Scan ewes for pregnancy	229 (51%)	307 (25%)
Scan ewes for twins and separate into different mobs	138 (31%)	103 (8%)
Weigh, condition score or fat score ewes for targets at joining and lambing and separate based on condition	164 (37%)	150 (12%)
Formal assessment of pasture or pasture growth rate	212 (47%)	222 (18%)

* Not target audience does not include innovators

CONCLUSION

The communication of LTW guidelines will include consultants, sheep producer groups and pregnancy scanners because this will provide better coverage of the target audience. The communication will also emphasise the information that the target audience know less about. For example, only 36% of the target audience are aware that improved ewe condition during pregnancy will decrease the fibre diameter of progeny. LTW is confident that the target audience are in a position to use the guidelines that will help them increase their profit from sheep.

KEY WORDS

Target audience, extension, ewe management, Lifetime Wool

ACKNOWLEDGMENTS

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Paper reviewed by: Perry Dolling, Chris Oldham and Andrew Thompson.

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Reproduction

Lifetime Wool – Ewe Management Guidelines

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ABSTRACT

Lifetime Wool is a national project that has developed draft management guidelines that will assist sheep producers to optimise production from their Merino ewe flocks. Central to the guidelines are condition score targets for ewes at key times during the reproductive cycle, and feed on offer boundaries to meet these targets are also provided. This essential information will allow better management of sheep and pastures.

INTRODUCTION

Lifetime Wool (LTW) is a national project developing guidelines for the nutritional management of ewes. The guidelines are based on condition score (CS) targets at key times during the reproductive cycle, and have been derived from five years of research and development that has taken place on commercial properties across southern Australia. Intensive plot-scale research in Western Australia and Victoria involving more than 10,000 sheep was initially used to develop relationships between ewe CS profile and: the reproduction, mortality, and wool production of ewes, and the survival and lifetime performance of progeny (Thompson and Oldham, 2004). A draft set of guidelines and decision support tools (DST's) were developed using these prediction equations. Results from the plot-scale research were supported by the outcomes of the paddock-scale research (Behrendt, 2006), and the resultant draft guidelines and decision support tools (DSTs) were road-tested for their feasibility and practicality by over 120 farmers involved in the demonstration/development phase of Lifetime Wool in 2005-06.

REVIEW

Ewe condition score profiles

Sheep producers from four states involved in the demonstration/development phase of LTW managed their ewes to an "optimum" CS profile devised for spring lambing flocks. The CS profile has five key targets during the year: joining (ram introduction), day 90 after joining (pregnancy scanning), just before lambing (pre-lambing vaccination and/or drenching), weaning (approximately day 240 after joining) and at joining in the following year. These targets were shown to produce the "optimum" return (90% of the maximum values of the various dose response curves for ewe and progeny parameters) based on economic modelling of the self replacing merino ewe flock enterprise and the likely pasture season and ewe response (Young and Oldham, 2005).

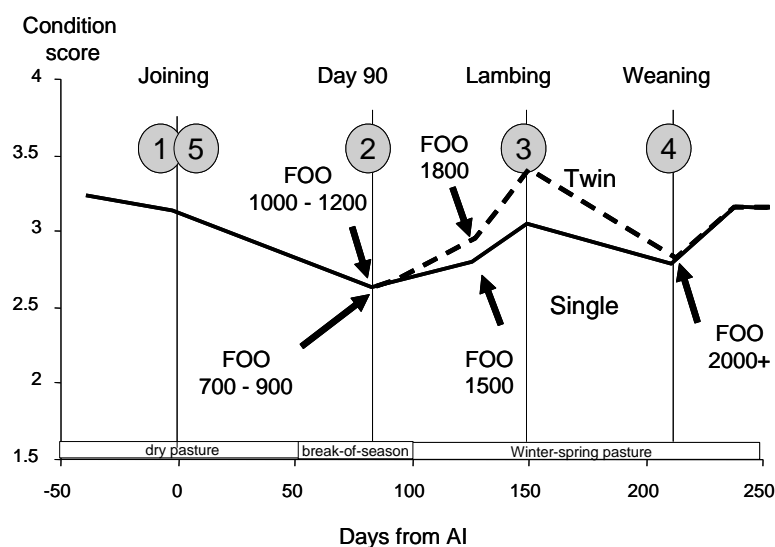


Figure 1. Schematic representation of a condition score profile for a winter-spring lambing in Western Australia, showing separate profiles for single and twin bearing ewes and feed on offer (FOO) boundaries at the break of season, leading up to lambing and at weaning.

Two crucial points in the ewe reproductive calendar (condition at joining and condition at lambing) set the framework of the profile and the environmental conditions, including expected level of supplementary feed, then dictate the shape of the profile for a particular region. CS at joining sets the reproductive rate (RR) and determines the potential number of lambs to be born. Our analysis has shown that the RR is linear with increasing CS to at least CS 3.5 although there are different slopes for different genotypes. Producers need to set the RR they want to achieve, and manage their ewes to attain the CS target by joining (and maintain over the joining period). CS at lambing influences the lamb and ewe mortality, lamb birth weight and progeny wool production. There are differences in the profile for singles and twin bearing ewes.

Depending on the probability of green feed in late pregnancy and lactation and the ewe's response to it, the shape of the CS profile from joining to the point of minimum CS and then to lambing can be determined. For example, in WA, LTW has shown that ewes can gain in condition on as little as 700 FOO from day 90 of pregnancy and will rapidly respond to increasing availability of FOO as late as day 130. Hence, average flock CS could be as low as CS 2.5 at day 90 but recover to CS 3 for singles (requires 1500 FOO at day 130) and 3.5 for twins (requires 1800 FOO at day 130) and therefore achieve targeted performance by lambing if sufficient FOO were available. However, in other areas, and during autumn lambing, the minimum CS should never be allowed to fall below their chosen target by lambing. This requires the ewe CS profile to be quite flat and closer to the original 'maintain at condition score 3' recommendations that have been promoted previously.

Key messages from 'Lifetime Wool'

- Whole farm profit is sensitive to the changes in condition of ewes during the year.
- Production from ewes and their progeny can be predicted from knowledge of the ewe's condition score profile.
- 'Measure to Manage' – CS is a quick and reliable tool for managing ewes to targets.
- CS can be managed to achieve predictable ewe fleece weight, fibre diameter and staple strength outcomes.
- Ewes higher in CS at joining conceive more lambs and the response varies between farms.
- Lamb survival can be predicted from changes in CS between joining and lambing; however, the response is modified by environmental conditions at lambing.
- Improved ewe condition during pregnancy increases the clean fleece weight of progeny by up to 0.2 kg and decreases their mean fibre diameter by up to 0.4 μ m.
- These effects are permanent for the lifetime of the progeny and are independent of birth type and sire source.
- Managing twin bearing ewes better will increase production.
- Ewes with higher CS at lambing will have less mortality than ewes with lower condition score.

CONCLUSION

Further economic analysis is being undertaken for five regions across Australia and at differing lambing times to provide optimal ewe management and decision tools for a particular enterprise. The setting of targets by the producer for joining and lambing provides the framework for managing ewes over the rest of year. The response of the flock to a particular target can be predicted and will give important information as to how supplementary feeding regimes and pastures are managed.

KEY WORDS

Lambing, ewe management, Lifetime Wool

ACKNOWLEDGMENTS

Lifetime Wool is funded by AWI, DPI Vic, DAFWA, SARDI, DPI NSW, DPI Tas., Austral Park, Billandri Merino Stud and 120 farmers across southern Australia.

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Achieving the best reproductive performance from your hoggets

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ABSTRACT

Management practices farmers should use to ensure high reproductive performance in their hoggets include; maximising hogget breeding weights, utilising Fn or EF composites, vaccinate against abortive diseases, shear hoggets pre-mating, utilise an up to 40 day breeding period, ensure a high number of rams are used and separate single- and multiple-bearing hoggets during lactation.

AIMS

Currently less than 30% of New Zealand hoggets (ewe lambs 8 – 9 months of age) are presented for breeding. A reason often given by farmers for this poor figure is the low reproductive performance of hoggets. Therefore the aim of the present study was to identify management practices that maximise the lambing percentage from ewe hoggets.

METHOD

A survey of 629 New Zealand sheep farmers gathered data on the practice of hogget lambing, in particular on the numbers and breeds of hoggets and rams used, selection criteria used for hoggets, use of teasers (vasectomised males), length of breeding period, live weight of hoggets, use of mating crayons, vaccinations and trace element supplements given, pregnancy scanning, management during pregnancy and lambing, number of lambs present at docking and shearing schedules of hoggets. This information was then used to identify individual factors that affected hogget lambing percentage (number of lambs present approximately 1 month after lambing / number of hoggets put to ram X 100) (LP). Hogget lambing percentage was used as the dependent variable, when assessing the effect of independent covariates on productivity. A multivariate model containing only significant ($P < 0.05$) variables was then determined (1).

RESULTS

The hogget lambing percentage range from New Zealand farms in this study was from less than 10% to greater than 120% with a mean value of 60%. This 60% mean was similar to that reported in previous studies. Factors that increased LP included: vaccination against both campylobacteriosis and toxoplasmosis, shearing pre-breeding, increasing the length of breeding period up to 40 days, increasing the number of rams per 100 hoggets, weight of hoggets at breeding and separation of singleton- and multiple-bearing hoggets during lactation (1). The breed of hoggets also affected LP. Such that composite hoggets which included 1/16 to 3/8 East Friesian (EF) or Finn (Fn) breed types displayed a 13% higher LP compared to Romneys, which are the dominate breed type in New Zealand, and those with 1/2 or greater EF or Fn had 23% higher LP. Coopworth hoggets also displayed 11% higher LP than Romneys. No other breed types differed. Every 1kg increase in liveweight above 36kg at breeding was approximately worth an extra 2% of LP. The only significant negative factor affecting LP was the number of hoggets presented for breeding, as the number of hoggets increased to 600, LP decreased. The final multivariate linear model explained 45% of the variation in LP ($r^2 = 0.45$), with live weight of hoggets at breeding and breed having the greatest effect on LP. Factors which did not affect LP, included use of iodine supplementation, use of vasectomised males before breeding, change in weight from breeding to lambing, separating singleton- and multiple-bearing hoggets or shearing during pregnancy, frequency of supervision during the lambing period and pasture mass or height at set-stocking.

CONCLUSION

The results clearly indicate that farmers should aim to have their hoggets as heavy as possible at breeding. Previous research has also identified this relationship (2). Heavier liveweights within breed are associated with more hoggets in oestrus (3). A further advantage of ensuring hoggets are as heavy as possible at breeding is that these animals will be more likely to cope with the demands of pregnancy and lactation and will have less weight gain before breeding as a two-year old ewe. In studies in which hogget mating has had a negative effect on two-year old ewe liveweight at breeding reproductive performance has often been disappointing.

The greater the percentage of either EF or Fn genes, the greater the LP compared to all other breeds. In addition, the Coopworth displayed higher LP. These results indicate there are some breed types more suitable to hogget lambing. Improved reproductive performances of Fn hoggets and composites have been previously reported (2, 3). However it is unlikely that farmers will change their breed types completely just to maximise hogget performance as these breeds may have other traits which make them unsuitable for some production systems (i.e. higher wool micron). However these results do indicate that even a minor influx of EF or Fn genes (1/16 – 3/8) can dramatically improve hogget reproductive performance.

An increase in the length of the breeding period, up to 40 days in the present study, was associated with an increase in LP. However it should not be forgotten that hogget breeding often occurs later than that of mature breeds. Thus while a longer mating period may improve the number of hoggets that lamb it can result in later born lambs, which may be relatively light weight at the normal weaning date and result in the young ewe having less time to gain weight post-lambing before being bred as a two-year old ewe.

An optimum ram to ewe hogget ratio of 2.5 to 3.5% was identified, while in mature ewes 1% is an often accepted ratio. It is known that ewe hoggets have a shorter oestrus period compared to the mature ewes and are less likely to seek out and stand for the ram (2). Therefore it is not surprising that having more ram power is associated with more pregnant hoggets and therefore a higher lambing percentage overall.

Maiden ewes are known to be at greatest risk of abortion from either campylobacteriosis or toxoplasmosis. Vaccination against these organisms is therefore prudent. However vaccination needs to occur at least one month pre-breeding, therefore farmers need to identify relatively early which hoggets are going to be presented for breeding.

Separation of singleton- and multiple-bearing hoggets for the lambing period resulted in higher LP. Multiple-bearing hoggets should be offered more sheltered flatter paddocks and be at a lower stocking density with higher pasture availability compared to their singleton-bearing counterparts.

Shearing pre-mating had a positive affect on LP. It is possible, although not known, that shearing the young ewes over the summer period pre-breeding resulted in an increase in intake and therefore liveweight pre-breeding.

In conclusion this survey indicates that to maximise hogget lambing percentage farmers should; ensure hoggets are as heavy as possible at breeding, utilise Fn or EF composites, vaccinate against campylobacteriosis and toxoplasmosis, shear pre-mating, use a 40 day breeding period, ensure a high number of rams are used and separate single- and multiple-bearing hoggets during lactation.

KEY WORDS

Ewe hoggets, lambing percentage

ACKNOWLEDGMENTS

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Lifetime Wool: Twin Futures

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ABSTRACT

The Lifetime Wool project has confirmed plot-scale observations that twin-bearing ewes produce fleeces of lower weight and lower tensile strength, while their progeny suffer high mortality, reduced weaning weight and produce less wool of higher diameter. However, improving ewe nutrition can improve the performance of twin bearing ewes and the future lifetime performance of their progeny.

AIM

The Lifetime Wool project established 18 paddock-scale research sites in cooperation with wool producers across southern Australia to confirm the research results in commercial situations and to develop practical guidelines for ewe management during pregnancy and lactation.

METHOD

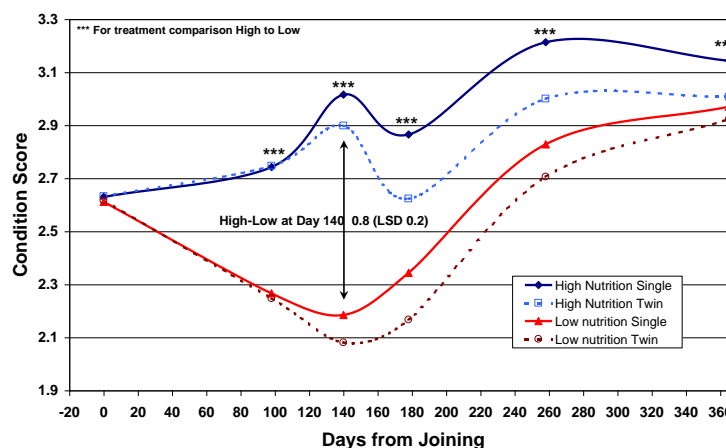
Lifetime Wool is a national project developing ewe management guidelines for woolgrowers. The project comprised plot-scale research that determined the response in wool production of ewes and the lifetime performance of their progeny to graded levels of ewe nutrition at different stages of pregnancy (Thompson and Oldham 2004). The Lifetime Wool project also established 18 paddock-scale research sites in cooperation with wool producers across southern Australia.

Oldham et al. (2004) have described the protocol for each paddock-scale site. In brief, cooperators joined 1000 mixed aged adult Merino ewes in a single flock at day 0. Ultrasound scanning of the ewes at day 50 identified those ewes that had conceived during the first 21 days of joining. These ewes were then randomly split into 2 treatments receiving either high or low nutrition. The liveweight (LW) and condition score (CS) targets for the high and low nutrition treatments were based on the LW and CS profiles of the CS3 and 3000 kg DM/ha feed on offer, and the CS2 and 1100/1500 feed on offer treatments of the plot-scale experiments (Ferguson et al. 2004). The quantity and quality of wool produced by the ewes was measured on a random sample of 25 single and 25 twin-bearing ewes from each nutritional treatment. The carryover reproductive performance of the ewes was measured using ultrasound scanning after their following joining. Wool production and quality was measured on all progeny for each flock up to 2.5 years of age.

RESULTS

CONDITION SCORE & LIVEWEIGHT

EWES ON HIGH AND LOW NUTRITION DIVERGED BY 0.8 OF A CONDITION SCORE TO PRODUCE AN AVERAGE 6.6KG DIFFERENCE IN LIVEWEIGHT BETWEEN HIGH AND LOW



NUTRITION TREATMENTS AT DAY 140. AFTER LAMBING THIS DIFFERENCE DECREASED BUT NEVER COMPLETELY CLOSED UP BY THE FOLLOWING JOINING (DAY 365).

Figure 1. The average condition score profile of single and twin-bearing ewes managed on high or low nutrition across Lifetime Wool paddock scale sites in southern Australia.

Ewe and Progeny Performance

Table 1 shows the impact of high and low nutrition on single and twin-bearing ewes and their progeny. Improved ewe nutrition during pregnancy led to higher condition score and live weight at lambing. This increased the fleece weight and fibre diameter of wool produced by commercial flocks of Merino ewes. Higher ewe live weight and condition score during pregnancy also increased survival of progeny, increased their wool production and reduced their fibre diameter. These results are consistent with the plot-scale observations that showed a strong relationship between live weight profiles and wool production of ewes and the subsequent lifetime performance of their progeny.

Twin-bearing ewes produced fleeces of lower weight, staple length and strength, while their progeny suffered higher mortality, reduced weaning weight and produced less wool of higher fibre diameter. Ewes that conceived and carried twins were more likely to have twins in subsequent years despite being slightly lower in condition score at the following joining. If twin-bearing ewes receive low nutrition the impact is additive and the ewe wool production and progeny performance results become worse. Conversely, better nutrition can improve twin performance. These results are consistent with Lifetime Wool plot-scale observations that showed a strong relationship between ewe parity and ewe wool production and the effects on lifetime performance of their progeny. The results show that there are opportunities to strategically manage twin-bearing ewes and their progeny for improved performance through better nutrition, particularly during mid and late pregnancy.

Table 1 The average performance of single and twin-bearing ewes and their progeny managed on high or low nutrition across Lifetime Wool paddock scale sites, in Southern Australia

Production Parameter	Ewe and Progeny Performance					
	Sites	Single		Twin		LSD (5%)
		High	Low	High	Low	
Average condition score at Day 140	15	3.0	2.2	2.9	2.1	0.2
Average live weight at Day140	15	56.2	49.7	60.5	53.9	2.1
Ewe clean fleece weight (kg)	15	3.4	3.0	3.3	2.8	0.1
Ewe mean fibre diameter (μm)	15	20.4	19.5	20.2	19.5	0.3
Ewe staple length (mm)	15	93.0	89.1	91.7	87.3	1.9
Ewe staple strength (N/ktex)	15	36.8	31.4	33.5	30.2	2.8
Average condition score at Day 365	15	3.1	3.0	3.0	2.9	0.08
Ewe carryover reproduction (scanning %)	15	123	116	135	133	7
Progeny survival to marking (%)	15	89.6	83.2	66.7	57.5	7.5
Progeny live weight at weaning (kg)	15	25.5	23.2	22.7	20.8	1.2
Progeny live weight at 12months (kg)	14	33.0	32.2	31.8	31.2	0.7
Progeny 1 st clean fleece weight (kg)	15	1.63	1.52	1.46	1.37	0.07
Progeny 2 nd clean fleece weight (kg)	10	2.99	2.93	2.83	2.75	0.06
Progeny 2 nd mean fibre diameter (μm)	10	18.38	18.49	18.65	18.79	0.14

CONCLUSION

Twin bearing ewes and their progeny can suffer large performance deficits. However, improving twin ewe nutrition during pregnancy and lactation can substantially improve twin ewe and progeny performance. Further work is required on the extent to which twin ewe and progeny performance could be improved and whether it is economic to provide even higher levels of nutrition to twin ewes.

KEY WORDS

Twins, Nutrition, Condition Score, Wool

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