



Department of
Primary Industries and
Regional Development

Research Library

Bulletins 4000 -

Research Publications

2-2009

Management of Merino weaners for optimum production

Patricia Harper

Keith Croker

Danny Roberts

Follow this and additional works at: <https://researchlibrary.agric.wa.gov.au/bulletins>

 Part of the [Agronomy and Crop Sciences Commons](#), and the [Animal Sciences Commons](#)

Recommended Citation

Harper, P, Croker, K, and Roberts, D. (2009), *Management of Merino weaners for optimum production*.
Department of Primary Industries and Regional Development, Western Australia, Perth. Bulletin 4762.

This bulletin is brought to you for free and open access by the Research Publications at Research Library. It has been accepted for inclusion in Bulletins 4000 - by an authorized administrator of Research Library. For more information, please contact library@dpird.wa.gov.au.



Patricia Harper, Keith Croker and Danny Roberts

Department of Agriculture and Food, Western Australia
Moora, South Perth and Albany



Department of
Agriculture and Food



Management of Merino weaners for optimum production

Patricia Harper, Keith Croker and Danny Roberts

Department of Agriculture and Food, Western Australia
Moora, South Perth and Albany



Department of
Agriculture and Food



Disclaimer

The Chief Executive Officer of the Department of Agriculture and Food and the state of Western Australia accept no liability whatsoever by reason of negligence or otherwise from use or release of this information or any part of it.

Copyright © Western Australian Agriculture Authority, 2009

TABLE OF CONTENTS

	Page
SUMMARY	1
INTRODUCTION	1
TARGET YOUR MARKETS	3
BEST PRACTICE MANAGEMENT FOR WEANERS	4
(1) Supplementation to allow better use of dry pastures during late spring and early summer ...	4
(2) Monitor the quantity and quality of green and dry pastures and provide grain supplements before the critical minimum FOO levels are reached	4
(3) Monitor the live weights and condition of weaners regularly, as they can decline rapidly from November-December onwards	5
(4) Optimise the use of cereal and legume stubbles	5
(5) Feed appropriate grain supplements when the requirements of weaners cannot be met by dry pastures or stubbles alone	7
(6) Draft off the smaller, light weight and weaker weaners as soon as possible (the 'tail' of the mob), and manage this group separately from the rest of the weaner flock	7
(7) Utilise dry pastures and stubbles before they deteriorate over summer	8
(8) Ensure that all weaners continue to grow during the first 12 to 15 months after weaning	8
(9) Address any general health issues	8
(10) Avoid shearing weaners during autumn	8

SUMMARY

There are several critical points that can help you to optimise the survival and growth of your weaners. These are:

- Supplement with grain to better utilise dry pastures in summer.
- Monitor the quality and quantity of green and dry pastures. Provide grain supplements *before* the critical minimum FOO levels are reached.
- Regularly monitor the live weight and/or condition scores of a random sample of weaners. Aim for a minimum live weight of 25 kilograms and a CS between 2 and 3 before mid December.
- Optimise the use of cereal and legume stubbles.
- Feed adequate amounts of grain supplements to weaners when dry pastures and stubbles cannot meet their requirements. This should occur before the 'crunch' in mid December.
- Draft off the lighter, weaker 'tail' of the mob and manage the groups separately.
- Use stubbles and dry pastures before they deteriorate. Provide weaners with the best quality stubbles/pastures and allow them to graze ahead of the older sheep.
- Ensure that all of your weaners continue to grow during the first 12 to 15 months. Constantly increasing live weights of weaners optimises their lifetime production of wool and meat. Ensuring that your ewe weaners continue to grow means that they are more likely to reach appropriate live weights for their first breeding and this can optimise their future breeding potential in the flock.
- Prevent/control the risk of health problems and if necessary treat them promptly (e.g. worms, diseases, lice and blowfly treatments, trace element and vitamin deficiencies).
- Avoid shearing your weaners during the autumn months (March to June).

The direct benefits of investment in weaner nutritional management can be measured by increased survival rates, improved wool production and quality, and more sheep in better condition by 15 months of age. Indirect benefits are the potential gains in reproductive performance of ewes when they are managed well as weaners.

INTRODUCTION

Sheep mortality during the first year of life is a large problem on many farms and poses a significant animal welfare issue for Australian agriculture. Post weaning mortality is estimated to cost the Australian sheep industry more than \$89 million annually through reduced income, poor productivity and increased management expenses (Sackett *et al.* 2006).



A high mortality rate among weaners reduces the number of surplus animals available for sale and the number of potential breeding replacements. This, in turn, affects the selection intensity for desirable traits and the flock's rate of genetic improvement.

Ill thrift and poor growth of weaner sheep during their first year can reduce wool and meat production as well as the weaner's reproductive performance at first joining.

Weaner mortalities ranging from 4.5 to 27 per cent have been reported in Merino flocks managed under commercial conditions in a variety of environments in Western Australia, South Australia, Victoria and Queensland (Campbell *et al.* 2006; Campbell and Behrendt 2008). The average weaner mortality from this research was about 14 per cent, despite the weaner flocks appearing healthy and being subject to management practices to control disease, nutritional deficiencies and high worm burdens. These results are probably indicative of weaner mortalities on many sheep farms across Australia. However, the results from surveys done by the Department of Agriculture and Food, Western Australia Wool Desk found that the average mortality of weaners in 2007 on the farms surveyed in Western Australia was lower—six per cent, but still significant.

Weaner losses represent a high opportunity cost. There are also losses associated with surviving weaners showing symptoms of ill thrift due to their slow growth and reduced production.

Maintaining weaners in good health is cost effective and needs to start before the lambs are taken away from their mothers.

Pre-weaning nutrition of ewes affects their ability to produce milk. The quantity, quality and composition of pasture available to ewes during late pregnancy affect the ability of ewes to produce colostrum and possibly their maternal behaviour at lambing. During lactation the ewes must have a sufficient quantity of high-quality pastures to produce sufficient milk to feed their lambs. The growth rates of single- and twin-born lambs are related to the amounts of feed available (Figure 1).

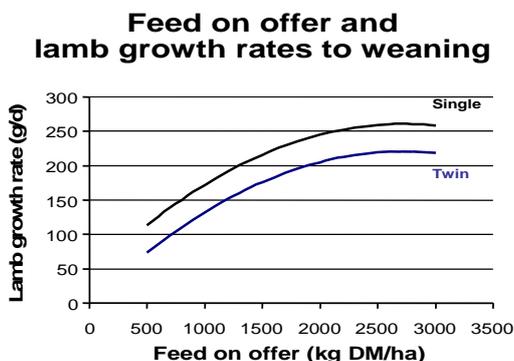


Figure 1 The growth rates of single- and twin-born lambs up to weaning are related to the amount of pasture available ('Feed on Offer').

(Source: Lifetime Wool)

The volume of milk produced by ewes influences the growth rate and eventual live weight of their lambs as well as their reserves of stored energy at weaning. These energy reserves are vital for weaner survival during the summer months when they only have access to dry, low quality summer pastures.

The live weights of lambs at weaning can vary considerably depending on their breed, expected mature live weight and frame size, the time of year they are born, their stocking rate and their level of pre-weaning nutrition. Small increases in weaning weights can strongly influence the chances of survival of light weight weaners (see Figure 2). It is recommended that lambs should have reached 45 per cent of their expected mature live weight by weaning to ensure their survival over the summer-autumn period.



Figure 2 The survival of Merino weaners is related to their live weight at weaning.

(Source: Lifetime Wool)

On many Western Australian farms, weaners are the most difficult class of sheep to manage effectively, largely because they usually cannot consume enough energy during their first summer and autumn while grazing dry pastures and crop stubbles. In addition, their immature immune system and grazing inexperience can predispose them to a range of disease and management problems.

The digestibility and energy value of pasture species fall dramatically following seed set and 'drying off' (Figure 3). In Western Australia, pastures decline in quantity and quality from about October-November until the break of season (about April-May) in the following year. This means weaners and adult sheep are faced with six to seven months of pastures declining in both quantity and quality.

Impact of post-weaning nutrition on weaner survival and growth. The nutritional management of weaners once pastures have dried off (from late spring in most areas) has a direct impact on the health and survival of the animals over the following summer and autumn. Post-weaning nutrition can strongly influence the growth rates of weaners, which in turn, influences their wool growth and subsequent reproductive performance. Providing adequate levels of nutrition at critical times following weaning can optimise the lifetime production of sheep.

Weaners have higher energy and protein requirements than adult sheep and are often the first group of sheep to require supplementation during summer. The energy reserves of weaners will largely determine the extent and cost of supplementary feeding to ensure their survival over the summer-autumn period. For example, a 20-kilogram weaner has only about one kilogram of body fat as an energy reserve, on which it can survive for less than 10 days.

Heavier weaners, or weaners that are growing faster, are more likely to survive as they can accumulate more body fat. These additional fat reserves can be metabolised to produce energy without threatening their survival. However, any further dietary deficiency of energy will cause the mobilisation of body protein sources (muscle) for energy production, affecting the strength and resilience of the animal.

Weaners are likely to lose weight during the summer and autumn months and feed supplements, such as lupin grain, will be required to maintain their growth and ensure their survival. Failure to provide sufficient energy and protein for weaners with low live weights leads to weakness, ill thrift, susceptibility to disease and possibly death from malnutrition.

Supplementing weaners with modest amounts of grain during the summer months can efficiently and cost-effectively reduce the widespread problem of weaner mortality and ill-thrift. Sheep producers should aim to provide their weaners with supplements consisting of a minimum energy content of 9 MJ per kilogram

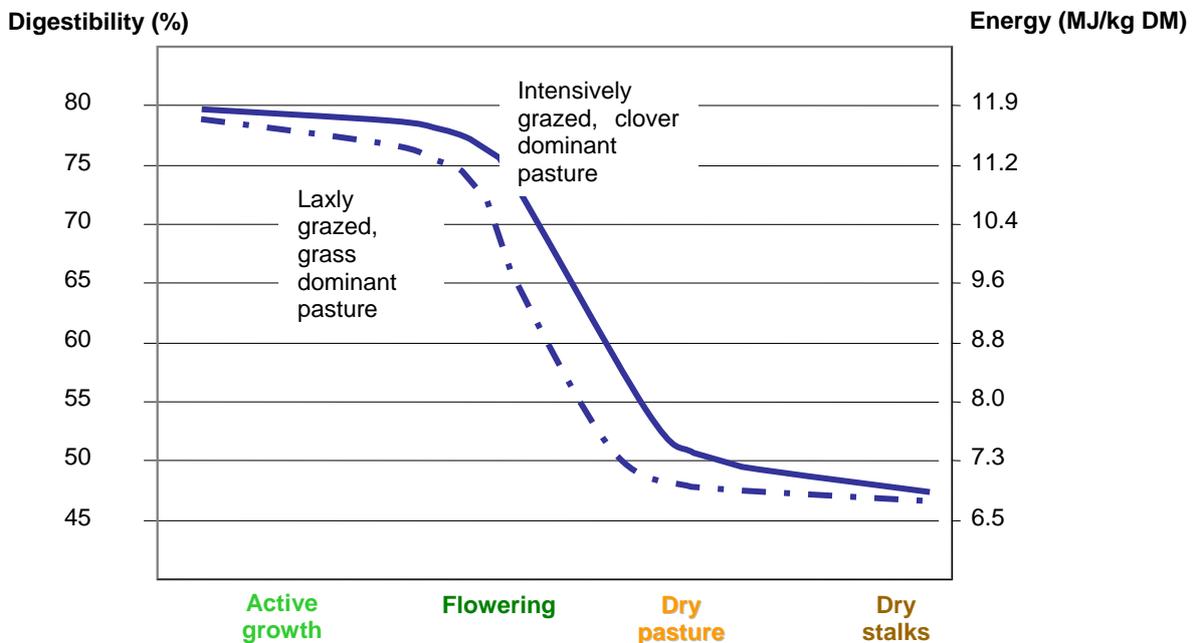
of dry matter, with 60 per cent digestibility and a crude protein content of 10 to 12 per cent per kilogram of dry matter. When feed values are below these levels weaners are unlikely to be able to consume enough feed for growth.

Producers need to ensure that sufficient quantities of pasture and supplements are available after weaning until October in the following year, in case the following pasture growing season is poor. This will ensure that animal welfare standards are met and weaner survival is maximised. In addition, if the dietary supplies of trace elements or vitamins (such as cobalt, selenium or vitamin E) are low, young sheep are often the only group on the farm affected due to their higher requirements for growth.

TARGET YOUR MARKETS

Management of weaners will vary depending upon their potential markets. Potential targets for weaners may be:

- Replacements for the breeding flock.
- Cull sheep for sale.
- Domestic meat markets.
- Export meat markets.
- Live export.



Digestibility decline post-senescence is about 0.3% per day

Formula: ME (MJ) = 0.156 x DMD% - 0.535

Figure 3 The decline in digestibility and energy content of annual grasses and clovers.

(Source: Lifetime Wool)

Targeting potential markets for weaners makes it easier to develop feed plans to ensure the weaners reach their target weights. For example, surplus lambs destined for meat markets will need feeds that contain 10 to 11 MJ of energy and 14 to 16 per cent of crude protein per kilogram of dry matter to achieve their optimum growth rate. On the other hand, ewe weaners destined as replacements in the breeding flock can be grown more slowly on rations containing a minimum of 9 MJ of energy and 10 to 12 per cent of crude protein per kilogram of dry matter.

It is important to aim for uninterrupted weight gains in weaners to achieve a robust size and weight before the pastures dry off. This applies regardless of whether the weaners are destined to become surplus lambs for sale or replacements for the breeding flock.

Green pastures are the cheapest feed source for weaners and good quality grass-legume pastures will optimise their growth. Legumes increase the quality of the pastures by increasing the palatability and digestibility of the feed. Ideal pastures for weaners contain about 30 per cent legumes.

Weaners grow well on green, actively-growing mixed pastures with a height of about 6 cm and yielding 1500 to 2000 kilograms of dry matter per hectare. Lambs born in May and weaned at about 14 weeks (September) will have access to good quality pastures of this type before the annual decline in pasture quality and quantity. On the other hand, lambs born in July-August and weaned around November will have limited access to these quality green pastures, especially in the northern regions of Western Australia. Regular assessment of the quantity and quality of green pastures is necessary to ensure the weaners have sufficient feed for weight gain.

Water. Weaners need a plentiful supply of good quality water. Low water intake can reduce feed intake. Under most conditions weaners will drink an average of two to four litres per day, but they can drink up to nine litres per day during the hot summer months, or when they are grazing salt pastures or high protein stubbles (e.g. lupin stubbles).

Water quality can vary greatly between regions and properties. Usually sheep become accustomed to variations in water quality during the year and should suffer few ill effects. However, weaners have a lower tolerance than adult sheep of total soluble salts (TSS) in water.

The recommended safe upper limit of TSS for weaners is 930 mS/m (or 6000 ppm). Note that providing poor quality water can reduce intake, which in turn may reduce feed intake.

BEST PRACTICE MANAGEMENT FOR WEANERS

Many problems associated with the slow growth or 'ill-thrift' of weaners are usually the result of inadequate amounts of feed or providing feeds of low energy and/or protein levels. A series of critical points in the management of Merino weaners have been identified. A well-constructed feed investment strategy that takes these critical points into account can provide the optimum opportunity to increase the survival and productivity of weaners.

(1) Supplementation to allow better use of dry pastures during late spring and early summer

Pastures decline in both quantity and quality (see Figure 3) as the plants dry off during October-November until several weeks after the break of the following season. Pasture digestibility naturally declines over time, at a rate of about 0.3 per cent per day. This occurs whether the pastures are grazed or not. The rate of decline in digestibility will be higher on grazed pastures and varies between locations. It also will be more rapid after rain.

Critical points for weaners on dry pastures/stubbles in Western Australia occur when:

- pasture quantity falls below 1500 kilograms of dry matter per hectare;
- pasture digestibility falls below 55 per cent; and
- crude protein content falls below 12 per cent.

As the pastures begin to dry off, supplements of small amounts of lupin seed will help to maintain the growth of weaners. The amount of lupins fed should be increased as the season progresses to ensure that the weaners continue to gain weight.

(2) Monitor the quantity and quality of green and dry pastures and provide grain supplements before the critical minimum FOO levels are reached

The growth of lambs after weaning depends on the quality and quantity of feed on offer (FOO) and the digestibility of the feed. The amount of dry FOO for weaners needs to be more than

1500 kilograms of dry matter per hectare, as intake may fall below this amount. Pastures with more than 25 per cent of unpalatable weeds (e.g. flatweed, double gee, barley grass, sorrel, spear grass, silver grass) will need higher minimum FOO levels to avoid a restriction of feed intake by weaners.

As the digestibility of the feed decreases, so does the amount eaten. This is because it takes longer to digest poor quality feed and it remains in the rumen for longer, limiting further intake. As indicated in Table 1, the level of supplementation required depends on the quality of the dry feed.

Table 1 Suggested levels of supplementary feeds required to maintain a 25 kg ewe weaner on dry pastures

Type of dry feed	Digestibility (%)	Suggested supplements (g/hd/d)
Good quality	55 to 65	50 (oats)
Poor	45 to 55	150 to 200 (oats)
Very poor	Below 45	250 to 300 (lupins/oats, 30:70) or 250 (lupins)

(Source: Feeding and Managing Sheep in Dry Times, DAFWA Bulletin 4697)

Note: Lupin grain provides an ideal supplement for weaners. Cereal grains alone often do not contain sufficient protein for the maintenance and growth requirements of weaners. Also, cereal grains need be introduced to the diet of sheep gradually by slowly increasing the amount fed over two to three weeks. This will reduce the risk of grain poisoning (rumen acidosis).

Grain supplements should be fed to weaners **before** the pasture becomes too sparse or is of low digestibility and **before** the animals start to lose weight. Weaner diets should contain a minimum of 12 per cent crude protein.

(3) Monitor the live weights and condition of weaners regularly, as they can decline rapidly from November-December onwards

Critical condition scores (CS) for weaners are between CS 2 and CS 3 in November and December and the sheep should be gaining live weight during this time. The expected mature frame size of weaners will determine the critical live weight for maximising survival. The critical live weights and condition scores for various sized weaners are shown in Table 2.

Table 2 Critical live weights and condition scores for Merino weaners at the start of summer to optimise survival

Merino weaner frame size	Expected mature live weight (kg)	Critical live weight (kg) and CS to ensure 95% survival
Small	40 to 45	20 (CS 2)
Medium	50 to 55	25 (CS 2)
Large	60 to 65	30 (CS 2)

Monitor the live weights and condition scores of a random sample of 25 to 50 weaners at regular intervals in the flock. *It is important that weaners attain at least 45 per cent of their expected mature live weight and have a minimum CS 2 before December to ensure survival until the following winter.*

(4) Optimise the use of cereal and legume stubbles

Most of the nutritional value in stubbles is in the amount of grain left on the ground after harvest. However, due to the increased efficiency of modern harvesting machinery, there is not usually much grain left in paddocks after harvest. The leaf and stem materials from stubbles provide only roughage for weaners. The



amount of grain left in the paddock will determine the number of grazing days.

The amount of grain left in a stubble paddock can be estimated by counting the number of grains in 0.1 m² squares (e.g. Hoegrass squares) at **20 random sites** at right angles to the harvest runs. Ensure that random samples are representative of the whole paddock (i.e. not all from the header rows) to get an accurate assessment of feed available.

100 kg of grain per hectare is estimated as approximately:

Wheat, oats	28 grains / square
Barley	25 grains / square
Lupins	8 grains / square
Field or chick peas	5 grains / square
Faba beans	2 grains / square

(Source: *Feeding and Managing Sheep in Dry Times DAFWA Bulletin 4697*)

There are large variations in the feed values between various cereal and legume stubbles (see Table 3).

Table 3 A comparison of feed values* of various stubbles at the start of summer in Western Australia

Stubble	Dry Matter (%)	Metabolisable Energy (MJ/kg of DM)		Crude Protein (% of DM)	
		Range	Average	Range	Average
Oats	89	6.0–7.7	6.8	4.0–6.5	5.0
Barley	89	6.0–7.5	6.7	4.0–6.5	5.0
Triticale	89	5.8–7.0	6.3	2.5–6.0	3.5
Wheat	91	5.5–7.0	6.5	2.5–6.5	3.5
Peas	90	6.5–7.8	7.2	6.0–8.5	7.5
Canola	92	5.5–7.5	6.5	4.7–7.5	6.0
Lupins	92	5.5–9.5	8.0	5.5–9.5	8.0

(Source: *Feeding and Managing Sheep in Dry Times DAFWA Bulletin 4697*)

* Figures extracted from data of Independent Lab Services, Perth, WA.

Weaners should be allowed to graze the best quality stubbles to optimise their growth and ensure survival. Provide fresh stubbles to the weaners ahead of the older sheep on the property. However, it is important that all sheep are accustomed to eating cereal grains and field peas before allowing them to graze on fresh cereal or pea stubbles. This reduces the risk of the sheep developing acidosis (grain poisoning) and optimises the use of the stubbles.

On their own, cereal stubbles will only be useful for growing weaners for about two to three weeks (see Table 4), as the unharvested grain will soon be eaten. Grain supplements will be required after the unharvested grain has been eaten.

Table 4 The expected growth rates of Merino and first cross weaners for the first two to three weeks grazing on stubbles

Type of stubble	Merino (g/hd/day)	First cross (g/hd/day)
Lupin	80–160	80–200
Cereal with grain self feeders	130–150	150–220

(Source: *Feeding and Managing Sheep in Dry Times DAFWA Bulletin 4697*)

Lupin stubbles can be quite nutritious for weaner sheep and sheep will tend to gain weight on stubbles containing at least 50 kilograms of lupin grain per hectare. Croker *et al.* (2005) specified some specific management guidelines for weaner sheep grazing on lupin stubbles. They recommended that weaners be taken off lupin stubbles after the amount of grain in the stubbles falls below 50 kilograms per hectare (i.e. four grains per 0.1 m²) or before 50 per cent of the ground cover has been removed.

Weaners grazing lupin stubbles should be monitored regularly for signs of weight loss and symptoms of lupinosis, especially after rain.

Monitor the flock regularly. It is important to monitor regularly the live weights and/or body condition scores of weaners grazing stubble paddocks. A random sample of 25 to 50 animals should be sufficient to give an indication of the average live weight or condition of the flock.

After six weeks in any stubble paddock, it is likely that the sheep will have stopped gaining weight. In fact they are more likely to be losing weight. There is no point leaving the animals in a paddock of little nutritive value, as they will lose condition by wasting energy searching for feed. In addition, erosion problems may develop with legume stubbles naturally deteriorating more rapidly than cereal stubbles.

The location of water points in stubble paddocks can influence the grazing pattern and utilisation of stubbles. Weaners tend to walk only 600 to 800 metres from water sources when they are grazing stubbles. Providing several (or moveable) water points may be required to ensure optimum grazing and use of the feed. Leaving a few adult sheep in the flock

can help to 'train' the younger sheep to find water sources and feed supplements, leading to better utilisation of the stubbles.

(5) Feed appropriate grain supplements when the requirements of weaners cannot be met by dry pastures or stubbles alone

Inadequate supplies of feed from dry pastures and stubbles will cause weaners to grow very slowly or start to lose weight. It is important to feed grain supplements or move the animals onto better quality pastures or stubbles before this happens. The need for grain supplements will increase as the pastures decline in quality and quantity. Plan to retain or purchase enough feed grain to keep weaners growing.

It is important to decide on the objective of feeding for your weaners. Objectives may be to: improve the use of dry pastures or stubbles, ensure survival, maintain condition, avoid ill thrift during late summer/autumn, produce wool of better quality and higher value, or to increase growth rates as part of backgrounding for feedlotting or improving reproduction.

To maintain weaned lambs above 25 kilograms and CS 2 while grazing pastures or stubbles, hand feeding will be needed **before** the 'crunch' in mid-December. Feeding lupin grain at about 50 grams per head per day should start in mid-November, and increase to 100 grams per head per day over the following 30 days. From early February onwards, the rate of lupin supplements will need to be increased to 150 grams per head per day (or 250 grams per head per day of 30:70 per cent lupin:cereal grain mix).

Ensure that adequate rations are provided.

Check the assumed nutritional values of the supplements are correct. This may mean analysing the feed values of the grains, hays and stubbles being fed and is especially important for weaners targeted for the prime lamb market.

Monitor stock regularly to ensure their needs are being met by the rates of supplements being provided. Condition scoring a random sample of 25 to 50 animals in the flock provides a quick and easy way to assess your stock. If the animals are losing weight or condition, the level of supplementation will need to be adjusted. The feed source for weaners should contain a minimum of 9 MJ of energy and a minimum of 12 to 14 per cent crude protein to ensure growth and survival.

(6) Draft off the smaller, light weight and weaker weaners as soon as possible (the 'tail' of the mob), and manage this group separately from the rest of the weaner flock

Research by Campbell and Behrendt (2008) showed that the lightest 20 per cent of lambs at weaning were 3.5 times more likely to die than weaners from the middle 20 per cent of weaning weights, regardless of the average weight of lambs in any one year. The next lightest 20 per cent of weaners were 1.5 times more at risk of dying than the middle 20 per cent, although the risk among weaners that were heavier than the median did not vary.

This suggests that light weight, weaker weaners are the most 'at risk' of dying and poor growth in the flock. They should be drafted off and provided with preferential treatment such as higher levels of grain supplements, better access to supplements, and closer monitoring of health, weight gain and condition than the rest of the mob. This will optimise their chances of survival and growth. Currently, many farmers would normally draft off the smaller, lighter weaners sometime over the summer months, but the inverse association between weaning weights and mortality rates suggests that it would be more beneficial to do this sooner rather than later.

Campbell and Behrendt (2008) suggested that increasing the weaning weight of the lightest 20 per cent of weaners may eliminate 71 per cent of deaths from this group (and 31 per cent across the whole flock). **In other words, increasing the live weight of just one fifth of the flock could address nearly one third of all mortalities among weaners.**

In addition, the average growth rate of the mob was more strongly associated with reducing mortalities than average weaning weights. Increasing the live weight of weaners from 0.25 to 0.5 kilograms per month over the first five months after weaning reduced the risk of deaths by 85 per cent.

Some producers also prefer to draft their weaners into single sex groups because ewe lambs mature earlier than wethers and put on more fat at lighter weights. Separation also allows the flocks to be managed differently according to their requirements and targets.

(7) Utilise dry pastures and stubbles before they deteriorate over summer

Pastures and stubbles will deteriorate over summer if not used. After drying off, the digestibility of pastures and harvested stubbles declines at a rate of about 0.3 per cent per day, whether they are grazed or not. Use any legume pastures or stubbles first, as these tend to deteriorate rapidly. Put the weaners on the best quality pastures and stubbles before the older sheep.

(8) Ensure that all weaners continue to grow during the first 12 to 15 months after weaning

This practice will optimise the production of wool and meat from the flock. Ensuring that ewe weaners continue to grow during this critical period will increase their chances of reaching optimum weights for their first breeding. Recent research from the Lifetime Wool Program has shown that optimising the live weight and condition scores of ewe weaners during their first summer can optimise the production of wool and their reproductive performance throughout their lifetime.

(9) Address any general health issues

Weaner sheep are more susceptible than adult sheep to worms, some infectious diseases and trace element and vitamin deficiencies. These factors may contribute to poor growth, ill thrift and consequently reduced survival rates. Preventing these problems is more economical than having to treat the weaners.

- Monitor all weaners for **worms** using faecal egg counts (FEC) during summer and treat with effective drenches, if necessary (see your local veterinarian for advice).
- Vaccinate all weaners against the main clostridial **diseases** (e.g. tetanus, pulpy kidney) and cheesy gland. An initial vaccination should be given at lamb marking and the second vaccination at weaning to ensure the development of long-term immunity. All sheep retained in the flock should have annual booster vaccinations.
- Monitor weaners regularly to prevent lice and blowfly problems. **Lice** and **blowfly** treatments may be required to ensure the optimal health of the weaners under some conditions. Prompt treatment is essential.

- Prevent **macro element**, **trace element** and **vitamin** deficiencies, as these can cause poor survival, poor growth and general ill-thrift among weaners. Calcium is the most common macro element that can become deficient in weaners, especially during prolonged supplementation with cereal grains (as may occur during a dry season). Trace element deficiencies (such as selenium and cobalt) can also be common among weaners and deficiencies of vitamins A, B₁₂ and E may also cause problems in weaner sheep. There are many suitable commercial preparations for the prevention or treatment of these conditions (see your local farm supplies merchant).

(10) Avoid shearing weaners during autumn

The time of shearing of weaners can influence their survival and growth. Shearing during the months of March to June has been reported to increase the risk of mortality four-fold, compared to shearing at either weaning time or in July (at about 10 months of age in south-west Western Australia). This is because the weaners have just coped with several months of inadequate nutrition during the summer and autumn and they have few body fat reserves to mobilise, even during mildly cold conditions. Avoiding shearing of weaners during the autumn months should be considered as part of the overall strategy to reduce their mortality and ill thrift.

More information on managing weaners can be found in the following publications:

- Anonymous (2006) Feeding and Managing Sheep in Dry Times. Bulletin No. 4697. Department of Agriculture and Food, Western Australia.
- Butler R, Croker K (2005) Stubbles—their use by sheep. Farmnote No. 188. Department of Agriculture and Food, Western Australia.
- Campbell A, Behrendt R (2008) Improving weaner sheep survival. Sheep Updates 2008 Perth. Department of Agriculture and Food, Western Australia.
- Campbell AJD, Vizard AL, Larsen JWA (2006) Quantified estimates of risk factors associated with mortality of weaner Merino sheep. Australian Sheep Veterinarians Conference **16**, Wagga Wagga. pp. 166-172.

- Croker K, Allen J, McDonald C (2005) Grazing weaner sheep on phomopsis resistant lupin stubbles. Farmnote No. 61/2005. Department of Agriculture and Food, Western Australia.
- Glauert S (2007) Livestock and water salinity. Farmnote No. 249. Department of Agriculture and Food, Western Australia
- Jacob R (2005) Moving water points on stubbles. Farmnote No. 106/89. Department of Agriculture and Food, Western Australia.
- Lantske N (2004) Water quality for farm garden and household use. Farmnote No. 41/2004. Department of Agriculture and Food, Western Australia.
- Lifetime Wool Program, Australia. *Condition scoring of sheep.* www.lifetimewool.com.au.
- Roberts D (2004) Feed investment strategy for young Merino sheep in the southern agricultural region. Sheep Updates 2004 Perth. Department of Agriculture and Food, Western Australia.
- Sackett D, Holmes P, Abbott K, Jeffcott S, Barber M (2006) Assessing the economic cost of endemic disease on the profitability of Australian beef and sheep producers. Meat and Livestock Australia Final Report AWH.087. Sydney, Australia.
- Water Resources Group, Department of Agriculture and Food, Western Australia. Salinity thresholds.