9-1996

Time of lambing: Extension manual

Keith Croker

Ian McFarland

Miscellaneous Publication 9/96
ISSN 1326-4168

TIME OF LAMBING

EXTENSION MANUAL

Prepared by

IAN McFARLAND
Extension Services
Narrogin

KEITH CROKER
Animal Research and
Development Services
South Perth

March 1996

Agriculture
WESTERN AUSTRALIA

TIME OF LAMBING - EXTENSION MANUAL

The development of the following Extension Manual on matters related to time of lambing has been undertaken by Ian McFarland and Keith Croker with assistance from Colin McDonald and Alan Haagensen.

This Manual is intended for use by Officers in group extension activities. It contains a series of technical articles, most written or updated in the second half of 1995, on various subjects related to time of lambing. However, some of the articles have been taken from earlier publications and have not been updated. The principles discussed in these articles are still relevant, but the economics of each situation needs to be evaluated in the current context. Therefore, it is important to closely examine the data contained in all articles because we do not bare responsibility for their content.

A number of the references are written so that they may be used as media articles.

It is our intention to provide new inserts for the Manual when new information becomes available.

The various authors of the articles are thanked for checking them and making changes where they thought is was necessary. The skill and the long time involved in formatting the Manual by John Suiter, is greatfully acknowledged.

A number of the articles are modified versions of those compiled by Brian Ashton of Primary Industries, South Australia.

Ian McFarland
EXTENSION SERVICES
NARROGIN

KEITH CROKER
ANIMAL RESEARCH AND DEVELOPMENT
SOUTH PERTH

CONTENTS

EARLY VERSUS LATE LAMBING

Ian McFarland, Development Officer, Narrogin

Clean wool production per hectare is the single most important determinant of profitability on wool producing properties. Generally, farms which have the highest levels of clean wool production per hectare have the highest stocking rates - measured in dry sheep equivalents per hectare. Farms with fewer sheep per hectare may have relatively high wool cuts per head but ultimately have lower production of wool per hectare. The surest way to increase wool production per hectare is to find ways to run more sheep per hectare. Usually this has to be done without increasing the autumn and winter grazing pressure.

Why then is it important when ewes lamb?

Savings in supplements

Ewes lambing later than June will have much lower requirements for supplementary feed than do ewes lambing in April or May. However, weaners born later than June may need more supplementation in the following autumn than weaners born in April or May. Also, in some areas these weaners may need to be supplemented between pasture senescence and when stubbles are available.

High reproductive rates

Ewes mated in March or April have higher ovulation rates and, consequently, a potential for higher lambing percentages than ewes of the same condition score joined in December or January. However, in practice the ewes are usually considerably lighter in March and April than they are in December or January, so the lambing percentages are often similar in ewes mated at either time. In some years lambing percentages will be higher with a later lambing; in other years the reverse will be true.

Size of lambs

Early lambing produces bigger lambs for October-November sales. For farmers who reliably make a large part of their income from sales at this time, later lambing may not be attractive. Alternatively, any loss from lamb sales would have to be matched by increased income from other sources.

Larger lambs (more than 25 kg) survive better over summer. However, these days Phomopsis-resistant lupin stubbles can provide good feed for some of the summer. Lupin seed also is an excellent protein and energy supplement for lambs.

Length of lambs wool

Lambing later means the lambs have shorter wool at shearing time - some consideration may need to be given to changing shearing time.

Ewe health

Lambing later than early June favours ewe health. Ewes lambing in winter and spring have green feed during late pregnancy, which reduces the risk of death from pregnancy toxaemia and improves the mothering ability and milk production of ewes. Unfortunately, ewes lambing in July, August or September have an increased risk of hypocalcaemia (milk fever) and foot abscess.

Stocking rate

Lambing ewes need to eat between 50 and 100% more pasture than do dry sheep. Therefore, timing lambing to occur in winter and spring will mean that the ewes can get the extra feed needed from the growing pastures. It will also take the pressure off the autumn feed gap. Overall, lambing on green feed often allows ewes to be grazed at a higher stocking rate.

Summary of the characteristics of each lambing time

- April lambing: puts intense pressure on pastures in May and June. July and August management is a little easier than with May lambing and similar to June lambing.
- May lambing: may allow pastures to get a good start but produces a very high demand for feed in June, July and August.
- June lambing: allows much easier autumn management, less pregnancy toxaemia, lower winter grazing pressure than with an earlier lambing. Reduced amounts of tender wool.
- July lambing: as for June, but winter and spring stocking rates can be 20% higher than for May lambing for the same winter grazing pressure. Even then, May grazing pressure will still be lower than with an April or May lambing.
- August lambing: stocking rates can be 50% higher than May lambing for the same winter grazing pressure.
- September lambing: stocking rates can be 70% higher than May lambing for the same winter grazing pressure but May grazing pressure may limit the increase to 60%.

As an example of the practical implications of this relationship, consider a paddock in which you would choose to run 400 wethers. This paddock could be stocked, for the same winter grazing pressure, with the following number of ewes.

Stocking rate varies for the same winter grazing pressure

Month of lambing	No. ewes equivalent to 400 wethers	Comments
April	207	Heavy supplementation of ewes needed
May	200	Supplementation of ewes needed
June	206	Some supplementation be needed
July	244	Weaners need to be fed from February
August	303	Weaners need to be fed from January
September	320	Weaners need special management or green feed

Some practical implications of choosing a lambing time

Weaner management

While it is true that an August lambing allows more ewes to be run per hectare, consideration must be given to the performance of the weaned lambs over summer and autumn. As a rule of thumb, lambs should have 4 months on plentiful green feed from the start of lambing otherwise it may be necessary to supplement them with vitamins A and E.

The ideal time of lambing will therefore depend on the district and rainfall.

If weaners cannot be grown to a minimum weight of 25 kg before the pastures dry off, their management through summer and autumn is difficult unless quality feeds, such as Phomopsis-resistant lupin stubbles, are available. Weaner management must be of a high standard. At least three factors are important: energy and protein provision through correct supplementation; worm control; and trace element nutrition (particularly selenium and cobalt).

Shearing time

Time of lambing has a much greater impact on profitability of sheep grazing than does time of shearing. Consequently, the time of lambing should be chosen first. With a July lambing, shearing can be performed any time from October to April. With October shearing, lambs will have very short wool and shearing them will be an expensive exercise. Leaving lambs unshorn and running them through until the following October for shearing with 15 months wool may need to be considered. In the case of autumn shearing the lambs can be shorn in February or later with 6 months, or more, wool, but in this case there is a need to have grass seed free paddocks for the weaners.

Summary

Lambing in late winter or early spring offers producers the potential to run ewes at higher stocking rates and to consequently profit from higher wool production and higher lamb production per hectare. However, lambing later needs the fine tuning of management practices, particularly in the areas of grass seed management, blowfly control and weaner nutrition.

TIME OF LAMBING - EWE HEALTH

Julian Gardner, District Veterinary Officer, Esperance

In lambing ewe flocks, the most frequently seen animal health problems are metabolic diseases and those associated with internal parasites. This paper attempts to address these and other diseases affected by time of lambing, although through a lack of recorded information some of the material presented and comment made is based on field experience and anecdotal information.

Metabolic diseases

Pregnancy toxaemia

Pregnancy toxaemia is associated with lowered sugar (hypoglycaemia) and elevated blood ketones (hyperketonaemia) along with elevated plasma cortisol levels. It results from a deficiency in net energy intake in ewes at a time of increasing demand as occurs in the last 2 months of pregnancy. Characteristically, twin bearing ewes are more frequently affected and it is mostly seen in flocks near the point of lambing, often in good condition on dry pasture before or at the break of the season.

The disease is also seen combined with emaciation in poor years where ewes in advanced pregnancy become cast and die. It occurs less frequently after green feed has become established.

Occasionally where ewes are grazing a new germination in bare paddocks, sand impaction leading to inappetence may precipitate an outbreak of pregnancy toxaemia.

Hypocalcaemia

Hypocalcaemia may be confused with pregnancy toxaemia because it occurs in the weeks immediately before lambing, but unlike pregnancy toxaemia it can also occur in lactating ewes up to about 10 weeks after lambing. It mostly affects mature ewes and may also occur concurrently with pregnancy toxaemia and hypomagnesaemia.

Its occurrence is normally sporadic although outbreaks may be precipitated by holding in yards; deprivation of food; long distance transport, forced exercise and a history of grazing oxalate containing plants or green cereal crops. Often a combination of these factors is associated with outbreaks. As a generalisation hypocalcaemia is more likely to occur on green pasture.

Parasites

Internal parasites are a major cause of disease and lost production, particularly in the higher rainfall areas. Richard's (1988) estimated the annual loss directly due to parasites in Western Australia was between $38.5 and $77 million.

At lambing and during early lactation ewes suffer a relaxation in immunity to parasites leading to a major source of contamination of lambing paddocks with worm eggs and larvae. This is an important factor in maintaining parasite ecology on the farm.

With the emergence of anthelmintic resistance it is important to consider managing parasite ecology and breeding resistant sheep, relying less on drenching for worm control. Limited

trial work (Wilkinson, 1969; Gardner *et al*. unpublished) suggests parasitism of lambs is more severe with an earlier lambing.

Perinatal mortalities

Extremely bad weather conditions during lambing can substantially increase new born lamb losses. Although these circumstances can occur at most times of the year, the chances of their occurring are greater with a winter lambing than for an autumn or spring lambing (Davies, 1987).

Davies also reported an interaction between stocking rate and lambing time with greater losses at higher stocking rates in winter.

Coccidiosis

Outbreaks of coccidiosis in lambs from 3 weeks of age are often seen in years when pastures are slow in establishing and growing. Poor lactation leads to lambs grazing and to oocyst infection.

There are differing opinions on the effect of this disease on lamb growth rate and feed consumption and whether the disease is coccidiosis or of mixed aetiology. This syndrome is more commonly seen in earlier lambing flocks.

Clover disease

The influence of time of lambing on clover disease is not clear. Underwood *et al.* (1959), quoting earlier work, reported that experiments on small animals have shown that oestrogen induced cystic endometrium can be prevented by concurrent treatment with progesterone. On this basis, having ewes pregnant part of the season when pastures are more clover dominant should be advantageous. This is not supported by Davies (1987) who reported a higher proportion of barren ewes with a winter lambing than an autumn lambing.

Ovine dermatophilosis

Survey work by Edwards *et al*. (1985), showed the prevalence of ovine dermatophilosis in lambs increased steadily from a minimum in early lambing flocks (January to March) to a maximum in flocks lambing later in the season (July to December). There were no such trends in hoggets, ewes and wethers. The trend seen in lambs was explained by the timing of rainfall and development of the sebaceous layer on lamb skins in the first weeks after birth (Roberts, 1963).

Flies

Flies are an overriding concern for many farmers. Lambing during a fly wave with the risk of body, vulval and umbilical strike is anathema to them. Because it is also necessary to avoid strike following the mules operation, mid August appears a practical limit to later lambing and mulesing in most Western Australian environments.

Enterotoxaemia

Enterotoxaemia is most common in lambs. Lambs on well fed, heavy milking ewes are particularly susceptible [Blood *et al*. (1985)]. In the absence of adequate vaccination cover this would suggest the prevalence of enterotoxaemia would be higher in late lambing flocks.

Foot abscess and footrot

Foot abscess is a disease of moist boggy conditions and can be particularly severe in pregnant ewes. So it is more likely to occur in later lambing flocks.

Footrot is favoured by warm, moist conditions as occur during spring. In south eastern Australia where it is endemic, it can limit the option of lambing in late winter or spring.

Grass seeds

Where grass seeds are a problem, smaller late born lambs appear to be more severely affected.

References

Blood, D.C., Radostits, O.M. and Henderson, J.A. (1983). Veterinary Medicine, sixth edition.

Davies, H.L. (1987). *West. Aust. Dept. Agric. Tech. Bull.* No. 72.

Edwards, J.R., Gardner, J.J., Norris, R.T., Love, R.A., Spicer, P., Bryant, R., Gwynne, R.V.R., Hawkins, C.D. and Swan, R.A. (1985). *Aust. Vet. J*. **62:** 361.

Richards, R.B. (1988). Economic Estimates - Research Priorities Review - Animal Health Division.

Roberts, D.S. (1963). *Aust. J. Agric. Res*. **14:** 492.

Underwood, E.J., Shier, F.L., Davenport, N. and Bennetts, H.W. (1959). *Aust. Vet. J.* **35:** 84.

WiIkinson, F.C. (1969). *J. Agric. West. Aust*. **10:** 501.

Disease	Clinical signs	Predisposing causes	Treatment
Pregnancy Toxaemia	Ewes away from flock, easily approached, 'stargazing' posture apparent blindness, goes down on side with periodic convulsions. May have difficulty lambing.	Low dietary energy associated with increased demand prior to lambing. More common with twin lambs.	Improve energy content of flock diet. Individuals may be treated with 50 mL propylene glycol twice per day.
Hypocalcaemia	Tremor 'proppy' gait leading to sternal recumbency - death in 6-12 hours. Mucous exudate from nostrils. Rapid response to treatment.	Low serum calcium, often associated with poor nutrition, high oxalate herbage, stress of prolonged yarding or droving over a distance.	Injection of 40-70 mL 25% Calcium Borogluconate solution.
Clover Disease	Dystocia - retained dead lambs.	Grazing high oestrogen pastures.	Nil.
Haemonchosis (Barbers Pole Worm)	Extreme anaemia, weakness, collapse on moving any distance with pronounced heart beat.	Often associated with larval pick up following early break or summer rains.	Drenching.

INCREASE PROFIT WITH LATE WINTER LAMBINGS

Keith Croker, Senior Research Officer, South Perth
Alan Haagensen, Regional Economist, Geraldton

Timing the joining of rams with ewes and the subsequent lambing 5 months later is a decision that involves compromises between a number of factors:

- The major aim of the sheep enterprise.
- The grazing pressure on the farm.
- The breeding season of the ewes.
- The seasonal patterns of rainfall, temperature and pasture growth.
- The ability to supply extra feed, if required, either as grain or special purpose crops; and
- The way time of lambing fits in with other farm activities.

Farmers wanting to increase the efficiency of production of their sheep enterprise can do so by changing their management program so that the ewes are on green feed for the last third of pregnancy and during lactation. This can be done relatively easily because the initial change in time of joining will mean that the interval between the previous lambing of the ewes and the start of the next joining period is longer than occurs with the established early time of lambing. Therefore, there should be no adverse effect on the ewes due to the new time of mating in the year of the change.

What are the advantages of a late winter lambing ?

Less supplements for ewes

In most years it will not be necessary to feed ewes at rates higher than those needed for non reproducing sheep. This is perhaps the biggest advantage of a late lambing. The need for large amounts of expensive supplementary feeds, common with early lambing ewes, is greatly reduced.

In some years, either because of a late start to the growing season or very cold weather, green pasture will be short when the ewes are lambing in late winter and so a small energy supplement will be needed to cater for the extra nutritional demands of reproduction.

Better quality wool

There is a lower variation in wool growth through out the year with ewes that lamb and lactate on green feed than those that lamb and lactate on dry feed. The late lambing ewes produce more wool in autumn and less wool in spring than ewes that lamb on dry feed and have their lambs weaned after a 12 week lactation. The lower seasonal variation in wool growth means that the wool has a much higher staple strength.

In comparisons of times of lambing it was found that 24% of the fleeces from May-June lambing ewes were tender even though the early lambing ewes had been fed a large amount of grain before and during lambing. More recently, in a study at Badgingarra, it was found that the staple strength of wool produced by March lambing ewes was lower than that for wool produced by July lambing ewes (29 v 39 N/ktex).

Potential higher carrying capacity

Because there is a lot of green feed available in late winter and spring to meet the energy demand of pregnant and lactating ewes, ewes can be grazed at higher pressures than is possible with early lambings.

The potential for a greater grazing pressure means that more sheep can be run on the farm. These could be wethers which would result in the production of more wool. Alternatively, the same number of sheep could be run on a smaller areas which would allow an increase in the area cropped or allow the development of other activities on the farm.

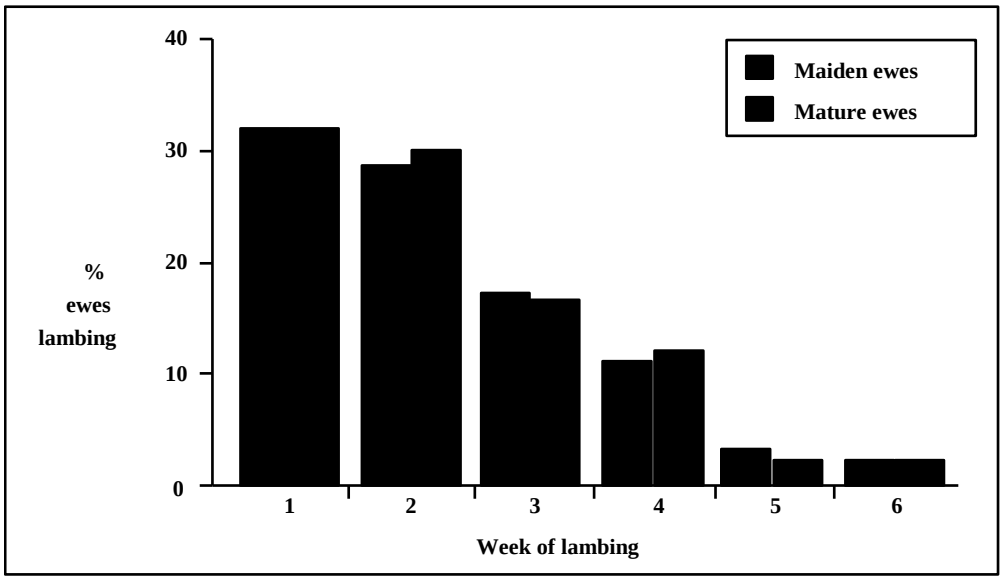
Ewes cycle naturally

When rams are joined with ewe flocks in February the ewes should be coming into heat regularly and the joining period can be reduced to 5 weeks which is the equivalent to the length of 2 oestrous cycles. November-December matings can also be reduced to 5 weeks provided that there is an effective teasing of the ewes.

Most ewes will conceive in this time unless they have some problem which affects their reproductive functions. In a study on a farm at Darkan in 1987, it was found that most ewes had lambed after 4 weeks when the rams were joined with them in early March (see Figure 1).

Short joining and lambing periods have a number of benefits. The ewe flock and their lambs can be managed more efficiently at both joining and lambing. Supplements, when necessary, are used more efficiently. Lamb marking, mulesing and weaning are more easily organised because there is a smaller range in the ages of the lambs. It is also likely that there will be a smaller tail in the weaner flock over the summer.

Figure 1. Percentage of ewes lambed each week in a flock joined in early March at Darkan Total ewes lambing - Maidens 88% and Mature 97%.



Higher lambing percentages

Ewes joined in February usually produce more lambs than ewes joined before Christmas

To maximise this boost in lambing percentages the ewes should be maintained in good condition (condition score 3) during the 2-3 months before the rams are joined with them and throughout pregnancy. Cereal stubbles or stubbles of Phomopsin-resistant lupins grazed at relatively light stocking rates could be used for this, otherwise the best available pastures should be grazed.

Ram management

Rams should not be forgotten. They should be fed well for the 8 weeks before they are joined with the ewes so that they are in good condition and have large testicles with plenty of reserves of sperm at the start of joining. Where the amount of paddock feed available is limited, feeding the rams 750 g lupin seed/hd/day for the 8 weeks before they are joined will result in them being in near optimum condition for joining.

Precautions

There are good reasons for lambing ewes on green feed. However, it is important to realise that there can be problems associated with these lambings and the resulting lambs.

In late winter, the passage of cold fronts through the agricultural areas is common. If these coincide with the birth of a lot of lambs mortality rates amongst lambs born at, or near, that time can be high. However, this is not common. Studies done by the Department of Agriculture Officers, at a number of sites, showed that the overall levels of lamb mortality recorded in May-June and July-August lambing flocks were similar.

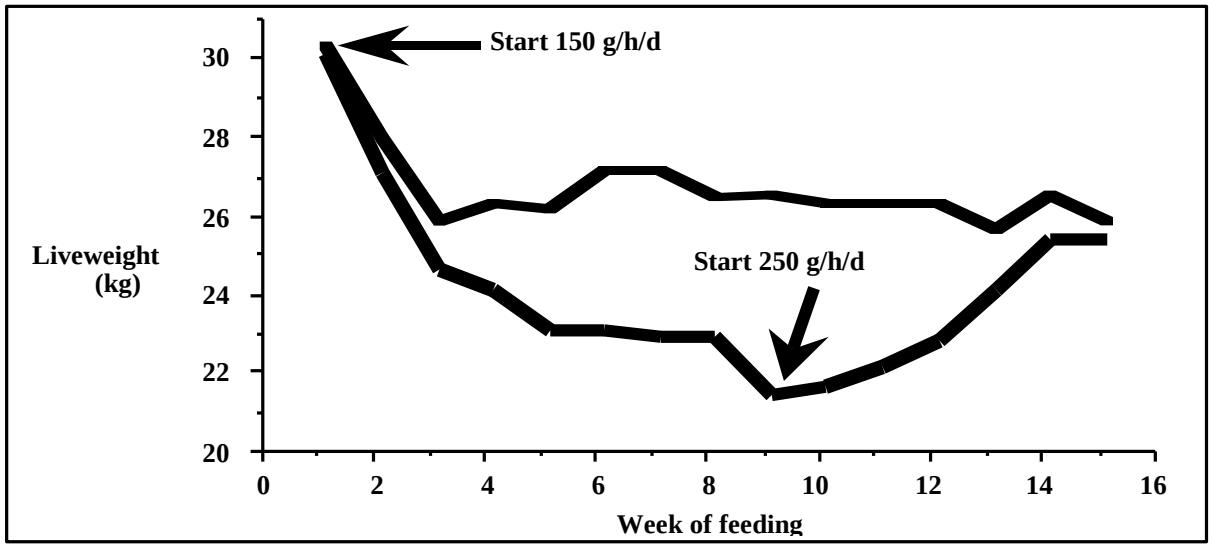
Neo-natal lamb mortality is higher with multiple births than occurs with single births. Because later lambings produce not only less dry ewes but often also more twins, it could be expected that lamb mortality would be higher for later lambings.

Because the weaners produced from a late winter lambing will be younger than those born in autumn, they will be lighter at the start of summer. Typically, in the Eastern and Northern Wheatbelt lambs born in July can achieve weights of 22-24 kg as pastures hay off. In the Great Southern, with a longer growing season, July drop lambs should achieve 27 kg before the pastures hay off. These lambs should be fed 30-50 g lupin seed/hd/day from when pastures senesce until lupin stubbles are available.

Where stubbles are not available, or are no longer maintaining the body condition of the weaners, they should be supplemented with lupin seed, or a lupin-cereal grain mix (say 30:70), which gives enough protein for growth of the young sheep. Feeding should be at a rate that will maintain their body condition score at 2 or better. As a rule of thumb, start feeding at a rate of 150 g/hd/day and adjust feeding rates to maintain body condition score.

Feeding should start early at low rates rather than late at high rates. In work at Wongan Hills where weaners were fed the same total amounts of supplement, starting either early or late, they finished with similar weights after a 16 week period. However, those fed the smaller daily quantity from earlier produced 8% more wool.

Figure 2. Feed a little early rather than a lot late, lupin seed supplementation of Merino weaners.



Weighing and/or condition scoring a sample of the weaners is recommended as an aid to monitoring growth and development and thus as a guide to the success of the feeding rate. Draft off the bottom third of the flock and run them separately to the rest of the flock. These sheep can then be fed at a higher rate.

There can also be problems in late lambing flocks with the incidence of flystrike and the presence of grass seeds in the pastures. Appropriate management can minimise the effects of these on production.

What is the cost of changing to a lambing on green feed with shearing in autumn?

(For an average flock of 2,500 sheep with 47% mated ewes.)

The time of lambing can be changed in one year, but the change from a spring to an autumn shearing could be done over 4 years by delaying shearing each year until the required time is reached.

It is suggested that the change in the time of shearing from August-September to February or March could be achieved using the following timetable:

Year 1 - Delay shearing until October to cut a 120% clip.
Year 2 - Delay shearing until mid December to cut a 116% clip.
Year 3 - The sheep are not shorn.
Year 4 - Shear in February to cut a 113% clip.

This program appears to result in a high cost for the change in the third year because there is no income from wool for 14 months. But when the cumulative cash flow is considered, after 7 years it is estimated that with a late winter lambing and an autumn shearing the enterprise is about $25,000 better off due to the better quality of wool produced. Where the stocking rate has been increased by 15% following the change in times of lambing and shearing, the enterprise is more than $50,000 in front of a late autumn lambing with a spring shearing after 7 years.

TIME OF LAMBING - BENEFITS AND COSTS OF CHANGING

Alan Haagensen, Regional Economist, Geraldton

Introduction

This study compares a May lambing-September shorn flock with a July lambing-February shorn flock, and looks at the cost of changing from a May to a July lambing. The time of lambing is changed in one year, the time of shearing is changed to fit in with the new management by premature shearing at 6 months.

Cull sheep and surplus sheep are sold off shears. The flock structure is based on a flock of 2,500 sheep made up of 1,170 mated ewes. Wethers are sold at 1.5 and 2.5 years of age.

Analysis

Comparison of May lambing with July lambing

Net income:

Wool price (¢/kg)	May $	July $	Difference $	Per cent %
235	17,175	24,208	7,033	40
330	29,766	37,724	7,958	27
470	48,70	58,000	9,230	19

The increase in cash flow of $7,958 for the July lambing is made up of the following factors:

	Cost $	Total $
COST SAVINGS		
Hand feeding	4,881	
Interest saved (10%) (interest saved at a 5% rate is $1,600)	3,357	
Extra income:		
Sheep sales (higher prices)	1,223	
Wool quality mated ewes	1,029	10,490
LESS		
Income foregone:		
Quantity of wool - 50 less sheep shorn (190 kg)	644	
Extra costs:		
Husbandry	1,887	2,538
TOTAL COST		**$7,958**

The extra income from wool quality is from an improved strength of wool from spring lambing ewes.

The strength of autumn lambing ewes wool is 20 N/Ktex - the price is discounted 10%.

The strength of spring lambing ewes wool is 30 N/Ktex - the price is discounted 5%.

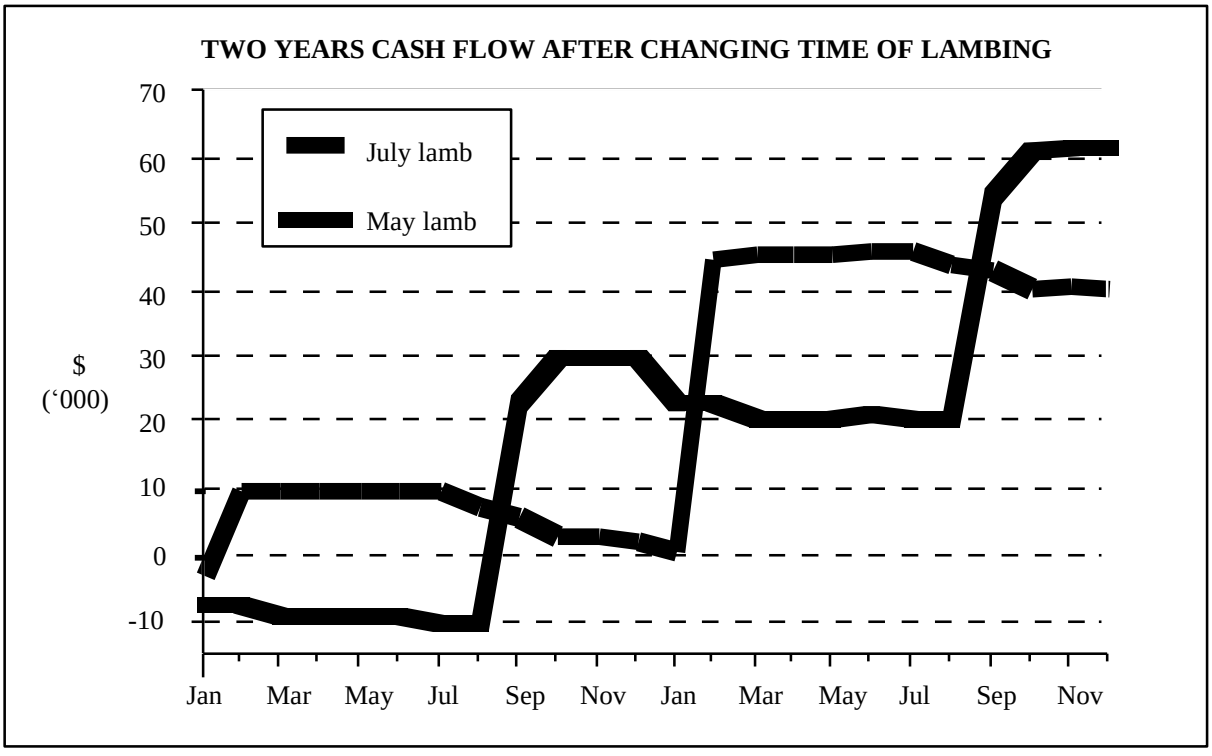
The difference in cash flow between May and July lambing is quite large, varying from 19-40% depending on the price for wool. There is a cost involved in changing time of lambing, most of this cost is associated with the cost of changing the time of shearing. In this study, time of shearing is changed simply by premature shearing at 6 months. This is the easiest way of changing time of shearing but for a comparison of different ways of changing the time of shearing see the article by Haagensen in Management Matters No. 20 (March 1995) published by the Department of Agriculture.

Changing time of lambing and time of shearing

It is easy to change time of lambing. The main consideration is changing the feeding and management of ewes and weaners, and having spraytopped clover based pastures for weaners. The time of shearing is usually changed to autumn to fit in with the management of later lambing.

A May lambing-September shorn flock is compared with changing to a July lambing-February shorn flock. A wool price of 330¢/kg is used.

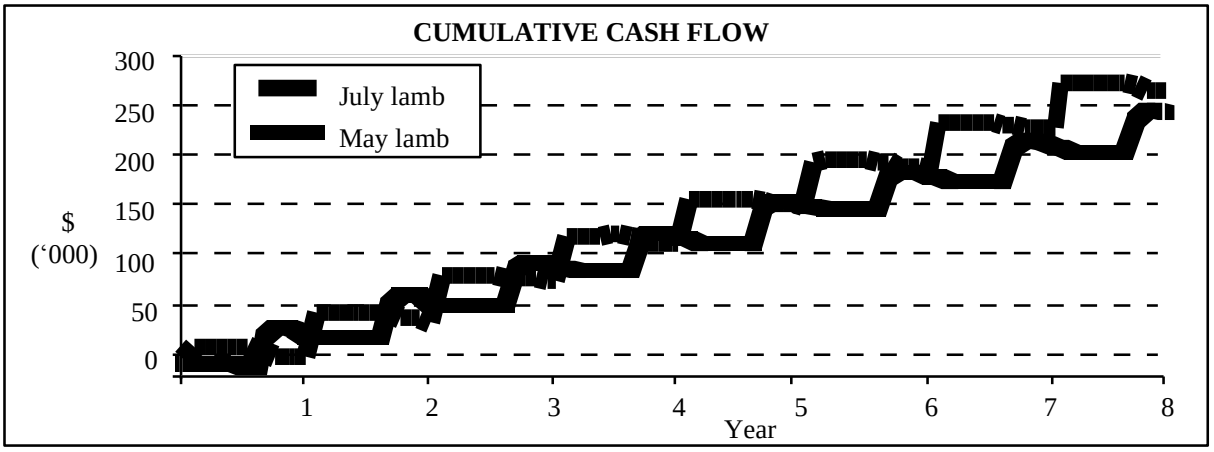
Changing the sheep program has a large effect on the cash flow and changes the time of the peak debt in the first 3 years. The graph below shows the effect on the monthly cash flow for the first 2 years.



The income foregone in the first year of changing the time of lambing is $27,250. This is made up of:

	Income $	Total $
Delaying sheep sales 6 months	10,485	
Less wool sales	23,854	34,339
CHANGES IN COSTS		
Feed	-4,876	
Freight	-828	
Husbandry	+1,489	
Shearing	-2,872	-7,078
TOTAL INCOME		**$27,252**

The graph on cumulative cash flow compares the cash flow for each time of lambing for 8 years at monthly intervals. It can be seen that July lambing is in front by the fifth year.



Effect of change in flock composition

This has been tested with a high proportion of ewes in the flock, i.e. 68% ewes. A wool producer with a large proportion of wethers and only 31% ewes would not benefit as much from a change to a later lambing. In such a situation the benefit from changing to a later lambing is $5,390 while the cost is $24,232. It would take a year and a half longer to break even.

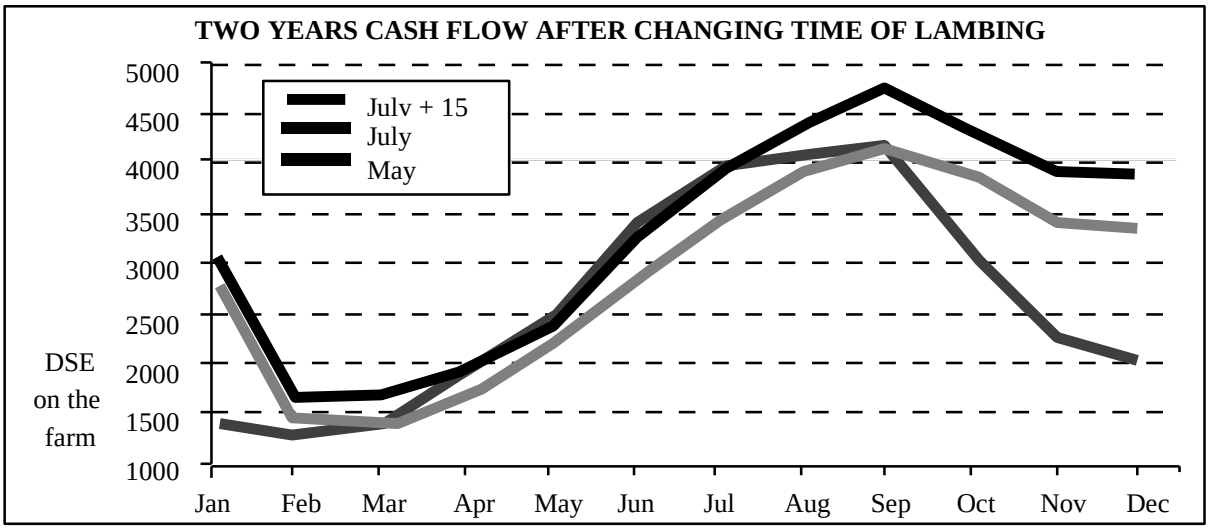
Increased stocking rate

Some farmers have found they can increase stock numbers when they change to a July lambing. This is because there is less grazing pressure at the break of the season.

The stocking rate with the later time of lambing was increased by 15% over 6 years by keeping half of the best cull ewes for 1 extra year. Increasing the stocking rate increased the net cash flow by $4,080 each year from the fifth year, that is an increase of 11%. Again there is a cost involved, it costs $7,351 to increase stocking rate due to less sheep sales, $4,330, purchase of extra rams $2,000 and extra husbandry costs $750, and it takes 2 years to pay for the cost of changing stocking rate.

A farmer can increase the stocking rate without increasing the number of sheep. He can do this by reducing the area of pasture by cropping more. This may be a more profitable alternative if he has suitable land and enough plant to handle the extra crop.

Changing the time of lambing changes the grazing pressure on the farm. The following graph shows the grazing pressure in DSE.



July +15 is a July lambing with a 15% increase in stocking rate.

APPENDIX

	May lambing		July lambing	
	Date	**Cost**	**Date**	**Cost**
Husbandry				
Crutch adult sheep	March	60¢	September	60¢
Drench all sheep	December	25¢	December	25¢
Drench lambs at weaning	July	15¢		
Vaccinate all sheep	March	20¢	August	20¢
Mark and mules lambs	July	70¢	August	70¢
Jetting			August	40¢
Sales				
Cull ewes	October	$9	March	$10
Hogget ewes	October	$13	March	$13
Ewe lambs	October	$12	March	$15
Wethers	October	$15	March	$17
Shearing				
Cost	September	$3	February	$3
Ewe wool weight and price	5 kg	$3.12	5 kg	$3.30
Wether wool weight and price	6 kg	$3.30	6 kg	$3.30
Hogget wool weight and price	4.5 kg	$3.60	4.5 kg	$3.60
Lamb wool weight and price	1.5 kg	$4.36	1.5 kg	$4.36
Lambing percentage	May	80	July	80
Deaths: Ewes		4%		4%
Wethers		3%		3%

Feed is paid for in January.
Lambs from each time of lambing are fed:
30 g lupins/day in October and November, 100 g in March, 150 g in April, and 200 g in May.

May lambing ewes are fed:
200 g lupins/day in March, 300 g in April and 200 g lupins and 300 g oats/day in May.

To change the time of shearing.

Year 1 shear in February with 6 months wool (60% of annual weight) with 20% discount for premature shorn wool.

HOW LATER LAMBING HELPS PASTURE MANAGEMENT

Ian McFarland, Development Officer, Narrogin

Sheep depend on good pastures. Therefore, grazing management should aim to improve pasture quality. It sounds obvious, but how often has the reverse been the case? Ideal grazing management of pastures has the correct grazing pressure to maximise establishment and production, control weeds and increase seed set. Such management utilises more of the feed produced, that is, converts most feed into wool and meat.

Ideal grazing management

- Autumn: Grazing strategy will depend on the break of the season:
  average break - defer grazing of pastures until there is 200-400 kg DM/ha;
  late break - defer graze pastures to 800 kg DM/ha.

- Winter: Use enough sheep to maintain pastures between 1,000 and 2,500 kg DM/ha;

- Spring Use enough sheep to maintain pastures between 1,500 and 3,500 kg DM/ha.

How can farmers achieve this ideal pasture management? In the past there has been too much grazing pressure at the break of season, and too little in later winter and spring. The most common mistake is to lightly graze in July, August and September.

A change to lambing later (lambing in June, July or August) will go a long way to achieving the ideal for the following reasons.

Later lambing has these advantages:

- Less grazing pressure at the break of season until the pastures are established. Ewes in early pregnancy do not need as much feed as ewes in late pregnancy or lactating ewes. Note; some grazing of pasture straight after the break will actually be of benefit in weedy pastures and those with high plant density (common in high rainfall areas).

- Easier to manage the sheep to enable spray grazing which often reduces winter feed supply. Ewes in mid pregnancy can be easily moved around and stocked at higher rates, whereas lambing ewes cannot. Red legged earthmite control may also be easier.

- Increased grazing pressure in August, September and October (because ewes with lambs at foot eat 2-3 times as much feed as dry ewes) means pastures can be kept shorter at this time of the year. This reduces the seed set of weeds and increases the seed set of clovers and medics.

- With the increase in herbicide resistant weeds, control of the seed set of weeds by hard grazing in Spring will become more important in cereal growing areas.

- A pasture hard grazed in spring will use, and need, much less moisture than a lightly grazed pasture. This can extend the growing season of the pasture by 3 weeks and therefore, increase the clover or medic seed set. Remember, the shorter the pastures in spring the more nutritious, palatable and weed free they become.

- The dry feed, being shorter and more nutritious, will be more easily removed over summer and autumn - resulting in better pasture establishment, or easier preparation of crops, the following year. Care must be taken, of course, not to over graze in summer or autumn. The sheep should be taken off the paddocks when the amount of ground cover falls to 40-50%.

- Less hand feeding of ewes at lambing will reduce the need to conserve fodder. Cutting of pasture for hay or silage removes nutrients from the paddock and reduces clover seed set.

- By shearing, and selling culled sheep off-shears, between October and March, the benefits of later lambing are even greater. The minimum stock numbers will be at the break of season, and the maximum numbers in spring or summer.

A change in lambing time is probably the biggest change that can be made to sheep management. It should be planned carefully. Farmers will need to adapt their sheep and pasture management to make the best use of later lambing. For example; topping of pastures to improve the feed value for the weaners and to reduce vegetable matter in their wool, or feeding lupins to the poorer third of the weaners over autumn.

All the benefits of later lambing will not occur overnight. However, farmer experience has shown that changing to a later lambing is very worthwhile to the whole farm management.

GRASS CONTROL IN PASTURES USING HERBICIDES

Alex Wallace, Research Officer, Katanning

The following tables are provided as a summary only. Refer to Bulletin No. 4307 - October 1995, Agriculture Western Australia for further details.

Table 1. Comparison of early (pasture manipulation) and late (spray-topping and hay-freezing) grass control techniques

	Pasture manipulation	Spray-topping	Hay freeze
Description	Early to mid season grass removal to produce legume dominant pastures that will facilitate high cereal yields through; Take-all reduction, early sowing and increased nitrogen fixation.	Seed set control of annual grasses to facilitate reduced tillage during crop establishment while also improving feed quality of sprayed pasture.	Method is as for spray-topping with higher rates of herbicide applied slightly earlier; kills pasture completely producing a standing crop of hay.
Main uses	This method is appropriate for all grasses especially barley grass and silver grass. * Early grass weed removal to maximise legume seed set especially when planning to harvest legume seed (simazine + grass selective). * To assist with the management of herbicide resistance (simazine + paraquat). * Early-mid season broad-leaved weed control can be included. * For long-term pasture to be cropped next year - reduces grass weeds and take-all in crop. * Control of grasses which are difficult spray-top effectively, barley grass and silver grass.	An important tool for managing herbicide resistance Most appropriate where: • take-all disease is less important; • the cost of pasture manipulation and the reduction of early season feed outweigh crop benefits; • pastures are to be reseeded next year - reduces grass competition, improves legume establishment; • selective herbicides are not available for grass weeds in the next crop, e.g. brome grass; • poor quality grasses, or those contributing to vegetable fault to be removed.	Appropriate where targeted paddocks have a low grazing pressure, less efficient post-spray grazing for the control of survivors, and in poor crops with low grain yield potential. Also useful when planning an extended crop phase as there will be excellent control of grass seed set and pasture legumes will also be controlled. Crops may also be sprayed out if infested with herbicide resistant grasses.

Table 2. The benefits of using a particular grass control method in pasture

Benefits	Pasture manipulation	Spray-topping	Hay freeze
Grass seed set control: - reducing grass weeds in the next crop; - reducing ARGT problem; - increasing legume content of pastures.	If carried out correctly pasture manipulation should remove grasses early in the season and no seed should be produced.	Level of control will depend on herbicide choice and the timing. Glyphosate has a broader target grass spectrum than paraquat and will have more effect on seed viability.	Total seed-set prevention, including legumes.
Take-all reduction	Two years of grass control may be required in areas with a high risk of take-all.	No reduction.	No reduction.
Earlier sowing of cereal crops	Grasses usually germinate first at the break of the season. Removal of grasses in the year before cropping should reduce the level germinating in the crop establishment year. Time required for control of germination's should be reduced.	Not as good as pasture manipulation.	As for spray-topping.
Improved summer feed quality	Dried legume based feed has a higher feed value than dried grass. However, it is also more easily destroyed which may increase wind erosion risk and limit full utilisation of available feed.	Glyphosate - alters the distribution of nutrients in the plant improving protein and digestibility. The standing feed resists leaching by summer rains. Paraquat - disrupts cells increasing digestibility but not necessarily protein. Quality is affected by the growth stage of grass at spraying. Earlier the plants are sprayed the better the quality will be.	As for spray-topping.
Improved summer feed quantity	Total production of pasture should not be reduced following pasture manipulation. Removal of grass component will reduce the bulk of residue in summer - see above.	No reduction - better quality means better utilisation; lower grass seed burden means more paddocks can be grazed (see also Table 3).	As for spray-topping.

Table 3. Key constraints of particular grass control techniques

Restraints	Pasture manipulation	Spray-topping	Hay freeze
Wind erosion risk of grazed pasture	High risk - grasses have a fibrous root system which acts to hold soil together.	Glyphosate - doesn't effect plant structure so likely to stand up to grazing better. Paraquat - effects plant structure making the plant brittle and easily damaged. Risk is affected by the timing of spray-topping and grazing management following herbicide application. Spray-topped pastures can be used in summer, reducing the need for grazing stubbles - so less erosion in stubble paddocks. However, paddocks can be grazed out quickly - take care; material is brittle and palatable.	As for spray-topping. Paddocks which have been frozen should ideally be grazed before the end of January. Material is generally more brittle and palatable than spray-topped pasture and summer rainfall can seriously damage quality and quantity of residue.
Reduction in early winter feed	Control of grasses reduces the grass component so early winter feed is reduced. Simazine + paraquat - growth suppression of clovers following treatment so the reduction in early available feed is greater than a simazine + grass selective treatment.	The later control of grass allows use of the grass component of pasture, especially if legume sparse paddocks. If a pasture paddock is spray-topped and allowed to continue in pasture it will have lower grass levels. If the clover seed bank is low, there will be a reduction in early winter feed.	As for spray-topping.
Effects on seed set of pasture legumes	Generally a mix of simazine + grass selective will increase legume seed set reducing plant competition with grasses. Simazine + paraquat mixes have a variable effect on seed set, depending on the length of the growth retardation period. Avoid applying these mixes to medic pastures. Simazine may have an effect on sandy soils in wet years causing legume damage through increased activity and 'root pruning'.	The effect on legume seed set will depend on the choice of herbicide and the time of application. Glyphosate reduces seed set more than paraquat, particularly if the legume is sprayed during early-mid flowering. Grazing strategy is important. Extend periods of heavy grazing in spring to push grass flowering time later in the season to avoid the more susceptible stages of legume growth (flowering).	Legume seed set is prevented. Subsequent density in pasture depends on seed bank supplies.

Table 3 continued …

Restraints	Pasture manipulation	Spray-topping	Hay freeze
Effects on seed set of pasture legumes (continued)		Areas in the northern wheatbelt have less time between flowering of legume and grass than areas in the south.	
Control of redlegged earth mites (RLEM)	Very highly recommended - Insecticide may be added to pasture manipulation spray tank (in most cases). Should also be considered if including capeweed control in the program. A repeat application of insecticide may be required 2-3 weeks after first application.	Benefits of including RLEM control in the operation are higher when pasture is topped using glyphosate (legume more stressed following application) or when a susceptible crop is the be planted in the following year (e.g. Canola).	Inclusion of RLEM control will depend on the future uses of the paddock (see spray-topping).
Follow-up required	Ryegrass - may require spray-topping particularly following simazine + paraquat. Especially if managing for herbicide resistance as it is important to minimise seed set. Broad-leaved weeds - density should be monitored as they can easily dominate sprayed pastures.		
Post-spray grazing requirement	Simazine + paraquat - grazing is recommended as this will increase grass control. Simazine + grass selective - graze where ryegrass present.	To obtain most benefits from spray-topping grazing is recommended. Spray-topped pastures should be grazed soon after treatment particularly if growing season continues after spraying and there is grass regrowth. Grazing further reduces grass seed set.	Pasture is killed by the hay-freezing operation - further grazing is not required to improve control.
Timing of operation, coinciding with busy periods	Coincides with seeding or post-emergence treatment of crop.	Fewer competing operations in September-October.	As for spray-topping.
Cost ($)	Expensive, especially if use grass selective herbicides.	Cheaper, approximately one-third of standard manipulation treatments.	Moderate, twice as much as spray-topping.

Table 4. Herbicide recommendations for grass control in pastures at particular growth stages

Species	Growth stage	Treatment#	Rate (mL/ha)
Annual ryegrass, Bromegrass and Barleygrass	2-5 Leaf	Fusilade®	250
		Sertin® (Annual ryegrass only)	300 - 500
		Select®	250
		Verdict®	500 - 750
		Targa®	125
		Simazine + Paraquat[1]	500 + 500[2]
Silvergrass		Simazine	500 - 750[2]
		Simazine + Paraquat	500 + 500[2]
Annual ryegrass, Bromegrass and Barleygrass	5 Leaf-Tillering	Fusilade	500
		Sertin (Annual ryegrass only)	500
		Select	375
		Verdict	750 - 1,000
		Targa	375
Silvergrass		Simazine	750 - 1,000[2]
		Simazine + Paraquat	750 + 750[2]
Barleygrass and Annual ryegrass	Head Emergence	Glyphosate CT[3]	450
		Glyphosate CT - Hay freeze	720
		Paraquat + Graze[4]	500
Annual ryegrass, Barleygrass[5], Bromegrass and Silvergrass	Flowering	Spray Seed®	800
		Glyphosate CT	240 - 360Y
		Paraquat	500
	Hay freeze	Spray Seed	1,700
		Glyphosate CT	720
		Paraquat	1,000
Annual ryegrass, Bromegrass and Silvergrass[6]	Dough	Paraquat	500
		Glyphosate CT	240 - 360

Read the product label prior to application to determine if adjuvants need to be added to the tank mix and application restraints, if any.

1 If using this mix for control of Annual ryegrass the paddock must be grazed following application.

2 Rates will also depend on soil type.

3 For Barleygrass control, may increase the level of damage to pasture legumes.

4 Useful for control of Annual Ryegrass Toxicity (ARGT).

5 Due to its long flowering period, Barleygrass may be better controlled by two applications of Paraquat (500 mL/ha) three weeks apart.

6 This growth stage is very difficult to determine as seeds are very small.

Y Use higher rate if Annual ryegrass is targeted.

WEANER MANAGEMENT WHEN LAMBING LATER

Ian McFarland, Development Officer, Narrogin

Management of weaners is important on all farms. The later the lambing, the more important it is. However, farmers who lamb later do not consider they have a problem growing the weaners out.

Late born weaners are normally smaller than early born weaners over their first summer. To achieve good growth rates, the management of the weaners needs to be good.

Early weaning

With late born lambs there are considerable advantages in weaning 12-14 weeks after the start of lambing, if a good paddock is available to put the weaners in to. Ideally, weaning paddocks should be selected early in the season and managed accordingly.

At 12-14 weeks of age the lambs will be getting little of their feed requirements from their mothers. If they are weaned onto good green feed there will be very little setback in their growth rate. The lambs can be put into the best paddock where they will not have to compete with the ewes for the best food.

Weaning is the first chance to drench the lambs and move them to a paddock which has a low level of worm larvae. For example, a paddock only grazed by cattle, or adult wethers, since the break of the season, where regrowth from a hay paddock has not been grazed or a sweet lupin stubble. Delaying this first drench, by weaning later, can be costly because weaners are very susceptible to worms.

Weaning is also the time to give the second vaccination and any mineral bullets that are needed. However, care is needed when such young sheep are bulleted so that they are not injured. Use soft, smooth tubing which should be replaced if it is scuffed.

Research has shown no disadvantage to the lambs by weaning about 13 weeks after the start of lambing. There are advantages to the ewes. After early weaning ewes have 4 months, instead of 2 months, to gain weight before mating. This may increase their following lambing percentage and their wool cut because they have a longer period in which to regain condition.

The exception to early weaning has been found where lambs have to be weaned onto poor dry feed, with no handfeeding. In this case, weaning should be delayed until 18 weeks, or more, after the start of lambing.

In some situations, such as droughts where there is limited green feed, or where the worm burden is high, it may be best to wean 10 weeks after the start of lambing. However, the management of these weaners is critical and they need a good source of nutritious feed.

Weaning early has been shown by farmer experience, and research, to be best for production of prime lambs. It is now the recommended practice.

Concentration of the lambing period

To enable early weaning the joining period should be as short as possible. With a 7 or 8 week joining, the late lambs will delay mulesing and weaning. A 5 week mating is long enough when mating is in February or later (unless the sheep have a fertility problem such as clover disease). This is because ewes are then at the peak of the breeding season. Five weeks gives all ewes 2 chances to get in lamb. Farmers consistently find that most lambs are born in the first 2 or 3 weeks of lambing.

Joining periods of 5 weeks can also be used with early joined flocks providing that the ewes are effectively teased so that they come into oestrus when the entire rams are joined with them.

Best paddocks

Plan weaning paddocks early. The aim is to have a pasture which is dense, well grazed and dominant in clover or medic plants. In sub. clover areas avoid highly oestrogenic pastures.

If handfeeding is expected, train the lambs before weaning so that they are used to the grain before feeding starts. Feed the ewes and lambs about 50 g of the grain each a day for a week. This is especially important where lupins are to be fed.

Reduce the stress of weaning

It is best to have about 5% of adult sheep with the lambs after weaning. They help the mob to find water and settle down.

If lambs are weaned early it is ideal to leave the lambs on the paddock they are used to (i.e. just remove the ewes). This way the lambs don't have to cope with learning their way around a new paddock as well as coping with no milk to drink. If this technique is used, drench the lambs when they go to the first new paddock - say 2 weeks later.

Once the lambs are in the weaning paddock it is best to set stock them as long as pasture is adequate. Moving them from paddock to paddock unsettles them.

Handfeeding

Even late born weaners may not need handfeeding over summer and autumn. However, the aim should be to keep them in fat score condition 2, or better, (30 kg live weight) and to avoid a break in the wool. Tender weaners' wool, which is the finest wool, is severely discounted.

It is not economical to heavily handfeed to increase liveweight of weaners over 30 kg. However, many farmers prefer to have weaners as well gown over summer as possible. This is an insurance in case the weaners have a set back at some stage.

To make growth, weaners need feed that is high in energy and 15% protein. If they are expected to use low quality dry feed, e.g. eaten out stubble, a supplement with a high protein level will be needed. Lupin seed is an ideal feed for this. Feed early, about 50 g/head/day, as the feed dries off. This rate can be increased over summer. Once stubbles are eaten out, or the weaners start to lose weight, they will need 1.5 to 3 kg of grain each week. At this stage an 80% oats: 20% lupins mixture will be the cheapest to feed.

Drafting off the tail

There is always a tail in a flock of weaners. In a large flock some may even be below 20 kg liveweight. Unless these lambs put on weight over summer their survival rate and lifetime wool production will be reduced.

Draft off the poorer weaners (less than 25 kg) and give them special treatment, i.e. feed them more of a high quality feed. This will be much cheaper than feeding the whole flock at the higher rate needed for the poor weaners.

SUMMER FODDER CROPS

Kevin Bell, Sheep Management and Production Consultant, Kojonup

An excellent method of supplementing the summer-autumn feed gap is to use an unharvested crop of cereal/legume mixture (commonly oats/peas). This is usually reserved for winter or spring born lambs and can be grazed at stocking rates of up to 40/ha for up to 4 months.

It may seem extravagant to plant a crop exclusively for sheep usage, but the system is attractive. Also, it may be essential in a high stocking rate, summer shearing system.

Having a large component of other material less digestible than grain, the fodder crop represents a self rationing feed source for perhaps the entire summer-autumn, depending on the stocking rate and the initial amount of dry matter present. Initially, the digestibility of the grain itself (in the case of oats) also may limit sheep intake. As the grain is knocked to the ground it is spread out providing another mechanism of rationing. For some farms, a fodder crop can provide an environment for unshorn lambs that is relatively free of grass seeds.

Seed mixtures

A variety of seed mixtures are used in fodder crops, from straight oats to mixtures of oats, barley, wheat, peas, vetches, clover and ryegrass. In most cases, the composition of the mixture is probably less important than the overall quantity of feed grown. The exception is when the liveweights of the lambs are less than 25 kg. In such cases it is definitely worthwhile to include a proportion of legumes in the crop because growth to around 30 kg liveweight is desirable. If lambs are weaned, or go onto a fodder crop, at around 30 kg liveweight, to simply maintain condition is quite acceptable, and can be achieved on oats alone. Oats alone may also provide the advantage of allowing chemical control of broadleaf weeds (especially radish and turnip) in the paddock. This is not possible if legumes are part of the mixture.

Pros and cons

Few people dispute that fodder crops are a good source of sheep feed; the main arguments naturally centre around economics. The standard argument is: on the land on which the weaners run on a fodder crop, a crop of oats can be sown and 3 t of grain harvested/ha - worth between $80.00 and $120.00/t. Weaners can be run either on the stubble or on pasture without supplementation till the end of January, then supplemented with oats at an average rate of 200 g/day from February till April - say 100 days.

Income from harvesting the crop for sale (@ $100/t)	=	$6,700
Subtract harvest costs ($50/ha)	=	$1,850
Cartage ($10/t)	=	$850
Net benefit (or apparent income foregone)	=	$5,800

'Standard' carrying capacity of fodder crops is 35-40 weaners/ha. Therefore, 1,300 weaners need 37 ha. If oats was harvested from this area (111 t), only 26 t would be needed for the 1,300 weaners, leaving 85 t for sale.

Where does the truth lie?

To understand the place and economics of the fodder crop, it must be considered in the context of the whole farm operation. It cannot be simplistically compared with a crop, but should be integrated with:

- stocking rate;
- time of lambing;
- proportion of farm in crop; and
- relative profitability of sheep and crop.

Consider the fodder crop in the light of the following:

1. Winter-spring (July-August) lambing is associated with higher stocking rates and sheep enterprise profitability.

2. July-August born lambs have liveweights of 25-35 kg at weaning; some lambs in this category must grow, and others be maintained, over summer.

3. In general, summer-autumn shearing is associated with the July-August lambing.

4. The increased intake resulting from grazing a fodder crop produces an increased wool production, and being lambs wool, the wool can move into a new price category. An extra half inch of wool (from 1.5-2" or longer), representing about 0.3 kg greasy, means another 80¢/kg clean at least (55¢/kg greasy) and, importantly, removes the extreme vegetable matter penalties that apply to shorter lambs wool (wool over 2", suitable for the worsted trade, is long enough to be combed; shorter wools cannot be combed; shorter wools cannot be combed to remove VM and must be carbonised).

Standard income from February shorn lambs: - 2.2 kg wool @ 370¢/kg	=	$8.14
Income from lambs from fodder crop: - 2.5 kg wool @ 425¢/kg greasy	=	$10.64
Increased income per lamb	=	$2.50

(If wool is shorter than 2", increase is 0.3 x 370¢/kg = $1.10.)

5. For shorn weaners, the increased wool production is realised at the hogget shearing 12 months later. In such cases the extra wool grown is increased because the extra liveweight of the weaners on the fodder crop transmits into a marginally greater feed intake and, hence, wool production, for much of the year. An extra amount of about 0.5 kg is to be expected.

   Extra income = 0.5 kg @ 450¢/kg = $2.25

6. The advantages of condition/liveweight can be difficult to put a figure on because sheep have the ability to compensate for weight lost (or not gained).

7. There may be an advantage for the better fed weaners in higher conception rates as maiden ewes, but this effect is not at all clear.

8. Parasite control is aided by the use of a fodder crop - the combination of good nutrition and clean grazing results in low worm burdens. Where high stocking rates are practised a standing crop may be the only way to achieve satisfactory worm control.

9. With a summer shearing, sheep sales (normally off shears) usually take place in January-March. The ability of a farm to hold sheep for this long on dry summer pasture is influenced very much by stocking rate and the area of farm in crop. If a farm has an above average stocking rate in winter, then holding onto surplus sheep into the summer may increase the feed requirement such that paddocks are eaten out, leaving insufficient reserves for the rest of the sheep.

   The fodder crop is a means of reserving extra feed for the summer-autumn to overcome these problems. The high stocking rate of weaners on the crop allows stocking rates to be lowered on the rest of the farm.

   For example:
   Consider the following sheep flock:

Ewes	1,640		
Weaners	1,240		
Wethers	1,220		
Rams	50		
Total numbers	4,150	Total DSE	5,020

   Annual sales to maintain the flock, presuming 5% death rate and 80% lambing, are 1,140 sheep. At 11 DSE/winter grazed ha, the pasture area needed = 456 ha.

(a) Consider the situation of 15% of the farm in crop, total farm area = 536 ha (456 ha pasture, 80 ha crop).

   At the end of Spring, sheep numbers have accumulated to:

Ewes	1,600		
Weaners	1,300		
Hoggets	1,200		
Wethers	1,200		
Rams	50		
Total numbers	5,400	Total DSE	5,400 (all stock = 1)

   Thus we have, after stubbles become available:

Stocking rate (not including fodder crop)			
Before Sales	5400/536	=	10.1 DSE/ha (4.0/ac)*
After sales, for rest of summer	4260/536	=	7.9 DSE/ha (3.2/ac)

   * Comment: Hard to sustain without excessive hand feeding.

   Let us compare this with the situation of a fodder crop of 37 ha being part of the 80 ha crop. This looks after 1,300 weaners leaving 4,100 sheep before sales and 2,960 after, on the remainder of the farm (499 ha).

Stocking rate (not including fodder crop)			
Before Sales	4100/499	=	8.2 DSE/ha (3.3/ac)*
After sales, for rest of summer	2960/400	=	5.9 DSE/ha (2.4/ac)

* Comment: Usually a safe stocking rate; hand feeding unlikely to be needed.

(b) It is helpful in understanding the place of the fodder crop in the previous system (15% of farm in crop) if we consider a farm with 25% of land in crop. It would be fair to assume a slightly lower winter stocking rate (10 DSE/ha), and the flock under consideration now runs in winter on 500 ha; total farm area = 667 ha (500 ha pasture, 167 ha crop).

The summer situation now becomes:

Stocking rate			
Before Sales	4500/667	=	8.1 DSE/ha (3.2/ac)*
After sales, for rest of summer	4240/667	=	6.4 DSE/ha (2.6/ac)

* Comment: Not very different to the previous system with a fodder crop (i.e. sustainable in most years).

Thus, fodder crops are useful in enterprises with:

(a) optimum stocking rates;

(b) summer sheep sales; and

(c) low proportions of the farms in crop.

However, they are not really necessary when relatively large areas of stubbles are available. These will be available when grain returns are higher relative to sheep and more cropping is practised.

10. When a fodder crop is entirely grazed, it removes very little from the soil, and may in fact increase soil organic matter and seed reserves. Where stocking rates can be sustained till the break, soil nitrogen levels are likely to be relatively high, because the deposition of nitrogen in urine is not all lost as ammonia over the summer. A legume component in the pasture also enhances soil nitrogen.

The net effect is maintenance of subsequent pasture growth in the winter, without the expected loss in carrying capacity associated with a harvested crop. The net advantage is at least 2 DSE/ha for the winter. At $15.00/DSE margin, this represents $30.00/ha involved as a fodder crop rather than a cash grain crop.

11. An attempted summary of the economics is:

(a) 1,300 weaners grazed on pasture and supplemented with part of a harvested crop:

Net from sale of remainder of oats (from 37 ha) = $5,800.00.

(b) Fodder crop for 1,300 weaners

Extra wool income:	(a)	lambs (say $2.00)	=	$2,600.00
	(b)	hoggets (say $2.00) (2% mortality)	=	$2,560.00
37 ha grazed at extra 2 DSE/ha in subsequent winter ($15.00/DSE)				$1,110.00
Less supplementary feed to adult sheep (ewes less 50 g oats/day for 100 days)				$820.00
Less 1.5% weaner mortality (shear 20 more weaners - net $20.00)				$400.00
Less labour				$?
Less ?				$?
Less drench				$?
Higher maiden ewe lambing percentages				$?
				$7,490.00

Apparent advantages of about $1,700.00.

Bear in mind that a farm with a high winter stocking rate may not be able to sustain summer shearing without the fodder crop.

Alternatives:

Earlier shearing (November-December)
Shear and sell sale sheep earlier
Lower stocking rate (not profitable)
Crop more (depends on relative profitability)

All this may provide some basis on which to evaluate the place of fodder crops in the farm enterprise.

FACTORS TO CONSIDER WHEN CHANGING TIMES OF LAMBING AND SHEARING

Ian McFarland, Development Officer, Narrogin

Traditionally, many farmers in Western Australia lambed their ewes in April-May and shore them in spring (September-November). However, it has been shown that higher net farm incomes are consistently associated with summer-autumn shearing and later lambing. Adoption of these practices may involve a major adjustment to current management practices on many farms and, therefore, all aspects of changing times of lambing and shearing should be carefully considered.

This article provides points to consider when changing the time of lambing (to winter-spring) and shearing (to summer-autumn). It must be remembered that all farms are different and an individual program must be developed for your own situation.

The following points are relevant to lambing on green feed

Local weather conditions

Especially in winter, wind and rain can cause high lamb losses due to exposure. Lambing paddocks should be well sheltered and not be prone to excessive waterlogging (flooding).

Ewe health

Lambing later than early June favours ewe health. Ewes lambing in winter and spring have green feed during late pregnancy, which reduces the risk of death from pregnancy toxaemia and decreases mismothering because ewes do not have to chase after feed. In addition, milk production of the ewes is improved. Unfortunately, ewes lambing in July, August or September have an increased risk of hypocalcaemia (milk fever) and foot abscess.

Lamb health

Marking/mulesing - with these practices occurring later in the season, the wounds need to be treated to prevent flystrike. Lambing later means weaners will be at a lower weight coming into the summer. Weaners should be over 25 kg liveweight at the start of summer with a fat score of 2 or better. Lupin stubbles or fodder crops should be used to at least maintain the condition of the weaners.

Length of lambs wool

Lambing later means the lambs may have shorter wool at shearing time - shearing may need to be moved to a new time.

Sale sheep

Lambs will be smaller in spring. Therefore, if lambs are to be sold, time of sale will need to be changed.

Summary of the characteristics of each lambing time

- April lambing: puts intense pressure on pastures in May and June. July and August management is a little easier than with a May lambing and is similar to June lambing.
- May lambing: produces a very high demand for feed in June, July and August.
- June lambing: allows much easier autumn management, less pregnancy toxaemia, less lamb desertions, less supplements. Stocking rates can be 3% higher than with a May lambing for the same winter grazing pressure. Reduced amounts of tender wool.
- July lambing: as for June, but stocking rates can be 20% higher than with a May lambing for the same winter grazing pressure. Even then, May grazing pressure will still be lower than with an April or May lambing.
- August lambing: stocking rates can be 50% higher than with a May lambing for the same winter grazing pressure.
- September lambing: suited to high rainfall areas only. Stocking rates can be 70% higher than May lambing for the same winter grazing pressure, but May grazing pressure may limit the increase to 60%.

The following points apply to late summer-autumn shearings

Grass seeds

Grass seeds, especially in weaners can be a problem. Spray topping is a management tool available to reduce this problem.

Vegetable Matter (VM) in wool

In general, autumn shearing increases the amount of VM in the wool, but the amount and type depends on stocking rate, season and district.

Flystrike

May be more of a problem in spring with summer-autumn shorn sheep. Jetting may be necessary, especially with later lambing ewes. They should be crutched or jetted before lambing.

Fleece rot

Autumn shearing can result in an increased amount of fleece rot and also dermo.

Sandy fleeces/dusty backs

In some areas sand impaction on the sheep's backs can make autumn shearing difficult in poor seasons. Dust can also be of concern in other areas. Therefore, paddocks should not be overgrazed.

Sale sheep

With summer-autumn shearing, the normal off-shear sales are missed, so it could be more difficult to sell cull sheep.

Summary of characteristics of each shearing time

- June, July, August shearing: possible delays due to weather.
- September, October, November shearing: any weakness will tend to occur in the middle of the staple. Possible difficulty in obtaining shearers.
- December, January shearing: Possible dust/sand problems; hot weather, increased VM, flystrike and grass seed problems. If later lambing, shearing lambs at this time becomes more economical.
- February, March shearing: as for December-January shearing. Risk of off-shears deaths in areas prone to summer storms. Any weakness tends to be near the tip of the staple.
- April, May shearing: increased risk of fleece rot and off-shears deaths.

OPTIONS FOR CHANGING TIME OF SHEARING WHEN LAMBING ON GREEN FEED

Ian McFarland, Development Officer, Narrogin

There are a number of shearing options to suit lambing on green feed:

Lambing	Shearing	
June, July, August or September	January or later Split shear	 Shear wethers at normal time. Shear ewes earlier or later.
June or early July	September	} May need to carry lambs
July or early August	October	} through until next shearing.
August or September	July	
September	August	

Changing the time of shearing needs careful analysis. The time at which sheep are shorn will depend on many factors, including wool prices and discounts, current shearing time, flock structure, cash flow during the changeover period and identification of the need for other management changes.

The following methods should be assessed carefully (assuming that the current shearing is September and that the change is to a February shearing which suits a late winter lambing):

1. Delay shearing to 13-14 months of wool growth
   - Year 1 - shear in early November.
   - Year 2 - shear in mid December.
   - Year 3 - there is no shearing.
   - Year 4 - shear in February.

Precautions: There is no wool clip in the third year.
Need extra care with flies and grass seeds.

Benefits: No price discounts on wool.
Wool clip in each taxation year.

2. Staggered flock shearing
   - Shear old flock in September.
   - Shear lambs in February.

Precautions: Takes 5-6 years to change entire flock.
Risk of lice problems with split shearing.
Requires 2 shearings each year for 6 years.
May be difficult to shear in September with later lambing.

Benefits: No taxation problems.
No wool discounts.

3. Prematurely shear after 9 months
   - Year 1 - shear in June.
   - Year 2 - shear in February.

Precautions: Risk of discounts for prematurely shorn wool.
Risk of high tax payment with 2 shearings in one tax year.
Risk of wool measuring stronger.
June shearing may interfere with lambing.

4. Prematurely shear all sheep at 5-6 months
   - Shear in September.
   - Shear all in February.

Precautions: Severe discounts for prematurely shorn wool
Premature wool will tend to be stronger than 12 month grown wool.
Higher tax due to one and a half wool clips in the one tax year.

Benefits: Quick and simple.

CHOOSING A TIME TO SHEAR

I.G. Ralph, ex-Research Officer, Sheep and Wool Branch

Farmnote No. 73/82 - July 1982
Department of Agriculture Western Australia

A sheep owner's decision on choice of shearing time is one of compromise: Factors such as local weather conditions, the availability of shearers, the sheep, wool quality, and the farm work program all influence the decision.

No one shearing time is likely to be ideal because conditions vary from property to property. Therefore, this Farmnote does not recommend an ideal time to shear but discusses factors which will influence the farmer's choice.

Some of these are technical and managerial, while others concern the cash flow within the farm business.

Local weather conditions

In winter/spring, rain or wet pasture can cause costly shearing delays by making the wool too wet for processing. Wet, cold sheep can also create health problems for shearers.

To avoid delays through wet weather, farms need sheep storage for one and a half to two days shearing; about 37 square metres should be allowed for 100 sheep. Even with this amount on farms in the Great Southern region, delays are common throughout July, August and sometimes September.

Total deaths in Western Australia in the 2 weeks following shearing appear to be less than 2 per cent but losses on individual farms can be high. The mortality level is not influenced by the amount of paddock feed available at the time nor the liveweight or body condition of the sheep. However, it has been found that a high rate of loss of bodyweight during the 4 weeks before shearing contributes to sheep deaths within 12 days after shearing.

In the agricultural areas of Western Australia sheep on pasture normally lose weight over late summer/autumn. When shorn in autumn, they are therefore prone to late summer thunderstorms, early opening rains or cold snaps.

The weather conditions certainly affect choice of shearing time. January/February is often intolerably hot in the wheatbelt; April/May could be associated with off shears deaths; and June, July, August require sheep storage for one and a half to two days shearing compared with half a day for a summer/autumn shearing.

Availability of shearers

About half of Western Australia's 35 million sheep are now shorn in August, September and October. If the shearers seek work during the rest of the year, growers will find them more available, and perhaps at concessional rates, during the off-peak period.

Grass seeds in weaners

Grass seeds can cause problems for lambs in spring/early summer. Experiments at Wongan Hills Research Station showed that shorn June-born weaners were untroubled in a dense stand of brome grass while deaths and carcase rejections were high among unshorn weaners. At Newdegate Research Station, where the same comparison of shorn versus unshorn lambs was made on a geranium-based pasture, there was no problem with grass seed infestation and no advantage in shearing the weaners.

Costs, and the proceeds from wool, may determine whether brome grass seed infestation in lambs should be reduced by shearing, or by some agronomic means.

With an April/May lambing and a July/August general shearing it is usually profitable to shear lambs - mainly on the basis of relative prices obtained for the overgrown fleece as a hogget versus a 12 month clip. With a June/July lambing and a February/March general shearing, a special lamb shearing in October/November does not pay because the main shearing follows too closely after the special shearing. The extra shearing tends to reduce the value of the wool grown in that summer because of its short staple length.

Fleece rot

Research at Mount Barker showed that the time of shearing can influence the severity of fleece rot, particularly in susceptible flocks. Autumn shearing increased fleece rot. The April-shorn wethers averaged 91 per cent with fleece rot compared with 38 per cent for the July-shorn group and 46 per cent for those shorn in November.

Fleece rot is often associated with body strike during the spring fly wave, so with sheep that are susceptible to fleece rot, blow fly strike can also be increased by autumn shearing.

Sandy fleeces

In some sandplain areas without wind protection, sand impaction on sheep's backs can make autumn shearing difficult in poor seasons.

However, this problem is more one of management or season than one of shearing time alone.

Yield: Changes in yield affect greasy but not clean prices; returns per head are similar with different times of shearing. However, if yields were extremely bad some allowance could be made because of the cost of transporting a large quantity of sand with each bale of wool and because of increased handling costs at the mill.

Tender wool

Tender wool breaks during processing. Like vegetable matter tender wool is a fault and has a price penalty imposed. The size of the penalty varies with the position and degree of weakness in the staple: wool that is tender at the tip could suffer a penalty of around 10¢/kg, while wool which has an obvious break in the staple is worth around 14¢/kg less.

The amount of tender wool in a clip varies with seasonal and management practice. In a trial at Merredin Research Station 24 per cent of autumn lambing/spring shorn ewes produced tender fleeces despite supplementary feeding. Only 2 per cent of spring lambing/autumn shorn ewes produced tender fleeces. Sale by Additional Measurement trials are now being

conducted at wool auctions and important measurements included are the staple strength and position along that staple where breakage occurs. Buyers can use these measurements to estimate the fibre length produced following processing and these, together with diameter, largely determine the clean price of wool.

Time of shearing does not affect the staple strength but it does control the position where breakage occurs. In Western Australia this is associated with the autumn thinning of the fibre. In a time of shearing experiment at Mount Barker Research Station the spring-shorn wool, based on fibre length in the top, would have been worth around 14 per cent less clean than the autumn-shorn wool, which, on 1982 prices, could be around 60¢/kg.

The wool from this experiment was from wethers run at normal stocking rates for the area. Autumn-lambing ewes would have produced wool of considerably lower processing performance than the wethers, thus increasing the relative advantage of autumn shearing. However, this advantage may not be reflected in the price.

Vegetable matter (VM) in wool

Generally, vegetable fault of any species in excess of 6 per cent increases the cost of processing Merino wool and, thus, carries a price penalty.

An average Western Australian fleece wool could have price penalties imposed on the clean price ranging from 2¢/kg for 2 to 3 per cent VM, to 20¢/kg for 6 to 7 per cent VM.

However, while the amount of VM is important, the individual plant species involved is in some cases more so:

- geranium can be removed during processing without any problems, if it is below 2 per cent;
- trefoil burr is not a problem and up to 3 per cent is easily removed by carding;
- shive (seeds of barley grass, spear grass and silver grass) is a serious fault at any level of contamination and carries an added price penalty of 8 to 30¢/kg over and above that for other VM.

In general, autumn shearing increases the amount of VM in the wool, but the amount and type depends on stocking rate, season and district. In the time-of-shearing experiment at Mount Barker the autumn-shorn wool had a whole clip average VM of 3 per cent, while the spring-shorn wool had an average VM of 1 per cent.

At times, autumn-shorn clips can have VM contents higher than those found in the Mount Barker experiment. In 1977 the Newdegate Research Station clip averaged 5 per cent V~/f in the fleece wools and 14 per cent in the pieces line.

Therefore, if grass seeds (especially those producing shive) are a problem on the farm, autumn shearing could result in a severe price penalty.

The farm work program

A basic aim of any farm work program is to spread the work load to clear the way for seeding and harvesting.

Shearing is one job that can be shifted to fit in with the cropping program and can be carried out at any time of the year, other than the lambing/marking period.

Conclusion

No one shearing time is likely to be ideal in all situations. However, autumn shearing under Western Australian agricultural conditions without a grass seed problem undeniably produces the best results; management arrangements must be made to overcome the possible problems of off-shears losses at the break of the season and body strike in spring.

TIME OF SHEARING

Kevin Bell, Sheep Management and Production Consultant, Kojonup

Around Australia, one can see newly shorn sheep at almost any month of the year. Leaving aside considerations of small shearings for sale sheep, etc. it is helpful to consider the factors behind choosing a shearing time.

Generally, farmers are fairly happy with their time of shearing and have chosen it for apparently good reasons, fitting in with other farm operations, wool quality, family considerations, to name but a few. The following discussion may provide a list of extra 'food for thought', and maybe help anyone in the throes of making decisions in this area.

In Western Australia, summer-autumn shearing seems to be consistently associated with higher net farm income. Looking behind this, a number of reasons offer themselves:

Lamb shearing

Every year, although the adult sheep with 12 months wool might cut the same, the summer-autumn shorn lambs consistently produce 1-1.5 kg more wool. At 7.5 ewes/ha and 80% lambs, this is 6 lambs/ha, or an additional 6-9 kg of wool, of increased price, per hectare, for that land (about half the farm) grazed by ewes.

Of course this wool does not materialise out of thin air; the farm must produce feed, which must be eaten to produce this wool (wool growth is an inevitable consequence of sheep eating). So, somehow, farms shearing later are either producing more feed (unlikely in every case) or are utilising feed produced more efficiently. I favour the latter explanation.

For most farms, the bulk of feed produced by the spring growth is enough to feed the extra sheep - in effect it means holding onto the sale sheep for extra months. Instead of selling them in say November, they are sold in February. All sheep spend an extra 3 months on the farm, providing they are born in the same month.

In fact, a spring shorn flock could achieve a similar result by retaining cull sheep and prem shearing them in summer-autumn, but the wool would be discounted for length.

The bulk of feed resulting from the spring flush must last the sheep until the next season starts. Therefore, it is reasonable to argue that some lightening off of stock numbers is necessary. However, the dry feed will decrease in quantity and quality with, or without grazing, so if it is not eaten early, there is a percentage of waste. In one reported experiment, a mainly dry clover pasture decreased at 5 kg/ha/day without grazing and 19 kg/ha/day under grazing.

So, in deciding shearing time in the light of this information, the amount of feed on offer at the end of the spring must be considered. In general, at 'optimum' stocking rates and with soil fertility and pasture quality in an 'average' season, it would seem that sheep can be sustained until mid summer to extract the maximum wool-growing potential from pasture. The availability of stubbles is, of course, an extra feed source.

The obvious problem with summer-autumn shearing is vegetable matter: steps must be taken to limit this, because it may become more significant as a price-downgrading factor. Farmers need to consider each farm, in fact each paddock, in dealing with this.

However, our results indicate that this has not been a problem, vegetable matter levels needing to be greater than 2% before significant price downgrading occurs.

Winter shearing of dry sheep carries a severe penalty

This is the effect that removal of the fleece has on the sheep's energy requirements. This would not affect the major shearings for most farms, because they generally fall between October and April. However, it is not uncommon for some sheep, generally wethers or hoggets, being 'brought into line', to be shorn in winter.

It is very likely that such a shearing causes a penalty in carrying capacity, due to the extra pasture that must be eaten to produce enough heat to maintain body temperature until the fleece is long enough to provide insulation.

A computer simulation model has been used to assess the effect of a variety of lambing and shearing dates, taking into account temperature, wind speeds and sheep requirements. Time of shearing was predicted to have little effect on the total annual pasture requirements of sheep. However, it could have substantial effect on pasture consumption during winter months

Table 1. Pasture needed (g DM/day) for maintenance of 42 kg dry sheep during June, July and August

Shearing date	Pasture requirement
1 January	534
1 April	629
1 June	820
1 October	492

Note that changing shearing from October to June increased predicted intake by 328 g - an increase of 67%! This would relate to a drop in carrying capacity, assuming static pasture availability, from 10 to 6 DSE/ha.

This substantial effect was confined to dry sheep. Because of the greater feed intake and normal heat production of pregnant and lactating sheep, shearing date did not have such a large effect on the predicted winter feed requirements of breeding ewes.

Table 2. Pasture needed (g DM/day) for maintenance of breeding ewes during June, July and August

Shearing date	Lambing date	
	mid July	mid August
1 January	1,122	809
1 April	1,115	856
1 June	1,321	1,092
1 October	1,118	800

For the July lambing, changing shearing from October to June increased predicted intake by 203 g/hd/day - an increase of 18%.

Summary

Predicted effects of shearing and lambing dates on winter carrying capacity (DSE/ha).

	Shearing date			
Lambing time	1 January	1 April	1 June	1 October
mid-July	4.4	4.4	3.7	4.4
mid-August	6.1	5.7	4.5	6.2
non-breeding	9.2	7.8	6.0	10.0

The insulating properties of a fleece are well recognised - as little as 1 cm of fleece can provide insulation. In summer, this fleece acts as a barrier to keep out the heat coming in, as well as retaining heat generated from within. In winter, the role of the fleece is confined to the latter.

Merino sheep are well adapted to heat and adults can tolerate most extremes likely in sheep raising areas of Australia by normal physiological adaptation. The use of shade and inactivity are two methods available to deal with high heat loads. It is not so easy to escape the effects of cold and heat loss must be counteracted by an increase in internal heat production - requiring extra feed consumption.

TIME OF SHEARING AND WOOL QUALITY

Ian G. Ralph, ex-Senior Research Officer, South Perth

Introduction

In Western Australia, about half of the 30 million sheep are shorn each year in the months of August, September and October. This concentration of shearing and wool delivery to store puts a heavy seasonal demand on shearers, shed labour, transport, storage facilities and the marketing system.

Beetson (1975) conducted a survey to establish reasons for this uneven spread of shearing in Western Australia. The main factors which seemed to influence choice of a shearing time were:

- the better appearance and lower vegetable content of spring wools;
- the timing of other sheep and cropping operations;
- the wet weather delays and shortage of shearers in the spring;
- the hot unpleasant working conditions of summer-early autumn;
- the reduction in tender wool with autumn shearing.

Generally, farmers had experienced other shearing seasons and had settled on the season they thought suited them best. Thus, it is clear that a sheep owner's decision on choice of shearing time is one of compromise; no one shearing time is likely to be ideal in all situations because conditions vary from farm to farm. Despite this, the Mediterranean type climate in the agricultural region of Western Australia does mean that the quality of wool produced varies with shearing time.

Western Australian time of shearing research (1950/60)

McGarry and Stott (1960a) compared a March with a September shearing of May lambing ewes over two seasons at Muresk. The autumn shearing in both years produced fleeces which were heavier than their spring shorn counterparts. The average cut per head of the autumn shorn sheep was 5.3 kg compared with 4.8 kg from those shorn in spring.

The results showed that the difference between the two times of shearing was due to a difference in the weight of skirtings with the weight of skirted fleece wool from both times of shearing being similar.

The clean wool weights were quoted for the second year of the experiment and based on these figures the two times of shearing had similar yields (62%). The authors referred to the autumn wool as being *'.. drier and higher yielding but (with) more seed than the spring-shorn. ... the main seed difference was in the pieces and bellies. There was little difference in the seed content of the fleece wool from both groups'.*

McGarry and Stott (1960b) also compared March and September shearing at Esperance with Corriedale ewes lambing in mid May. Fleece weights of 6.5 kg were obtained with the March shearing compared with 6.1 kg from those shorn in September. Again the authors remarked that *'the autumn-shorn wool was dustier but higher yielding than the spring-shorn wool'.*

Presumably the authors were influenced in making this statement by the drier handle of the autumn wool (therefore lower moisture content) and by the apparent lower grease content.

The latter lower grease content of autumn wools compared with spring wools is confirmed by processors working with Western Australian wools (M. Yelverton, WA Woolcombers, personal communication).

However, despite any possible lower moisture and wool grease content of autumn wools compared with spring wools, this lack of any yield difference between the two times of shearing (or even a higher yield for autumn wools) reported by McGarry and Stott is not what would be expected given the experience from pre-sale testing we have today. Pre-sale testing clearly shows autumn-shorn wools have a lower yield than spring-shorn wools with at least part of this drop in yield coming from an increase in vegetable matter.

Lightfoot (1967) reported the comparison of April with October shearing of wethers over a range of stocking rates at Wongan Hills for the period from October 1962 to April 1965. At all rates of stocking, April shearing produced heavier fleeces than October shearing. Even though the autumn-shorn wool had the expected 7% lower washing yield of mid-side samples than the spring shorn wool, April shearing still appeared to produce more clean wool than October shearing.

This work by Lightfoot was continued until October 1967 when all the sheep were shorn. The skirted wools from the highest and lowest stocking rate plots from the 1966 shearing were sent to the Gordon Institute of Technology, Geelong, for worsted manufacturing performance testing on the Noble comb.

The greasy wool production per head for the period from October 1962 to October 1967 was 30.6 kg from the April shearing (plus the October 1967 prem-shearing) compared with 27.4 kg from the October shearing. Spring shearing produced higher yields from the mid-sides samples at every stocking rate though differences were only significant at the 3.7 and 4.9 wethers/ha (overall comparison was 71.4 *v* 68.0%).

In summary, the April shearing resulted in:

- heavier greasy fleece weights;
- lower yielding wool;
- higher vegetable content;
- less tender wool where the autumn nutritional stress is great (e.g. with high stocking rates, a false break to the season and/or with autumn lambing ewes);
- sounder wool fibres resulting in longer fibres in the top and stronger yarn;
- less combing waste.

Time of shearing - Mt Barker (1971/1973)

The doubt from this early work was the reliability of the yield from the mid-side sample to predict the yield of the whole fleece when making a comparison of different times of shearing. That is, even though the research had consistently shown increased greasy fleece weights by shearing in autumn, was this translated into increased clean wool weights? Also, to allow the prediction of the outcome of shearing at times other than 'autumn' and 'spring' some form of a regression of outcome in terms of wool quality and date of shearing was needed.

Research was started at Mt Barker Research Station in 1970 to study the effect of date of shearing on wool quality using merino wethers and six times of shearing spaced at 52 day intervals throughout the year (Christmas - the seventh time - was not included in the spread).

Materials and method

The sheep used in the experiment were medium woolled Merino wethers born in 1968 at one of the three Research Stations, Merredin, Wongan Hills or Newdegate, and all run together after weaning on Newdegate Research Station.

Table 1. Pre-experimental mean liveweights and wool measurements

Shearing group	21 February	14 April	5 June	27 July	17 September	11 November
Liveweight (kg)	34.0	32.6	33.0	33.7	32.3	33.3
Greasy fleece wt. (kg)	2.63	2.59	2.59	2.63	2.63	2.54
Washing yield (%)	67.3	66.8	66.8	67.3	65.8	68.1
Mean fibre diam. (µm)	21.3	21.2	21.3	21.4	21.3	21.2
Crimps/inch	11.0	11.0	11.0	11.0	11.0	11.0

All the sheep were shorn at Newdegate in November 1969 and their fleeces weighed and mid-side wool samples were taken for detailed measurement of the wool characteristics - washing yield, mean fibre diameter and crimps per inch.

The 360 wethers were transferred to Mt Barker Research Station and shorn on 24-25 February 1970. After shearing, the sheep were weighed and allocated to one of 6 shearing groups. Animals per treatment were balanced for source, liveweight and fibre diameter of their wool.

The shearing times of 21 February, 14 April, 5 June, 27 July, 17 September and 11 November were chosen to give an even spread throughout the year (about 52 days between dates without a December treatment), see Figure 1.

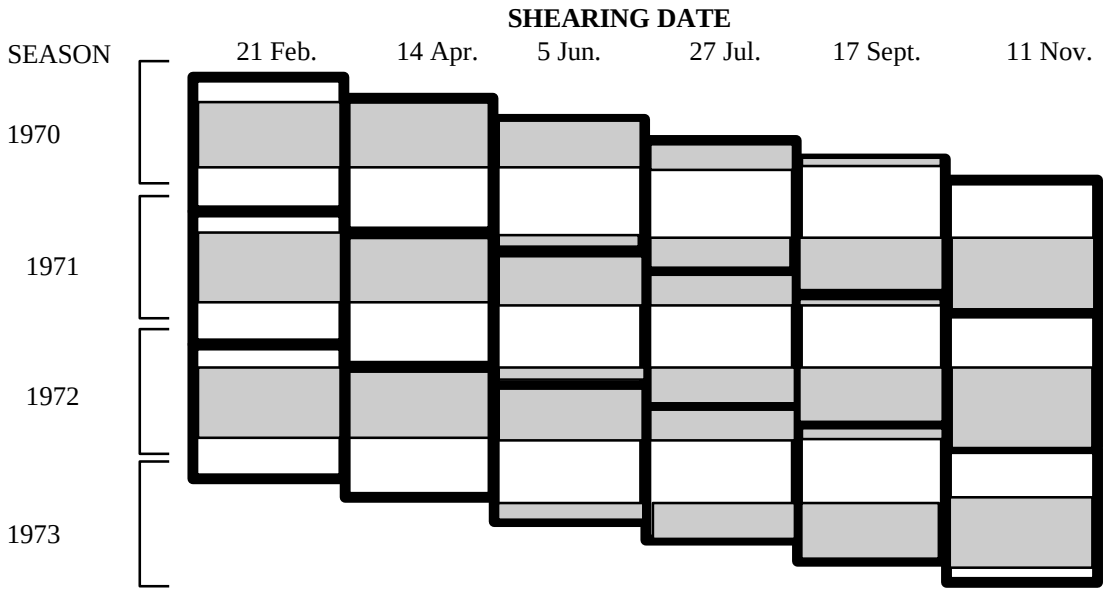


Figure 1. A schematic design of shearing treatments. The shaded areas represent the periods of green pasture; unshaded dry feed periods. The horizontal lines represent a shearing date with three experimental shearings for each treatment.

Measurements

Shearing shed
- wool type

Agriculture Western Australia (midside sample)
- mean fibre diameter

AWTA (core sample)
- IWTO Sch. Dry Yield
- mean diameter
- vegetable matter (%)

greasy fleece weight

washing yield

wool base

At each shearing the greasy fleece weight was measured, the wool given an AWC Type and a mid-side sample taken for detailed laboratory measurements. Fleeces were unskirted, apart from the urine stained wool being removed from the bellies, and pressed into 3 lightweight bales (20 fleeces plus bellies/bale). The bales were then cored with a hand coring tube and the 3 core samples sent to Australian Wool Testing Authority (AWTA) for commercial pre-sale measurements (measurements were not obtained for the September and November shearings in 1973).

Wool was also sent to the CSIRO Division of Wool Textile Industry, Geelong, for a processing comparison of the 6 times of shearing:

1971 14 April 5 June
27 July 7 September
11 November

1972 21 February.

These wools were jet scoured using non-ionic detergent and soda. They were carded on a Platt worsted card followed by backwashing before Noble combing. The bulk of the wool was Noble combed but a portion was French combed for comparative results with Noble combing, particularly in respect to removal of vegetable matter. Spinning tests were undertaken on the self twist system which is more convenient for limit spinning trials than the conventional frame.

Results: Raw wool characteristics measured at the 3 shearings for each shearing time are listed in Tables 2-4.

Table 2. 1970/1971. Wool measurements on mid-side samples taken from the fleeces at shearing and on cores taken from the bales of the total wool produced

	21 February	14 April	5 June	27 July	17 September	11 November
GWW (kg)	5.1	5.5	5.2	5.4	5.0	5.2
Mid-side Yield (%)	72.0	70.1	67.4	68.6	71.3	73.8
Mid-side FD (µm)	22.3	22.7	22.4	22.4	22.1	21.4
Core FD (µm)	23.3	23.9	23.2	23.1	23.3	23.6
Wool Base (%)	56.2	57.3	58.0	59.2	60.1	61.4
Sch. Dry Yield (%)	65.8	67.0	68.2	69.6	70.9	72.6
VM (%)	1.4	1.6	0.8	0.9	0.4	0.3
Style rating	5	6	6	6	5	5

Table 3. 1971/1972. Wool measurements on mid-side samples taken from the fleeces at shearing and on cores taken from the bales of the total wool produced

	21 February	14 April	5 June	27 July	17 September	11 November
GWW (kg)	5.3	5.7	5.3	5.2	4.8	4.3
Mid-side Yield (%)	72.5	72.8	70.5	70.0	70.5	71.6
Mid-side FD (µm)	23.3	23.8	22.7	22.9	22.1	21.9
Core FD (µm)	24.1	24.0	24.1	23.5	22.8	22.8
Wool Base (%)	57.2	56.8	56.1	52.2	57.6	55.3
Sch. Dry Yield (%)	68.7	66.3	65.5	65.7	67.5	64.9
VM (%)	2.7	2.3	1.8	1.8	1.2	0.8
Style rating	5	5	6	6	5	5

Table 4. 1972/1973. Wool measurements on mid-side samples taken from the fleece at shearing and on cores taken from the bales of the total wool produced

	21 February	14 April	5 June	27 July	17 September	11 November
GWW (kg)	5.4	5.5	5.8	6.0	6.3	4.6
Mid-side Yield (%)	69.1	70.0	71.2	74.2	72.2	74.3
Mid-side FD (µm)	22.5	22.4	22.4	23.5	23.7	23.6
Core FD (µm)	23.0	23.2	23.2	23.7		
Wool Base (%)	52.9	53.1	55.3	56.7		
Sch. Dry Yield (%)	61.0	61.1	64.3	66.2		
VM (%)	4.0	4.1	2.4	2.3		
Style rating	5	5	5	5		

Note: The style gradings have been allocated a numeral on the basis of Best TM 4, Good TM 5, Average TM 6 and Inferior TM 7. The AWTA tests were not obtained for the September and November shearings in 1973.

The results from processing by the CSIRO Division of Textile Industry of around 180 kg of greasy wool from the 1971/72 shearings (see Table 5) are presented in Table 6.

Table 5. Results of AWTA tests on wool sent for the processing comparison

	14 April '71	5 June '71	27 July '71	17 September '71	11 November '71	21 February '72
FD (µm)	23.9	23.2	23.1	23.3	23.6	24.1
Sch. Dry Yield (%)	67.0	68.2	69.6	70.9	72.6	68.7
VM (%)	1.6	0.8	0.9	0.4	0.3	2.7

Table 6. Results of the carding, combing and spinning comparisons (only the results from the French comb have been quoted because of their greater commercial relevance than those from the Noble Comb)

	14 April '71	5 June	27 July	17 September	11 November	21 February '72
Card loss (%)	7.3	7.7	6.8	6.2	5.9	7.8
Noil (N) (%)	3.8	4.3	4.5	4.2	4.7	4.7
T and N yield (%)	66.5	67.6	66.9	68.9	69.9	65.0
Hauteur (mm)	83.6	79.3	72.9	65.1	65.5	82.1
Top (T) FD (µm)	23.5	23.4	23.6	22.9	22.6	24.0
Veg./oz.	22	13	8	7	5	22
Limit spinning (breaks/kg)	3.6	6.6	12.5	48.4	excess	2.6
Untwisted yarn strength (g/tex)	2.26	1.93	1.71	1.46	N/A	2.34

Time of shearing and time lambing - Yalanbee (1974/1976)

Arnold *et al.* (1984) measured wool production and the processing characteristics of wool from medium-wool Merino ewes shorn in March (autumn) or October (spring) coupled with March or June lambing.

Table 7. 1974/1975. Effects of time of shearing and lambing on wool production, Yalanbee

	October shorn March lamb	October shorn June lamb	March shorn March lamb	March shorn June lamb
CWW (kg)	3.0	3.3	3.5	3.4
FD (µm)	22.5	23.0	23.3	23.3
Yield (%)	71.3	71.6	66.7	68.1
Tender flcs (%)	35.5	2.1	6.1	17.3

Table 8. 1975/1976. Effects of time of shearing and lambing on wool production, Yalanbee

	October shorn March lamb	October shorn June lamb	March shorn March lamb	March shorn June lamb
CWW (kg)	3.0	2.9	3.6	3 6
FD (µm)	22.2	22.3	22.8	22.7
Yield (%)	71.3	72.6	69.2	69.0
Tender flcs (%)			16.5	5.4

The wool from each shearing and lambing treatment was bulked into one bale and the wool processed as a batch by the CSIRO, Division of Wool Technology, Geelong. The results are presented in Tables 9 and 10.

Table 9. 1974/1975. Wool processing comparison

	October shorn March lamb	October shorn June lamb	March shorn March lamb	March shorn June lamb
Card loss (%)	5.7	4.4	6.8	7.0
Noil (N)(%)	4.8	4.6	4.0	4.2
T and N yield (%)	69.4	69.4	62.5	64.4
Hauteur (mm)	63.2	70.9	85.1	78.3
Veg./oz.	5.6	26.6	38.6	68.8

Table 10. 1975/1976. Wool processing comparison

	October shorn March lamb	October shorn June lamb	March shorn March lamb	March shorn June lamb
Card loss (%)	5.7	5.4	9.2	8.8
Noil (%)	6.1	5.9	5.5	5.4
T and N yield (%)	67.8	69.8	63.5	64.2
Hauteur (mm)	57.8	63.7	77.8	74.6
Veg./oz.	6.3	4.9	41.4	28.7

The results of the Yalanbee work indicate that the closer that shearing time was to lambing, the greater the mean fibre length in the top and at each time of lambing (March and June), March shearing gave superior results with regard to wool fibre length in the top. However, the vegetable matter in the top was significantly higher in the combed March wool which may have been a greater cost than the benefit accruing to its longer Hauteur.

References and further reading

Arnold, G.W., Charlick, A.J., and Eley, J.R. (1984). Effects of shearing time and time of lambing on wool growth and processing characteristics. *Aust. J. Exp. Agric. Anim. Husb*. **24**: 337-43.

Beetson, B. (1975). Reasons for the uneven spread of shearing in Western Australia (17 Jan.)

Bigham, M.L. (1974). Effects of shearing interval on fleece weight and wool growth on a delineated midside patch. *NZ J. Agric. Res*. **17**: 407-10.

Davey, A.W.F., and Holmes, C.W. (1977). The effect of shearing on the heat production and activity of sheep receiving dried grass or ground hay. *Anim. Prod*. **24**: 355-61.

Donnelly, J.B., Lynch, J.J. and Webster, M.E.D. (1974). Climatic adaptation in recently shorn merino sheep. *J. Inst. Biom*. **18**: 233-47.

Hawker, H., Crosbie, S.F., Barber, M. and Andrews, R.N. (1985). Effects of shearing and herbage allowance on the intake, liveweght gain and wool growth of Romney ewe hoggets in spring-summer. *Proc. NZ Soc. Anim. Prod*. **45**: 141-44.

Hemsley, J.A., Jackson, N. and Marshall, J.T.A. (1984). Weaner shearing may increase fleece rot susceptibility. *Wool Tech. Sheep Breed.* 146-48.

Lightfoot, R.J. (1967). The effects of shearing time and stocking rate on wool production. *J. Agric. West. Aust*. **8**: 90-98.

McGarry, W.L. and Stott, I.K. (1960). Autumn v spring shearing. *J. Agric. West. Aust.* **1**: 2-5.

McGuirk, B.J., Paynter, J.R. and Dun, R.B. (1966). The effect of frequency and time of shearing on the reproduction and wool growth of Bungaree South Australian Merino ewes. *Aust. J. Exp. Agric. Anim. Husb*. **6**: 305-10.

Sumner, R.M.W. and Armstrong, D. (1987). Effect of different shearing policies on sheep production in Northland. *Proc. NZ Soc. Anim. Prod*. **47**: 107-10.

Sumner, R.M.W. and Willoughby, L.D. (1988). Effect of shearing once-yearly in October or twice-yearly in February and October on ewe performance. *Proc. NZ Soc. Anim. Prod*. **48:** 213-17.

Wheeler, J.L., Reardon, T.F. and Lambourne, L.J. (1963). The effect of pasture availability and shearing stress on herbage intake of grazing sheep. *Aust. J. Agric. Res*. **14:** 364-72.

Wodzicka-Tomaszewska, M. (1963). The effect of shearing on the appetite of sheep. *NZ J. Agric. Res*. **6**: 440-47.

Wodzicka-Tomaszewska, M. (1964). The effect of shearing on the appetite of two tooth ewes. *NZ J. Agric. Res*. **7:** 654-62.

Steenkamp, C.H., Venter, J.J. and Edwards, W.K. (1970). Seasonal effect on weathering of wool. *Agroanimalia* **2**: 127-30.

SHEARING LAMBS AT 15 MONTHS OF AGE

Karin Patten, formerly Regional Economist, Katanning

Growers with their main shearing in spring have to decide between one of two options for the timing of lamb shearing:

(i) Shear lambs with the main flock 3 months after lambing, then shear them again with 12 months wool the following spring; or

(ii) Carry the lambs through the first spring unshorn and shear them as hoggets at 15 months of age to bring them in line with the main spring shearing.

Net wool returns

1993/1994

Table 1 compares the profitability of shearing lambs prematurely (Option 1) or delaying shearing to 15 months (Option 2) in the 1993/1994 season. Wool prices were based on the yearly average prices in 1993/4. Prices in option 1 at the 3 months lamb shearing were based on good length lambs' wool of 40-50 mm and an average of 19 µm (type 251). At the 12 months of age shearing, the average wool price is based on good length wool of an average of 20 µm (type 77). There is only a 1% discount between average prices for type 251 and type 77. Option 2 wool prices are based on wool of sound strength greater than 86 mm in length with a fibre diameter of 18.6-19.5 µm (type 70). Wool type 77 was commonly sold at 16% discount to type 70. The main cost involved with option 1 is the additional shearing. The gross fleece value from option 1 is $1.73/hd below that of option 2, but the difference becomes $3.53/hd after shearing costs have been accounted for.

Table 1. Comparison of 1993/1994 net returns from shearing July dropped lambs at 3 and 12 months of age (Option 1) with delayed shearing to 15 months of age (Option 2)

	Option 1		Option 2
Lamb shearing age (months after lambing)	3	12	15
Clean fleece weight (kg/hd)	0.6	2.4	2.9
Staple length (mm)	40-45	76-85	86-116
Wool type (19-20µm)	251	77	70
Av. greasy price (Yield 68-71%,¢/kg)	400	385	461
1993/1994 average price (¢/kg/clean)	563	567	678
Gross fleece value	$2.40	$9.24	$13.37
Shearing costs	$1.80	$1.80	$1.80
Net fleece value ($/hd)	$0.60	$7.44	$11.57
Net return for option		$8.04	$11.57

1994/1995

With prices surging upwards towards the end of the 1993/1994 season and continuing in the first 8 weeks of the 1994/1995 season, it was not surprising to see sharp increases in price differentials between fine and broad fleece wool. However, there was no change in the length discounts during this period. Therefore, the price gap between lambs wool and fleece wool in terms of length was not being reduced.

The net returns for the beginning of the 1994/1995 season from shearing lambs at two different time options are shown in Table 2. There is a 20% discount between 20 µm (type 77) wool and 19 µm wool (type 70). The price of 19 µm wool at a minimum of 86 mm in length is nearly double that of 19 µm wool at 40-45 mm in length. Option 2 still has a benefit 1.5 times greater than Option 1 as was seen in the 1993/1994 season based on the wool types used in the examples.

However, the net difference between the options is now $7.74/hd. In the 1994/1995 season, there is a lot to be gained from delaying shearing for as long as is practical providing the lambs shorn at 15 months of age have good strength wool.

Table 2. Comparison of July to beginning of November 1994/1995 net returns from shearing July dropped lambs at 3 and 12 months of age (Option 1) with delayed shearing to 15 months of age (Option 2)

	Option 1		Option 2
Lamb shearing age (months after lambing)	3	12	15
Clean fleece weight (kg/hd)	0.6	2.4	2.9
Staple length (mm)	40-45	76-85	86-116
Wool type (19-20µm)	251	77	70
Av. greasy price (Yield 68-71%,¢/kg)	727	1,166	1,450
1993/94 average price (¢/kg/clean)	516	793	968
Gross fleece value	$3.10	$19.03	$28.07
Shearing costs	$1.80	$1.80	$1.80
Net fleece value ($/hd)	$1.30	$1,7.23	$26.27
Net return for option		$1,8.53	$26.27

There are a range of reasons put forward by growers for shearing lambs early, but most of the problems associated with delayed shearing can be overcome by careful management. Some common reasons are:

- To prevent grass seeds lodging into lambs' wool. This problem can be avoided by weaning onto fodder crops or grass free paddocks which are going into crops.
- Shorn lambs will grow better during summer than unshorn lambs. There has been conflicting evidence for and against this. In an Esperance experiment, shorn lambs did show a small liveweight advantage (1.8 kg) over hogget shorn lambs. However, adequate nutrition is the key to attaining desired target weights for weaners and for maximising staple strength.
- Flies are a problem for unshorn lambs. Flies should be controlled in short wool sheep by jetting.
- Wool is too long after 15 months. This is not a problem! In this case, some numbers need to be done by the farmer to decide the best shearing strategy to maximise wool

returns. This may involve shearing lambs as weaners in autumn so that staple length is adequate for the higher priced fleece wool types.

LAMB SHEARING CF. HOGGET SHEARING

J. Gardner[1] and A. Kuss[2]

[1] Dept of Agriculture, PMB 50, Esperance, WA 6150
[2] Dept of Agriculture, Salmon Gums Research Station, Salmon Gums, WA 6445

Technote 6/94 Agdex 431/26
Department of Agriculture Western Australia

Summary

A flock of 323 mixed sex Merino lambs were divided into two groups, one group was shorn as lambs with a 4 month fleece and reshorn 11 months later and the other left unshorn until the hogget shearing at 15 months. Those shorn as lambs showed a small liveweight advantage (1.8 kg greater over the time of the experiment, $P < 0.001$), more clean wool (3.86 *cf.* 3.52 kg, $P < 0.001$) and wool quality advantages (VM, length and strength). There was a slight financial advantage for early shearing which depended on costs of inputs and wool prices.

Introduction

Due to the cost of shearing and the limited returns from the short lambs fleece many farmers have been leaving lambs unshorn until they are hoggets. This option has been advocated in recent years by a number of wool agents and financial advisers, apparently based on lamb shearing comparisons with shorter shearing intervals where a financial penalty was demonstrated for shearing lambs twice in the first year due to discounting the wool for a lack of staple length (Donnelly 1990). This Technote reports the production data and financial returns of an experiment on Merino lambs at Salmon Gums where delaying shearing until about 15 months was compared with a more conventional regime of shearing at 4 and 15 months of age.

Method

A flock of 379, April to July born merino lambs was randomly allocated to two groups in October. One group (LS) was shorn as lambs at that time and reshorn as hoggets 11 months later. The second group (HS) was left unshorn until the hogget shearing. The two groups were run together on Salmon Gums Research Station on dry pastures with low levels of grass seed and stubbles over summer and green annual pastures after the break of the season.

Liveweights were recorded for both groups before the lamb shearing and at 12, 40, 214 and 334 days thereafter. Greasy fleece weights were measured at each shearing and average clean weights calculated from the bale yields.

A total of 40 small tufts were taken at random from the lambs wool. This was combined and tested for yield, fibre diameter, vegetable matter and length.

After the hogget shearing the fleece wool, pieces and bellies from each treatment were baled and tested for yield, fibre diameter, vegetable matter, length and strength. Locks were included with the greasy fleece weights but discarded afterwards.

Results

The average liveweight of the HS and LS groups is shown in Table 1.

The HS group had a significantly higher average liveweight than the LS group at days 12 and 40, probably as a result of the lambs wool shorn from the LS sheep. By day 214 there was no difference between the groups and by day 334 the average Iiveweight of the LS group was significantly greater than the HS group.

At the hogget shearing, the LS group had a lower (5.48 *cf.* 6.42 kg) greasy fleece weight than the HS group. Total greasy wool (lamb fleece + hogget fleece) was similar for the LS and HS groups (6.52 *cf.* 6.42 kg) but because of the higher yields of the hogget wools and lambs wool in the LS group there is a significant difference in the total clean wool cut by sheep in the two treatments (3.52 kg for HS *cf.* 3.86 kg for LS).

Table 1. Average liveweights (kg) of sheep shorn as hoggets and lambs with a calculated final fleece-free weight

	Pre-shearing	Day 12	Day 40	Day 214	Day 334	Day 334 - shorn
LS	28.9	25.2	28.2	41.0	49.7	43.2
HS	28.4	26.4	28.8	41.2	47.3	40.9
SED[A]	0.43	0.21	0.28	0.24	0.43	0.44

[A] Standard error of difference.

The proportion of hogget wool classed into the LS and HS main fleece lines was 82% and 81.3% respectively, into pieces 11.1% and 11.9% and bellies 6.9% for both. When the wool from the LS lamb shearing is included the proportions fall to 17% lambs wool, 68.1% fleeces, 9.2% pieces and 6.9% bellies.

Clean wool production, yield, fibre diameter, vegetable matter, staple length, staple strength and wool value for the lamb shearing of the LS group and the hogget shearing for both groups are shown in Table 2.

The average gross return per sheep from wool sales was $17.54 for the LS and $16.53 for the HS group.

Discussion

There were liveweight, clean wool weight and some wool quality advantages (VM, length and strength) for the conventional practice of shearing sheep as lambs and again as hoggets compared with leaving them unshorn until the hogget shearing.

Most of the difference in the growth rate between the LS and HS groups occurred in the last 120 days of the trial (72.5 g/day *cf.* 50.8 g/day). Although a liveweight advantage did occur over time, the 12 and 40 day results do not support the frequently heard farmer assertion that shearing lambs leads to an immediate lift in liveweight.

The hogget wool was heavily contaminated by burr medic (*Medicago minima*) in the months immediately after the LS lambs were shorn. An across the clip VM over 3% for Western Australian spring shorn wools is regarded as very high (Stanton and Chambers, 1992).

The greater length of the HS wool may have compensated for its lower staple strength and higher VM, leading to a similar price at auction for both main lines of fleece wool (486¢/kg clean for the LS *cf.* 489¢/kg clean for the HS).

Although not a factor in this experiment shearing will give protection from grass seeds and depending on the level of contamination seed penetration of the skin may in fact be a contributing factor to ill-thrift in lamb flocks. This was demonstrated by Bob Wroth and John Suiter (unpublished) with shorn and unshorn lamb flocks run together on a dry pasture with a high grass seed (*Bromus diandrus*) content. In their experiment liveweights were not recorded although the experiment had to be terminated and the residual lambs sent to slaughter when the unshorn lambs started to die through grass seed injury. At slaughter almost all the unshorn lambs were rejected from export owing to seed contamination, averaging over 100 grass seeds per side, whereas lambs shorn before the grass seeds began to drop averaged less than two grass seeds per side and had no rejects attributed to seeds.

During February and March 1992 unexpected rainfall led to fleece disease and subsequent flystrike in the lambs. A greater number of unshorn lambs (21 in the HS group compared with 7 in the LS group) were affected and led to fleece damage and some losses. These sheep were excluded from the study as susceptibility to fly strike was not considered a significant factor affecting the wool weight or quality. However, this demonstrates an additional risk to unshorn sheep due to blowflies. This finding contrasts with Donnelly's (1990) comment that shearing lambs could make them more susceptible to fleece rot.

Table 2. Clean wool production (CFW), yield (YD), fibre diameter (FD), vegetable matter (VM), staple length (SL), staple strength (SS), and wool value (P) for the group shorn as lambs (LS) and the hogget shearing for the 1s group and the group shorn as hoggets (HS)

	CFW[B] (kg)	YD (%)	FD (µm)	VM (%)	SL (mm)	SS (N/ktex)	P (¢/kg clean)
HS - Hogget shearing							
Fleece wool	2.82	63.0	22.1	4.9	111	22	489
Tender fleeces	0.24	61.0	21.4	5.5	109	16	412
Pieces	0.30	43.6	20.8	10.4	87	30	381
Bellies	0.16	39.5	21.4	14.2	86	23	377
LS - lamb shearing							
Fleece wool	0.68	70.1	21.6	Almost nil	37.3	Not measured	382
LS - Hogget shearing							
Fleece wool	2.77	66.2	22.1	2.9	92	25	486
Pieces	0.27	48.2	21.4	9.1	79	31	335
Bellies	0.14	41.5	21.7	15	81	29	372

[B] Clean fleece weights are calculated from the yield of the bulked greasy wool.

The estimated real prevalence of sheep lice (*Damalinia ovis*) in Western Australia in 1992/1993 was 47% of flocks (Buckman, 1993). Although not a factor in this trial the need to either control an infestation or the risk of lice being introduced is a factor on many properties that may limit options such as leaving part of the flock unshorn.

Deducting the different variable costs (lamb shearing costed at $1.50, cradle crutching $0.45 and contract jetting $0.30), associated with each treatment (i.e. an extra shearing for the LS group and cradle crutching and jetting for the HS) leaves a net advantage of $ 0.26 for the LS group. This advantage would be reversed if lamb shearing was costed at the upper end of its range (i.e. $2.00/head).

In this experiment hogget fleece wools from both treatments were typed similarly except for the VM (AWC Type W1/73/B for LS and W1/73/C for HS), the shearing intervals did not lead to a length penalty for either of them and the lambs' wool from the control group received a relatively good price for wool of that length. As a consequence the profitability between the two treatments depended largely on factors such as the cost of shearing.

In summary the economic merit of this strategy and that of related shearing intervals is largely governed by the shearing interval used, description of the wools produced (particularly the length), wool prices on the day of sale, control over factors such as grass seeds, flies and lice and the relative cost of husbandry procedures such as shearing and crutching.

Acknowledgments

The assistance of Mr I. Ralph, Department of Agriculture, South Perth, Mr R Collins of the Wool Analysis Centre, Belmont and Mrs G. Grinham of the South East Wool Centre, Esperance, are acknowledged for advice and technical assistance with the wool.
Mr D. Feldman, Rural Economist, Department of Agriculture, Esperance provided advice and economic analysis and Mr M. Kennedy and Mr P. Spicer, Department of Agriculture Esperance, excellent technical assistance. Mrs J. Speijers is acknowledged for assistance with the statistical analysis.

References

Buckman P.G. *et al.* (1993). Review of Community Sheep Lice Eradication Campaign, WA Department of Agriculture.

Donnelly, F.B. (1990). Proc 20th Sheep and Wool Seminar and Refresher Course, NSW Dept of Agriculture and Fisheries.

Stanton, J. and Chambers, N. (1992). Proc Wool: Advantage Western Australia.

SPLIT SHEARING

Allan Herbert, Adviser, Market Economics and Rural Adjustment, South Perth

Summary

Split shearing suits some farmers for a range of reasons. While the major penalty is an increased difficulty in controlling possible lice infestations, some farm managers believe this risk is offset by other management benefits. It is difficult to make a financially strong case either for or against split shearing unless it allows a significant reduction in operating costs, such as cost of shearing, or there is enhanced wool value.

Reasons for split shearing

Farmer's reasons for split shearing (generally ewes in autumn and wethers in spring) are varied:

Cash flow

Obtaining wool income at two different times of the year, roughly 6 months apart, helps reduce peak seasonal borrowings and may save on interest payments.

Risk management

Wool sales separated by 6 months might be considered as a means of spreading market risk by partially avoiding short term depressions in price. However, it also has the effect of not maximising prices if all wool is not sold at a high price sale.

Other ways of managing price risk include reserve pricing, price averaging schemes, and the use of hedging arrangements (e.g. futures).

Cost of shearing

It is easier, and possibly cheaper, to obtain shearers of choice in autumn rather than the busy spring period. Cost of shearing becomes an even bigger factor if a farmer is able to help out in the shed (either shearing himself or classing or 'rousing') by shearing part of the flock at a time when other farm activities are not pressing. This might allow, for example, the farmer to employ shearers only (e.g. in autumn) rather than a full contract team (e.g. in spring). Cash savings could be around $1.50-/hd.

Sheep turn-off

Shearing at least part of the flock in spring is of benefit in making decisions as to how many sheep to carry into summer. Appropriate numbers can be disposed of off-shears without worrying about holding on to them any longer to realise on wool returns. Off-shears sheep are also better for summer stubble and pasture management because they will not pick up as much sand and dust.

Grass control

Spring shorn wethers can assist in grass control for paddocks being prepared for crop in following years. Autumn shorn sheep are not as suitable owing to possible VM fault from grass seeds.

Shipping wether sales

Some farmers' programs are tuned to making shipping wether sales in the better priced autumn months. Hence, they shear their wethers at this time.

Wool quality

Autumn shorn wools could have higher staple strengths because the weakest point is located towards the end of the staple as compared to spring shorn wools where the weakest part of the fleece is in the middle - especially for autumn lambing ewes. Price penalties for weak wool could throw the advantage towards autumn shearing. Opposed to this is the possibility of higher VM. Some commentators say spring wools have better style and may attract a premium over autumn shorn wools.

Lambing time

Some farmers like to shear ewes in autumn in the belief that they perform better at lambing in terms of improved liveweights and increased lambing percentages. There is little experimental evidence to support this.

Sheep purchases

Some flocks are locked into a particular time of shearing because they were purchased as such and it is very difficult to quickly bring them into line with the existing flock on the farm.

Cost benefit analysis

JUMBUCK, one of the ZACK range of farm management software packages, was used to assess the options and test sensitivity to the various factors involved.

(**Note**: ZACK software is no longer available, nor supported by Agriculture Western Australia.)

Assumptions

A standard self replacing flock was assumed to have 1,790 ewes plus 1,330 wethers with a 70 per cent lambing (May) from 1,400 ewes mated. Sales consist of cfa ewes and wethers in October as either off-shears (spring shorn) or in-the-wool (March shorn).

Other 'standard' assumptions were:

- Wool prices @ $3.40/kg greasy net on farm.
- Wool cuts were the same between different shearing times apart from lambs which cut 1.2 kg from the spring shearing and 2.4 kg from autumn.
- Husbandry and feeding costs were not varied between the different shearing times.
- On the basis that competition might allow a slightly cheaper rate, autumn shearing costs were assumed to be 20¢/head less than the spring rate.

Note: JUMBUCK does not account for overhead costs (e.g. fencing, water, pasture establishment) nor fertiliser or chemical applications. These are assumed to be the same regardless of shearing strategy.

Result

The net cash flow with a spring shearing strategy was estimated to be around $40,000. There is only about $2,000 advantage in shifting to a split shearing, but slight changes to the assumptions will cancel this out. Therefore, it is not really significant.

In terms of financial benefit to the farm, the lack of difference means farmers can make their own choice based on whatever rationale they like. There is no compelling financial reason to either to encourage people towards a split shearing or indeed to encourage people away from it if they are already doing it.

The two influences are likely to be the cost of shearing and the differential wool price.

Cost of shearing

If with an autumn shearing a farmer could substantially reduce his cost of shearing, e.g. by employing shearers only instead of a full contract team, then there will be obvious cash advantages.

Using the above standard flock assumptions, but using an autumn shearing cost of $1.00/hd cheaper than in spring, there is an advantage to split shearing of nearly $4,000. It is obvious that any system that exploits a cheaper shearing rate will be relatively better - all other things being equal.

It should be realised that these differences will be scaled up or down depending on the size of the flock.

Effect of wool price differential

Some people say there is a price difference between the same wools sold in autumn versus spring. How large does this price difference have to be to favour a particular time of shearing?

For the assumed flock above, the spring wool price was held constant while varying the autumn price.

The table indicates that about 10¢/kg better price for autumn wool is needed before thinking about changing from a full spring shearing. In the table it was assumed that there was a cost of shearing difference of only 20¢/hd. What if it was $1.00/hd as before?

The cheaper shearing rate provides strong encouragement towards autumn shearing. Autumn wool price can be 20¢/kg less than the spring price and still be the best option. In fact, split shearers (and spring shearers) should both be thinking about changing to a full autumn shearing.

Autumn wool price (compared to spring price) (¢/kg)	Advantage to split shearing ($)
-49	-3,800
-30	-2,400
-20	-900
-10	+600
No difference	+2,000
+10	+3,500
+20	+5,000
+30	+6,400

Conclusions

Large differentials are required in the price or cost components to encourage decisions in any direction.

The management issues outlined in this article carry various importance to different individuals and cannot be applied across the whole industry. If split shearing is to be discouraged, eg to make it easier to control lice, then the argument should focus on the financial benefits to lice control rather than any other compelling factor.

In effect, single issue analysis is not appropriate when there are so many factors interacting and competing at the farm flock level. Farmers should match their shearing time(s) to their own circumstances - especially in relation to flock structures and turn-off strategies.

TIME OF LAMBING/SHEARING - CASE STUDY

L.J. Castle, Farmer, Kojonup

Location - 12 km West of Kojonup.

Flock - shears 6,200 sheep and lambs.

The original strategy was to lamb in May-early June. Shear all in October.

New Strategy Direct change lambing to July-August.

Now shears all sheep and lambs in January.

Methods of implementing change

1. Change lambing directly to July.
2. Started change of shearing by shearing lambs in January and the rest of the sheep in October.
3. As each shearing took place, all January shorn animals were shorn each January plus the new lambs. It took 5 years to swing all sheep to January shearing. The reason behind this method was to have no prem shorn wool.

Positive aspects of change

1. Considered to be more efficient.
2. Less supplementary feeding of ewes.
3. Less pregnancy toxaemia in ewes, less lambing difficulties.
4. Increased lambing percentage.
5. Less tender wool - particularly in the ewes.
6. If wool was tender - point of break is at the tip.
7. Gained higher stocking rates - 12 DSE - up from 10 DSE due to ewes being stocked at higher rates.
8. Increase in wool cut per head.
9. Lambing no longer clashes with seeding - leading to better ewe management.

Negative aspects of change

1. Increased flystrike - jetting a necessity - all lambs plus a percentage of adults need jetting.
2. Increased grass seed problems.
3. Unseasonal rains cause losses in newly shorn sheep.
4. Some increase in fleece rot following autumn rains.

The farmer says that the new system works extremely well and allows for better work practices throughout the year.