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Wooltech Merinos: a resource flock using elite  
link sires.

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# Shearing Merino Ram Weaners-Is It Worth It?

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## Summary

This study compared two groups of young Merino rams - one that had been shorn at weaning and the other not. The groups were comparable in breeding, feeding and management and both were then shorn at 10 and 16 months of age. The purpose of the study was to evaluate the impact of weaner shearing on the repeatability of fleece measurements taken on young rams when shorn at 10 months of age. We also aimed to determine if there were any management benefits from weaner shearing on growth rates, seed infestations and fly strike.

In the group that was not shorn at weaning, the fleece weight rankings at 10 months were very poorly related to the fleece weight rankings at 16 months of age. In the other, weaner shorn, group the relationship between fleece weight rankings at 10 and 16 months shearings was twice as high. Weaner shearing had little impact on the repeatability of measurement of fibre diameter at 10 months of age. The rankings of rams on fibre diameter at that age were closely related to rankings at 16 months of age, regardless of whether the rams had been weaner shorn or not.

There were no management advantages which resulted from weaner shearing. Weaner shorn and unshorn rams grew at similar rates, and grew wool at similar rates and of similar quality. In fact nett returns from wool, up to and including the 10 month shearing, were \$2.36 per head lower in the weaner shorn group - as a result of the cost of the extra shearing in that group.

**Keywords:** Merino, fleece measurement, repeatability.

## Introduction

Current recommendations to the Merino ram breeding industry for the conduct of performance recording programs indicate that to achieve reliable estimates of the genetic merit of sheep for wool production and wool quality, the sheep must have been shorn as

lambs or weaners (to reduce the effect of spread of lambing), and shorn again at least six months later to obtain a fleece for measurement purposes' (Maxwell and Brien 1988).

This recommendation is based on interpretation of a limited amount of published data which indicates that the repeatability of performance records taken at 4 - 6 months of age is low due to the relatively large effects of variation in birth type, age of dam and birth date on variation in production characters measured at that age, when compared with measures taken at later ages (Young et al. 1965). Hence it is proposed that a weaner shearing prior to measurement at a subsequent shearing will reduce, though not completely eliminate, the variation in production characteristics that is due to the non-genetic causes outlined above. In most cases Merino ram breeders will not be able to 'correct' for these sources of variability prior to estimating breeding values for production characteristics, because birth type (twin or single), dam identity or age and date of birth are not routinely recorded.

We are not aware of any direct empirical evidence of the effect of weaner shearing on subsequent repeatability of performance records. The lack of this evidence makes it difficult to substantiate the need for weaner shearing in ram breeding flocks. Advisory officers and consultants are experiencing an increased questioning of this practice under the current economic climate where it is perceived to be an additional cost (ie. shearing, labour) not fully compensated for by the value of wool harvested.

It is recognised that the age of measurement will be a determinant of the accuracy of selection for lifetime productivity, though this may be more so for selection based on fleece weight (GFW) than on fibre diameter (FD). Atkins et al. (1990) indicate that in a management regime where rams are shorn as weaners (about 4 months) and then measured for GFW and FD at 10 months of age with 6 months wool, selection for lifetime productivity based on those measures was about 80% as efficient as selection based on measurement at 16 months of age in the case of fleece weight and about 95% in the case of fibre diameter. Those authors indicate that the reduced accuracy of fleece weight selection at the early age is due to the substantial influence of maternal and early life environmental effects on variance in fleece weight, even where the rams have been subjected to a weaner shearing.

Apart from the implications of shearing ram lambs (or not) for performance recording accuracy, there are other issues such as the cost of shearing and discounting of short staple lambswool and whether lamb shearing affects grass seed and fly problems or the growth rates of young rams:

A study in Victoria in 1989 indicated that commercial Merino breeders were losing \$5 to \$8 per lamb by shearing them at 3 to 4 months of age and then again at 14 months rather than carrying them through to a single shearing at 14 months of age. This loss was from discounting of the short staple lambswool and the cost of the extra shearing (Taylor 1989).

A CSIRO study in 1983 indicated that shearing Merinos at 5 to 6 months of age may have increased their subsequent susceptibility to fleece rot, when compared with unshorn weaners/hoggets. This may result in increased body strike in young animals previously shorn as weaners (Hemsley et al. 1984).

Conventional wisdom is that shearing Merino weaners will reduce the problems of seed infestation in eyes and skin. While this is certainly true in some cases, the benefits achieved will vary greatly from season to season and on the ability of the manager to wean lambs away from high risk paddocks. Of even more speculative benefit is the proposed benefit of lamb shearing on the subsequent growth of young Merino rams. In a trial with crossbreds in the Riverina in the 1960's, Drinan and Ferguson (1966) showed that lambs shorn at 4 months of age were 5% heavier than an equivalent group of unshorn lambs by the time they were slaughtered 3 months later. Grass seeds were not a problem in that trial, so the growth rate response can be attributed to other benefits associated with lamb shearing.

## Materials and Methods

### *Sheep Management*

277 medium wool Merino ram lambs were weaned at Trangie Research Centre in late November 1991. They had been born in the previous July/August. At birth, lambs were ear tagged, identified as twins or single, weighed and mothered-up. Hence, full pedigree records, day of birth, age of dam and birth type data were available on these young rams.

At weaning, half the young rams were randomly allocated to a weaner shearing group - these were shorn on 6 December 1991; the other group were left unshorn. Both groups of young rams were run together at pasture at all times. The young rams primarily grazed good quality dryland lucerne pasture after weaning and through summer 1991/92 - a period in which above average summer rainfall stimulated excellent dryland lucerne growth. The winter/spring of 1991 had been relatively dry and there had been little growth of barley grass - hence, grass seeds had not been a problem with these lambs.

Both groups of young rams were shorn on 12 May 1992 - at an average age of 10 months. Following shearing, the two groups were again run together at pasture. Supplementary feeding with oats grain was required through autumn and winter of 1992, a period of very low rainfall (record low for the period March - June). Spring 1992 was relatively wet and the rams were jetted in late October to protect against

flystrike. Final shearing of the two groups of rams took place on 12 November 1992 - at that shearing, the rams were 16 months of age with 6 months wool growth. The trial terminated as planned, following that shearing.

### *Sheep and Wool Measurement*

Data collected on the rams throughout the course of the experiment were:

Ear tag no.  
 Dam tag no.  
 Age of dam.  
 Sire tag no.  
 Flock of origin (rams were from 7 purebred medium wool bloodlines)  
 Day of birth (spread of lambing was 39 days - 72% born in the first 17 days)  
 Birth type (60% had been twin born).  
 Birth weight.  
 Weaning weight.  
 GFW at  
 Weaner shearing (50% of animals only).  
 GFW )  
 CFW ) at 10 month shearing in May 1992.  
 Yield )  
 Fibre diameter )  
 Off-shears body weight - 10 months old  
 GFW )  
 CFW ) at 16 month shearing in November 1992  
 Yield )  
 Fibre diameter )  
 Off-shears body weight - 16 months old  
 Fly struck at any stage of the trial

Wool samples were forwarded to the Gordon Technical College Wool Testing Service in Geelong for measurement of yield and fibre diameter.

## **Results**

### *Sheep and Wool Measurements*

**Table 1 Average Production levels for the Two Groups**

Measurement	Group	
	Lamb Shorn	Not Lamb Shorn
Number in Group	144	133
Weaning Weight (kg)	26.3	25.6
GFW - weaner shearing (kg)	1.2	
GFW - 10 m shearing (kg)	2.4	3.5
Yield - 10 m shearing (%)	66.2	66.6
Fibre diam. - 10 m shear (microns)	20.6	20.1
Liveweight - 10 m (kg)	34.4	32.9
GFW - 16 m shear (kg)	3.6	3.5
Yield - 16 m shear (kg)	70.5	70.0
Fibre diam - 16 m shear (%)	22.0	21.6
Liveweight - 16 m (kg)	49.5	48.8
Flystruck*	28	24

\* Note, 72% of all strikes were head/horn strikes detected in late October 1992, a period of wet warm weather. Of the six animals affected by body strike in this period, all had been shorn as lambs.

### *Statistical Analyses*

There were no significant differences between the two groups in average production levels at the two shearings (Table 1). The co-efficient of variation between animals within the two groups is a measure of the variability in measured production characters within the groups. In the following table, our analyses of the variance within the two groups for major production characteristics shows the coefficient of variation unadjusted

for any factors, as well as the remaining coefficient of variation after adjusting individual animal production records according to their age, birth type (twin, single) and age of their dam (Table 2).

**Table 2 Co-efficients of variation (%) in production characteristics at 10 months of age**

Adjustment	Weaner Shearing Group	GFW (kg)	YLD (%)	FD ( $\mu\text{m}$ )	BW (kg)
Unadjusted	U *	17.0	7.0	6.1	15.2
	S	15.1	7.8	6.2	14.7
Birth Type	U	15.8	7.0	5.9	15.4
	S	15.2	7.7	6.3	14.6
Age	U	16.1	7.0	6.1	15.3
	S	15.1	7.8	6.1	15.5
Birth Type, Age, Age of Dam	U	14.6	7.1	5.9	15.3
	S	15.2	7.8	6.1	14.0
* U = unshorn as weaners,		S = shorn as weaners			

The magnitude of effects on production characteristics of rams being twin or single born, having been born early or late in the spread of lambing, or having had a maiden or mature dam; are shown in Table 3 (10 months of age) and Table 4 (16 months of age).

The results of most importance to the objectives of the project are the correlations between production measurements at 10 and 16 months of age, and whether these correlations are influenced by lamb shearing. These correlations are presented in Table 5.

**Table 3 Adjustment factors at 10 months of age**

	Weaner Shearing Group	GFW (kg)	YLD (%)	FD ( $\mu\text{m}$ )	BW (kg)
Overall Average	U	3.6	67.6	20.1	32.3
	S	2.4	66.2	20.4	33.3
Diff. between singles and twins	U	0.6	0.6	0.6	0.9
	S	0.1	-1.4	0	1.0
Diff. between progeny of adult and maiden ewes	U	0.1	-1.3	0.4	1.9
	S	0.1	0.1	0.4	3.3
Diff. between lambs born 30 days apart	U	0.8	0.7	0.5	0.9
	S	0.3	0.6	1.3	4.0

**Table 4 Adjustment factors at 16 months of age**

	Weaner Shearing Group	GFW (kg)	YLD (%)	FD ( $\mu\text{m}$ )	BW (kg)
Overall Average	U	3.6	70.5	21.4	48.1
	S	3.6	70.8	21.7	48.2
Diff. between singles and twins	U	0	0.6	0.2	0.3
	S	0	0.2	0.1	-0.1
Diff. between progeny of adult and maiden ewes	U	-0.2	-0.9	0.6	1.9
	S	0.2	0	0.6	3.2
Diff. between lambs born 30 days apart	U	0.2	0.2	0.1	3.5
	S	0.1	1.0	0.7	2.0



**Table 5 Correlations between measurements at 10 and 16 months of age**

Adjustment	Weaner Shearing Group	GFW (kg)	YLD (%)	FD ( $\mu\text{m}$ )	BW (kg)
Unadjusted	U	0.26	0.59	0.68	0.88
	S	0.52	0.62	0.69	0.87
Birth Type	U	0.28	0.59	0.69	0.88
	S	0.53	0.63	0.69	0.87
Age	U	0.32	0.59	0.69	0.88
	S	0.52	0.63	0.68	0.87
Birth Type, Age, Age of Dam	U	0.37	0.59	0.68	0.88
	S	0.52	0.63	0.67	0.87

## Discussion

### *Sheep and Wool Measurements*

The two groups of young rams, one shorn at weaning and the other not, were virtually identical in terms of fleece weights, liveweights, yield and fibre diameter at 10 and 16 months of age (see Table 1). The sum of fleece weights at weaner shearing and 10 months shearing for that group (3.6 kg) was virtually identical to the fleece weight at 10 months for the other group (3.5 kg). At the 10 month shearing, that group which had not been shorn as weaners were 0.5 microns finer than the weaner shorn group - consistent with the expectation of a fleece which still contained the lamb tip. The lamb shorn group was 1.5 kg heavier at 10 months but this probably was a carry-over of a random difference of 0.7 kg between the two groups at weaning. The two groups were virtually identical in liveweight by 16 months, as they were for fleece weight, fibre diameter and yield.

The two groups were similarly affected by fly strike in the wet spring of 1992, although most strikes were on the head and horns. It was interesting to note that of the small number of animals affected by body strike at that time (2% of the total mob), all had been shorn as lambs 10 months earlier. Though this number is very small, this finding is consistent with an earlier study by CSIRO.

The analysis of the variability between sheep within the two groups at 10 months (Table 2) shows two interesting points. The group not shorn as lambs was more variable in fleece weight than the lamb shorn group (CV 17.0% versus 15.1%). For other characteristics measured, the two groups were similar in variability. When individual animal fleece weights in the non-lamb shorn group were 'adjusted' for birth type, age and age of dam effects, the variability between animals in that group was similar to that in the lamb-shorn group.

The magnitude of these 'adjustment' factors, or the difference between twins and singles etc. are shown in Tables 3 and 4. For the non-lamb shorn group at 10 months of age (Table 3), singles cut 0.6 kg more than twins. This is a larger birth type effect (17% of average fleece weight) than is currently assumed in Woolplan calculations (5%). On the other hand, the difference between singles and twins in the lamb shorn group was only 0.1 kg (4% of average fleece weight). This graphically demonstrates the impact of weaner shearing on reducing early life non-genetic effects such as birth type, on fleece weight measured at 10 months of age. Similarly, rams born 30 days apart differed by 0.8 kg in fleece weight at 10 months in the non-lamb shorn group, but only by 0.3 kg at the same shearing in the lamb shorn group. The 'noise' in estimating genetic merit for fleece weight at 10 months was significantly reduced by the weaner shearing.

At the later shearing (Table 4), the differences between twins and singles were minimal for all characteristics, regardless of whether the rams had been shorn as weaners or not.

### *Sheep Breeding Implications*

Ram selection and marketing programs in ram breeding flocks generally involve a number of stages, with fleece measurement playing a greater or lesser role in one or more of those stages. Initial assessment, involving the identification of reserves (potential replacement sires in the ram breeders own flock) and the broad classification of sale rams into various grades, generally takes place prior to 12 months of age. The questions asked in this experiment were:

How repeatable are fleece measurements on rams that are less than 12 months of age, when compared with measurements at a later age?

What is the impact of weaner shearing, or not, on the repeatability of fleece measurements on rams that are less than 12 months of age?

These questions are largely answered by the results in Table 5.

The correlations between fleece weight, yield, fibre diameter, and body weight at 10 months of age (lamb shorn, as per current recommendations) and those same measurements at 16 months of age were 0.52, 0.62, 0.69 and 0.87 respectively. These are in effect, the repeatability of measurements at 10 months of age when compared

with the same measurements on the same animals at 16 months of age. These figures are comparable with other recent studies of Merino rams. However, these same correlations for the group not shorn as lambs, show a different pattern - the relevant correlations to compare were 0.26, 0.59, 0.68 and 0.88 for fleece weight, yield, fibre diameter and body weight. These are all very similar to the lamb shorn group except for fleece weight. In effect, the repeatability of rankings on fleece weight in the non lamb-shorn group was only half the figure for the lamb shorn group (0.26 v's 0.52).

The conclusion to draw from these correlations is that where selection is influenced by measurements of fibre diameter, yield and/or body weight at 10 months of age, lamb shearing has little or no effect on the accuracy of that selection. By contrast, where selection at that age places emphasis on fleece weight, there is a substantial loss of accuracy if rams have not been previously shorn as lambs. This is graphically indicated in Figures 1 (a) and (b). These graphs indicate the impact of lamb shearing or not on actual versus potential genetic gains in a hypothetical ram breeding flock where selection of sires is based on fleece measurements at 10 months of age.

Fig 1(a) Actual versus potential response to selection based on an index of GFW/FD (2% Micron premium)

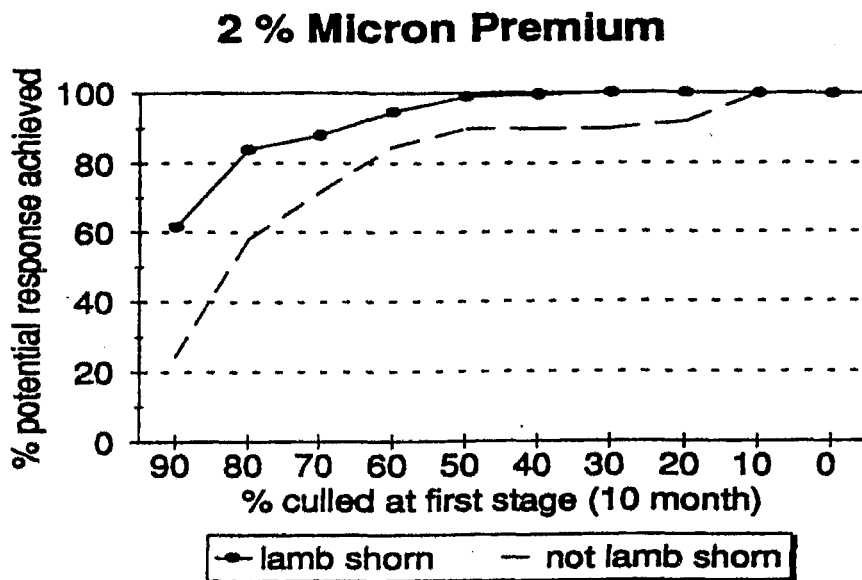
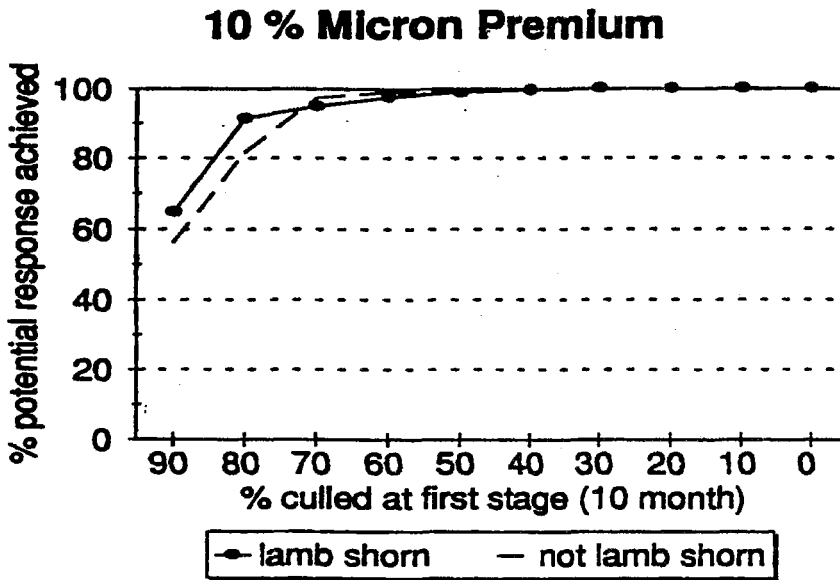


Fig 1 (b) Actual versus potential response to selection based on an index of GFW/FD (10% Micron premium)



Two scenarios are presented:

Fig. 1 (a) '2% Micron Premium' is a situation where a ram breeder is placing most emphasis on increasing fleece weight, with minimal attention to reducing micron. In this case, if 90% of the selection decisions are based on the fleece measurements at 10 months of age with no lamb shearing, the actual response to selection will only be approximately 20% of the potential. Under the same circumstances, but where the rams have been shorn as lambs, the actual response to selection will be approximately 60% of the potential. This increase in selection response for the lamb shorn group, reflects the increased accuracy (or repeatability) of fleece weight measurements at 10 months in the lamb shorn group - as reported in Table 5.

Figure 1(b) '10% Micron Premium' is a situation where a ram breeder is placing most emphasis on reducing micron, with minimal attention to increasing fleece weight. In this case, there is much less difference in potential responses to selection between the lamb shorn and not-lamb shorn groups, even when up to 90% of the selection decisions are based on the fleece measurements at 10 months of age. This reflects the result from Table 5 which shows that the repeatability of fibre diameter measurements at 10 months of age is relatively unaffected by lamb shearing.

A more realistic situation for both scenarios is probably where about 50% of the sire selection decisions are made at the first stage (10 months of age) with the remainder being made after subsequent classing and possible re-measurement of reserves at a later age. For the 2% micron premium scenario (high emphasis on fleece weight) the lamb shorn group will be achieving about 100% of the potential genetic gain and the non-lamb shorn group will be achieving about 90%. For the 10% micron premium scenario (low emphasis on fleece weight) both the lamb-shorn and not lamb-shorn groups will be achieving near 100% of the potential genetic gains.

### *Sheep Management Implications*

Issues to be considered are the extra costs associated with lamb shearing; prices received for prem-shorn lambs wool and for fleeces with either 10 months or 6 months staple length at 10 months of age; effects of lamb shearing on grass seed contamination, weaner growth rates, flystrike or other issues.

A summary of the actual shearing costs and wool prices in this study is given below.

	Cost of Lamb Shearing (\$/head)	Wool Value		Nett Returns
		Lamb Shearing	10 Month Shearing	
Lamb Shorn	\$3.05	\$3.54	\$5.21	\$5.70
Not Lamb Shorn	0	0	\$8.06	\$8.06

From this table it can be seen that the nett return where a lamb shearing was included in the management regime was \$2.36 per head less than where the group was carried through to first shearing at 10 months of age.

As indicated earlier, the seasonal conditions in spring and early summer in 1991 were such that grass seeds were not a problem at Trangie - hence there was no opportunity to demonstrate if lamb shearing had any effect on grass seed infestation in ram lambs. Growth rates did not differ significantly between shorn or unshorn groups from weaning to 10 months of age, nor at later ages. Total flystrike incidence did not differ significantly between the two groups, although six animals in the lamb shorn group (4% of that group) were affected by body strike while none were affected in the non-lamb shorn group.

## Conclusion

The recommended practice of weaner shearing prior to fleece measurement in ram breeding flocks was based on the assumption that such weaner shearing would improve the repeatability (accuracy) of fleece measurements at 10 - 12 months of age. This improvement in repeatability would result from the minimisation of carry-over early life effects of birth type, dam age and spread of ages on fleece weights and fibre diameters of young rams.

This study has verified that recommendation where fleece weight at 10 to 12 months of age is an important selection criterion in Merino ram breeding programs. Where fibre diameter at 10 to 12 months of age is an important selection criterion, weaner shearing did not increase the repeatability of that measurement. Where selection is based on a two stage measurement or classing regime (10 month and 16 month assessment), there appeared to be little benefit, in terms of increased potential rates of genetic gain, from weaner shearing.

The practice of weaner shearing resulted in returns of \$2.36/head less than where ram weaners were not shorn - this takes into account the cost of weaner shearing and the sum of wool value at the weaner and 10 month shearings. There were no apparent management benefits from weaner shearing in this study.

One would conclude that unless grass seed infestation of lambs was a high risk, or that ram selection and classing emphasis was heavily based on fleece weight at 10 to 12 months of age, there appears to be little justification for weaner ram shearing in ram breeding flocks.

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