

FIELD OBSERVATIONS ON LAMBING EFFICIENCY

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SUMMARY

The Australian sheep industry has a reputation for efficiency in animal output per unit of human input. This paper questions that reputation, suggests inefficiency at the time of lambing, and discusses the impact of lamb losses. Changes are needed so the current level of animal production can be attained with fewer animal units and less human input.

Keywords: efficiency, lamb losses, predator, management.

INTRODUCTION

It is well established that perinatal lamb mortality is a source of serious loss to the sheep industry with estimates ranging from 15% (Alexander 1984), to 20% in Victoria (Foot 1990), and 30% in Western Australia (Morrison and Young 1991).

Results in different regions indicate lamb marking percentages of 70% for parts of W.A. and 80% for S.A. and national results for 1987-1988, 81%, 1988-1989, 81%, and 1989-1990, 83% (BS Catalogue No. 7221 .0).

The profitability of increasing lambing percentage as distinct from marking percentage in W.A. was studied and modelled by Morrison and Young (1991) who found that it was profitable, but not highly so, to increase lambing percentage. A grazier may view the long-term potential of lamb losses as a cumulative financial loss.

This paper provides field data on lamb survival, birthweight and cause of death and comments on the efficiency of an existing lambing system in S.A.

MATERIALS AND METHODS

General

Data were collected north-east of Bordertown, an area specialising in sheep and cereal grain production. Soil type is mainly a clay loam that varies from heavier clay-based soil found on low areas and higher hill tops to lighter patches on the slopes. The region is described as a Savannah woodland. Bulloak (*Casuarina luehmanni*), blue gum (*Eucalyptus leucoxylon*), and box trees (*Eucalyptus largiflorens* and *Eucalyptus odorata*) are the main trees covering the area. Pastures are a mixture of annual grasses, mainly ryegrass (*Lolium rigidum* Gaud), barley grass (*Hordeum leporinum* Link), and several varieties of subterranean clover (*Trifolium subterraneum* L.).

The region has an annual rainfall of approximately 475 mm, which falls mainly from April to October. Temperatures average between 5 and 15°C in July, the coolest period, when frosts occur occasionally. In January, the warmest period, mean minimum and maximum temperatures are 13 and 30°C respectively. Minimum temperatures during the lambings discussed were 2-5°C.

The original property of 202 ha has maintained a ewe flock each year with few exceptions since 1920. Marking percentages were around 75 lambs per 100 ewes mated until the 1950s. Since then the average has increased to 80% with individual flocks returning a low of 35% to a high of 117%. No objective measurements were made to obtain the exact number of new-born lambs which died, until 1984 when L. Kirsch (University of Wisconsin) studied the lambing system as part of her final year undergraduate study. In 1987 R. Ehrhardt, also from Wisconsin, continued the study of lamb losses. (Both were students of Professor N. J. Benevenga.)

In 1984 the property consisted of 2 farms 10 km apart. The second farm of 384 ha has mainly lighter soil, but with similar pasture with the addition of perennial veldt grass (*Ehrharta calycina*) on the rises. While both farms were undulating and had some trees for shelter as well as cereal stubble and/or dry grass in most paddocks, it was assumed that physical shelter for young lambs in cold, wet, windy weather was inadequate.

Sheep

The ewe were Merinos producing 4-5 kg per head of 20-23 micron greasy wool per annum. The rams were either Merino or Suffolk.

Management

In 1984, 1200 mixed-aged Merino ewes previously mated to Merino rams were divided into 5 groups for lambing in June-July. Supplementary pasture hay and oat grain was fed during lambing. Lambing supervision consisted of a morning inspection and dead lamb collection for identification of cause of death. Lambs present at marking (8 weeks) were calculated as a percentage of ewes present at marking.

In 1987, 382 18-month-old Merino ewes with Merino sires, and 150 3-month-old Merino ewes with Suffolk sires were put into 6 groups for a May-June lambing. Nutrition at lambing consisted of an emerging pasture and dry pasture supplemented with round bales of pasture hay. The ewes were all pregnancy tested at 85 to 105 days of gestation using an ultrasound unit. A more thorough examination for multiple foetuses was not done because of the small number of multiple births expected in maiden ewes. Ewes were observed twice daily at a distance using binoculars to avoid disturbance, mis-mothering, and desertion of the lamb. Maiden ewes are much more easily disturbed, so special care was taken not to disturb ewes in the process of lambing or with new-born lambs. Ewes needing assistance were quietly separated from the mob and caught with the aid of a well-trained dog.

The pregnancy rate was defined as a number of pregnant ewes (determined by ultrasound) over the number of ewes in the mob. The pregnancy rate in 1987 was 9.1% in 18-month-old ewes (Group A) and 93% in 30-month-old ewes, which had not been pregnant the previous year (Group B).

The lamb losses in 1987 were recorded daily and each dead lamb weighed and examined to determine the cause of death. Eight categories of dead lambs were defined using autopsies where required. These 8 categories were:

(i) *Starvation-exposure*. Physical symptoms included an emaciated condition with lambs often found in sheltered areas (protected side of a tree or tall stubble, etc.) with legs sprawled out. An autopsy revealed compliant pink lungs and fully metabolised brown adipose tissue surrounding the pericardium, the kidneys and intestines.

(ii) *Dystocia*. Dystocia deaths included lambs dying from asphyxia in the birth canal and lambs dying from birth injuries. Lambs dying from asphyxia are born dead, as can be determined by the lack of blood clotting in the umbilical artery. Autopsy findings showed non-aerated lungs and non-depleted brown adipose tissue in lambs dying. Lambs dying from birth injury to the central nervous system and internal organs may or may not have fed and usually have only partially metabolised brown adipose tissue. It was difficult to confirm this injury by the autopsy method used. Dystocia deaths often have severe oedema of the head.

(iii) *Congenital abnormalities*. This category included lambs with hernias and other malformations found at birth.

(iv) *Misadventure*. Lambs dying from drowning, suffocation and other accidents were placed in this category.

(v) *Predation*. The main predators killing lambs on the property studied were foxes and crows. Fox deaths were diagnosed by puncture wounds to the neck and ribcage severing major arteries and veins. The crow deaths were diagnosed by a missing eye(s) and/or tongue as well as a moderate to severe attack on the lamb's abdomen.

(vi) *Premature birth*. Lambs born preterm have hairy birthcoats and are very small (often less than 2 kg). These lambs also have non-compliant lungs and underdeveloped organs.

(vii) *Disease*. The only disease diagnosed was enterotoxaemia. This disease often affects fast-gaining lambs. It is diagnosed by congested lungs, bright red intestines, and small haemorrhages in the cardiac muscle.

(viii) *Unknown*. All lambs not fitting the above categories.

RESULTS

The lamb loss in 1984 from 1200 mixed age ewes was 284 or 24%. Desertion appeared to be the main cause of death with 143 lambs or 50% dying in that way. The final marking percentage equalled the state average of 80.

In 1987 the 2 largest causes of lamb deaths in this study were dystocia and starvation-exposure, see Table 1. Dystocia was the major cause of mortality comprising 48% of the total deaths. This figure could be projected to be 57% if the 22 lambs pulled at birth were considered dystocia losses (lambs pulled are indicated by parentheses in Table 1). Starvation-exposure was the second largest cause of mortality accounting for 32% of the total lamb deaths. Starvation/exposure was the greatest in paddocks which contained little cover. Predation was the other significant cause of death in this study accounting for 9% of the total lamb loss.

Table 1. Number of lambs alive at marking, number dying and causes of deaths in lambs from 18-month-old ewes (Group A) and 30-month-old ewes (Group B) in 1987

	Group A	Group B
Number of ewes present at marking	377	151
Number of lambs alive at marking	286	121
Live lambs/100 ewes	76	80
Number of lamb deaths before marking	79	35
Lamb deaths (% of lambs born)	22	22
Number of lambs dying from:		
Starvation-exposure	23	14
Dystocia (lambs pulled)	40 (17)	15 (5)
Abnormalities	2	0
Misadventure	3	0
Predation	5	5
Premature	2	0
Disease	2	0
Unknown	2	1

The number of lambs at marking (5 weeks) was calculated as a percentage of the number of ewes in the mob. The younger ewes (Group A) had a lower proportion of live lambs at marking than the older ewes (Group B) but the percentage lamb mortality did not differ between the 2 groups. Within Group A and Group B there was an inverse relationship between mob size and marking percentage, although these differences were small and probably do not reflect significant differences.

DISCUSSION

Post-natal mortality is a loss to the sheep industry of Australia averaging 17% of total lambs dropped (Gunn and Robinson 1963). Studies with Australian Merino lambs (Alexander 1962) showed the limited nature of the body reserves in new-born lambs and the importance of post-natal nutrition in determining lamb survival. It is suggested the loss of 24 dead lambs/100 ewes mated observed in 1984 could be similar to the state or national average.

In 1984 the potential dollar loss caused by death of lambs, calculated from the income produced by the surviving lamb and wool sales, was \$2839. This represented a potential loss of around 7% of sheep income in the first year. This result compares with that of Morrison and Young (1991) when they suggested that by taking lambing from 70 to 80% ewe profitability was increased by \$A1.80 (in 1990) whereas, in 1987, \$2.30 per ewe was the potential. Average Australian lambing percentage in the years 1987-88 to 1989-90 (definition not quoted) was 81.68 using ABS figures. If these figures represent a \$2/ewe loss over 62.5 million ewes, the losses to the industry were \$125 million or about \$2000 per sheep property in Australian per annum.

Ewe management, adequate nutrition and disease prevention treatment can be readily maintained during pregnancy although body weight and hence birthweight of lambs can be difficult to control if paddock feed is above adequate. The weather, predictably unpredictable, can turn the lambing from apparent success to disaster, protection by windbreak, whether natural, planted or physical is possible. All these have been part of management during the lambing history at 'Mraadine' and together with pregnancy testing have kept the sheep component viable.

In 1987 predators caused 9% loss. However since then night predators, presumably foxes, have been estimated to cause over 25% of losses. This is proving an intractable problem since despite dogging, spot-light hunting, trapping and baiting, losses have continued over the last 4 years. Predators may include dogs as they are also maiming grown sheep.

CONCLUSION

Lamb losses are a source of inefficiency in sheep production systems but any method to reduce deaths needs to take into account the declining availability of labour.

Currently, if 800 lambs are required 1000 ewes need to be mated and there are about 240 dead lambs. If ewe numbers could be reduced to 900 to obtain 800 lambs, then money and resource savings are available for other uses.

Improved management skills may help to reduce losses from dystocia and starvation-exposure, the

2 major causes of lamb deaths observed in 1984 and 1987. However, predation, which became the major problem in subsequent years, could offset any gain achieved by reducing losses from other causes. In the absence of a market-driven harvesting of foxes it is reasonable to suggest that a fox bounty may achieve the desired results. At the same time should regulations be introduced to force **graziers** to control their working dogs when not working; should town and pet dogs be controlled by a realistic registration fee?

REFERENCES

- ALEXANDER, G. (1984). 'Reproduction in Sheep.' (Eds D.R. Lindsay and D.T. Pearce.) pp. 199-208. (Aust. Academy Sci. and AWC: Canberra.)
- ALEXANDER, G. (1962). *Aust. J. of Agric. Res.* 13: 82-99.
- AUSTRALIAN BUREAU OF STATISTICS. Catalogue No. 7221.0
- FOOT, J. (1990). *Rural Quarterly*, March, p. 12.
- GUNN, R. G. and ROBINSON V. F. (1963). *Anim. Prod.* 67-76.
- MORRISON, D. and YOUNG, J. (1991). *Aust. J. Agric. Res.* 42: 227-41.