EARLY DISTURBANCE OF MERINO EWES FROM THE BIRTH SITE INCREASES LAMB SEPARATIONS AND MORTALITY

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SUMMARY

The survival of twin born Merino lambs within 48 hours following parturition was studied in ewes given four treatments associated with disruption of birth site. In group 1 the ewes and the lambs were drifted 25 m away from the original birth site 30 minutes after the second lamb was born. Group 2 was penned on the birth site for the first six hours following the birth of the second lamb. Group 3 was drifted 25 m away to a new site 30 minutes after the second lamb was born and drifted back to the original birth site 30 min later, and group 4 was a control group and lambed under normal conditions. The proportion of ewes showing permanent desertion in groups 1, 2, 3 and 4 was 29 per cent, 0 per cent, 27 per cent and 15 per cent, respectively. The corresponding figure for lamb mortality was 17.6 per cent, 2.6 per cent, 22.7 per cent and 11.5 per cent, respectively. The time spent on the birth site is therefore related the incidence of lamb separations and lamb survival.
(Key words: maternal behaviour, birth site, survival rate, Merino ewes, desertion).

INTRODUCTION

At few hours prior to parturition, pregnant ewes display physical and behavioural signs that signal impending parturition. Often one such sign is seeking a site for the birth of her lambs and isolation from the flock (Arnold and Morgan 1975; Holmes 1975). However, the amount of time spent by the ewe on the birth site after parturition varies with breed, litter size and parity of the ewes (Alexander et al. 1983; Alexander et al. 1984).

Stevens et al. (1982) showed that one strain of fine wool Merino ewe was unable to maintain contact with more than one lamb, resulting in 37 per cent of twin lambs dying compared to only 10 per cent of singles. This evidence was supported by Alexander et al. (1983) who showed an even higher proportion of multiple-born lambs which separated from their mothers (46%). This high proportion of separations was suggested to be associated with the amount of time the ewes spent on the birth site.

The present experiment was designed to study the effect of deliberately disturbing ewes and lambs and forcing them away from the birth site,on subsequent maternal behaviour and lamb mortality.

MATERIALS AND METHODS

The experiment was carried out at the University of Western Australia's Research Farm "Allandale", Wundowie WA, during May 1986. Sixty pregnant twin-bearing ewes (4-tooth) were selected from 150 pregnant ewes whose litter size had been diagnosed by real-time ultrasound scanning (Fowler and Wilkins 1984). Oestrus had been synchronised using sponges and the ewe had received 5 ml (500 iu) of PMS, injected intramuscularly, to increase twinning rate.

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One week prior to lambing ewes were randomly allocated into four treatment groups. Group 1 was drifted 25 m away from the original birth site 30 minutes after the second lamb was born (17 ewes), Group 2 was penned on the birth site for the first 6 hours following birth of the second lamb (19 ewes), Group 3 was drifted 25 m away to a new site 30 minutes after the second lamb was born and then 30 minutes later they were drifted back using same method to the original birth site (11 ewes) and Group 4 was a control group and lambed under normal conditions. A few days before lambing ewes were accustomed to the presence of observers and at lambing the ewes could be approached within 3-5 m without visible disturbance.

The flocks were continously observed 24 hours daily for two weeks. The paddocks were illuminated with a series of spot lights. Behaviour of the ewes toward their own lambs at lambing was classified into normal behaviour, temporary disturbance, and permanent desertion according to the criteria described by Putu et al. (1986). The incidence of separation and lamb mortality within 48 hours of parturition were also recorded.

Data relating to comparison of proportions were statistically analysed using the test of Fisher for exact probabilities or Chi-square with 1 degree of freedom (Freeman and Halton 1951).

RESULTS

Disruption of the birth site 30 minutes after the birth of the second lamb significantly affected-maternal behaviour of ewes at lambing. Five out of 17 ewes in group 1 and three out of 11 ewes in group 3 deserted permanently at least one of their twin lambs (Table 1). By contrast ewes which were penned for the first six hours following parturition did not desert their lambs when released. Group 2 was significantly better than group 1 (X^2=10.1, P=0.003) and group 3 (X^2-7.1, P=0.009) but was not different from the control group. Pooled data on permanent desertion indicated that 8 out of 14 lambs (57%) were second-born lambs, and another 14 of the second-born out of 19 lambs (74%) were deserted temporarily by their mothers within 48 hours following parturition.

The mean interval between birth of first and second lamb was 28.1 min + 2 min which ranged between 5 and 65 min. The amount of time spent on the birth site by the control ewes in group 4 was 4 h 2 min ± 22 min. During the drifting period from the original birth site to a new site, 8 out of 17 ewes (47%) of group 1, and 6 out of 11 ewes (55%) of group 3 returned and licked the ground at their original birth site and then went back to their lambs.

Table 1 The effect of deliberate disruption of birth site on subsequent maternal behaviour in Merino ewes

Groups	No.	% Ewes in maternal behaviour classes							
		Normal behaviour	Temporary disturbance one lamb		both lambs		Permanent desertion one lamb		both lambs	
1 (moved)	17	35 a	35	(1A,5B)	0		24	(1A,3B)	6	(1A,1B)
2 (penned)	19	84 b	16	(1A,2B)	0		0		0	
3 (returned)	11	18 ab	45	(1A,4B)	9	(1A,1B)	9	(1B)	18	(2A,2B)
4 (control)	13	62 ab	23	(1A,2B)	0		8	(1A)	8	(1A,1B)

Figures in brackets are numbers of first (A) or second (B) lambs which were deserted by their mothers.

A similar trend was found also in the proportions of separation between ewe and lambs' within 48 hours following parturition. In Group 2, 79% of ewes did

not separate from their lambs and this was a significantly higher proportion than the 29% in Group 1 (X^2=7.0, P=0.009) and 18% in Group 3 (X^2= 8.1, P=0.006) that did not separate, but no different from group 4 (63%). Pooled data on permanent separation indicated that 8 out, of 14 lambs were second born (P>0.05) and when temporary desertion was considered 14 out of 21 were second born lambs (P>0.05).

Table 2 The proportion of ewes reunited with both of their twin lambs at twin separation test within 48-60 h following birth

Groups	No	% Ewes reunited with both of their twin lambs		
		0-0.5 min.	0.5 - 5.0 min.	more than 5.0 min.
1 (moved)	11	27 a	46 a	27 ab
2 (penned)	18	83 b	17 a	0 b
3 (returned)	7	29 a	29 a	42 a
4 (control)	10	60 ab	30 a	10 ab

Values with the same superscripts within column are not significantly different (P>0.05)

In artificial separation tests, conducted between 48 and 60 h following birth of the lambs, 83 per cent of ewes in group 2 reunited with both of their twin lambs within 30 second which was significantly different from group 1 (X^2= 6.9, P=0.009), group 3 (X^2=4.7, P=0.04) but no different from group 4. Forty-two per cent of ewes in group 1 and 27 per cent of ewes in group 3 failed to reunite within the 5 minute test period (Table 2).

Lamb mortality in group 2 was lower than that in group 1 (X^2=3.1, P=0.09) and group 3 (X^2=4.2, P=0.041), but was not significantly different from that in group 4 (Table 3). Eleven of 14 lambs (79%) which were deserted by their mothers died due to starvation within 48 hours following parturition and another three lambs died between 48 and 72 hours after birth. Four out of 19 (21%) lambs born from ewes which showed signs of temporary disturbance died of starvation and weakness.

Table 3 Effects of deliberate disruption of birth site on lamb mortality within 48 hours following parturition

Groups	Total lambs dead	No.of lambs dead in maternal behaviour classes		
		Normal behaviour	Temporary disturbance	Permanent desertion
1 (moved)	6/34 (18%) a	0	1	5
2 (penned)	1/38 (3%) b	0	1	0
3 (returned)	5/22 (23%) a	0	1	4
4 (control)	3/26 (12%) ab	0	1	2

DISCUSSION

Time spent by the ewes on the birth site has a significant effect on subsequent maternal behaviour and lamb survival during the 48 hours following parturition. Movement from the birth site 30 minutes after the birth of the second lamb in group 1 and group 3 increased the proportion of ewes that deserted their own lambs particularly the second born lamb (Table 1). This lack of interest by the ewe toward the second lamb indicates that 5 to 65 minute that

ewes spent with the first born lamb was important and that 30 minutes after the birth of the second lamb was insufficient for many ewes to recognize the size of their litters. By contrast, Smith et al. (1966) suggested that licking the lambs for approximately 30 minutes soon after birth was enough to create bonds between ewe and lamb. The difference between the present results and those of Smith et al. (1966) was probably due to breed. Twin-bearing Merino ewes may require a longer time to establish bonding toward their lambs compared with Clun Forest or Border Leicester x Cheviot ewes.

The lower proportion of ewes in group 2 which became separated from both lambs and also the higher proportion of ewes which reunited with both of their twin lambs within 30 seconds during the 5 minutes twin separation test are a reflection of stronger bonding between ewes and the twin lambs if they remain together for six hours. This supports the concept of Alexander et al. (1983) that the incidence of separation in multiple-born lambs was positively associated with the time spent by the ewes on the birth site.

The high proportion of ewes in group 1 (47%) and group 3 (55%) that returned and licked the birth site during the drifting period suggests that accumulation of amniotic fluids may stimulate the ewe to stay on the birth site. Poindron and Le Neindre (1980) and Poindron et al. (1980) report that the amniotic fluid has an important role in the establishment of maternal behaviour in ewes. It seems likely that the ewes in the present experiment were not satisfied with the new site to which they were moved.

During the first few hours after birth, the ewes and the lambs of Group 2 were able to stay on the birth site longer than other groups and were not disturbed by contact with other ewes which were showing pre-lambing maternal interest. This practice could reduce the incidence of mismothering among twin-bearing ewes.

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REFERENCES

ALEXANDER, G., KILGOUR, R., STEVENS, C. and BRADLEY, L.R. (1984). Appl. Anim. Ethol. 12: 363.

ALEXANDER, G., STEVENS, D., KILGOUR, R., deLANGEN, H., MOTTERSHEAD, B.E. and LYNCH, J.J. (1983). Appl. Anim. Ethol. 10: 301.

ARNOLD, G.W. and MORGAN, P.D. (1975). Appl. Anim. Ethol. 2: 25.

FOWLER, D.G. and WILKINS, J.F. (1984). Proc. Aust. Soc. Anim. Prod. 15: 681.

FREEMAN, G.H. and HALTON, J.H. (1951). Biometrika 38: 141.

HOLMES, R.J. (1975). N.Z. Vet. J. 23: 219.

POINDRON, P. and LE NEINDRE, P. (1980). Adv. in study of behaviour. 2: 75.

POINDRON, P., LE NEINDRE, P., RAKSANYI, I., TRILLAT, G. and ORGEUR, P. (1980). Reprod. Nutr. Develop. 20: 817.

PUTU, I.G., POINDRON, P., OLDHAM, C.M., GRAY, S.J. and BALLARD, M. (1986). Proc. Aust. Soc. Anim. Prod. 16: 315.

SMITH, F.V. VAN-TOLLER, C. and BOYES, T. (1966). Anim. Behav. 14: 120.

STEVENS, D., ALEXANDER, G. and LYNCH, J.J. (1982). Appl. Anim. Ethol. 8: 43.