THE IMPORTANCE OF THE BIRTHSITE ON THE SURVIVAL OF MERINO LAMBS

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SUMMARY

The length of time spent on the birthsite influences the establishment of bonding and survival, but is the birthsite itself important, or is it simply the length of uninterrupted, post-partum contact between the ewe and her lambs? The survival of twin and triplet-born Merino lambs from birth to 6 weeks of age was studied in ewes allocated to 1 of 3 treatments. Group 1, ewes and their lambs were not interfered with after parturition for 6 hours (control); group 2, ewes and lambs were penned on the birthsite for 6 hours; and group 3, ewes and lambs were penned 25 metres away from their birthsites for 6 hours, after which they were released. Lamb survival to 48 hours after birth and up to 6 weeks of age were recorded. Survival of lambs was significantly higher in the penned treatments (86% and 81% survival) compared with the controls (72% survival; $P < 0.05$). The penned treatments did not differ signficantly, so the birthsite seems to act only in its capacity to attract the ewe to remain in the vicinity. It appears that it is not so much that the ewe is on the birthsite for 6 hours after parturition that improves lamb survival, but simply the fact that the ewe is together with all of her lambs.

Keywords: lamb survival, birthsite, multiple births.

INTRODUCTION

Most losses of multiple-born lambs in Merino sheep flocks are due to poor maternal behaviour in the ewe and this may be attributed to either the ewe failing to exhibit maternal interest immediately after birth, or failing to establish a strong bond with her lambs (Poindron *et al.* 1980). The first few hours after parturition are critical for the establishment of the ewe-lamb bond (Poindron *et al.* 1984), since it is during this time that the ewe learns to recognize the identity of her litter. When Merino ewes fail to recognize the size of their litter during the 24 hours after birth, twin lambs are often separated from their mothers and may die (Stevens *et al.* 1982). The strength of the ewe-lamb bond depends on the time spent by the ewe on the birthsite (Stevens *et al.* 1982; Alexander *et al.* 1983) and therefore the incidence of separations and consequently, lamb mortality, are decreased as the time spent on the birthsite is increased. It appears that about 4 to 6 hours of contact on the birthsite is sufficient for the establishment of a strong bond between a ewe and her twin lambs, thereby improving the chances of survival of both lambs (Alexander *et al.* 1983; Putu *et al.* 1988).

Expelled amniotic fluids on the birthsite stimulate and maintain maternal interest and these fluids encourage newly lambed ewes to remain nearby (Poindron *et al.* 1980). Disruption of the ewe-lamb group from the birthsite is reported to disrupt maternal behaviour and bonding profoundly (Poindron *et al.* 1980) and significantly reduce the chances of survival of multiple-born lambs (Putu 1988). In the study by Putu (1988), the ewe-lamb groups that were drifted away from their birthsites soon after parturition separated from their twin lambs more readily and had higher mortality (20% vs 3%) than groups that were penned on their birthsites for 6 hours before release. Implied in these studies was the suggestion that the birthsite itself may have a special significance in the establishment of a solid ewe-lamb bond. This has not been investigated, as the maintenance of contact of the ewe with all of her lambs may also facilitate strong ewe-lamb bonding and lead to lower lamb mortality, irrespective of the inclusion of the birthsite. This experiment was designed to resolve this question.

MATERIALS & METHODS

Twin and triplet-bearing Booroola Merino ewes were identified by ultrasound and lambed during the months of June and July at Wundowie, Western Australia in 1992 ($n = 39$) and 1993 ($n = 53$). Twin and triplet lambs were utilised here due to their high mortality rates and the farm has a history of medium to high lamb mortality, especially among multiples. Ewes delivering stillborn lambs, or lambs that died immediately after parturition were excluded from this experiment. The ewes ranged between 2 and 6 years of age. They were habituated to the presence of humans for at least 5 days prior to the expected start of lambing and could then be approached within 5 metres with no visible signs of disturbance. Small day-paddocks of about 1 ha were utilised for the studies, along with a paddock of similar size which was illuminated for night observations. The unlambed ewes were drifted into the night paddock just before dark each day. *Ad libitum* oaten hay was provided to the day and night paddocks in the form of large

haystacks, and supplementary oats with some lupins were supplied daily at a rate of approximately 700 g/hd.day. The ewes were branded with numbers 20 cm high on both sides for identification and were observed 24 hours/day over the lambing period in both years.

Ewes exhibiting signs of imminent parturition were allocated at random to 1 of 3 groups. The first group (control) were not interfered with for 6 hours after parturition except to mark the birthsite 30 minutes after the birth of the last lamb. The second group of ewes were trapped on their birthsites 30 minutes after the birth of the last lamb for 6 hours in a circular wire enclosure 2.5 m in diameter secured with stakes. The third group of ewes were drifted 25 m away from their birthsites 30 minutes after the birth of the last lamb and trapped for 6 hours using similar enclosures to group 2. The lambs from all of the groups were weighed and tagged after 6 hours and the penned groups were released without further interference. Forty eight hours after parturition, the ewes and lambs were slowly drifted to a larger paddock of approximately 13 ha with mixed areas of trees, scrub and pasture. The lambs were marked at 6 weeks of age. The. data on lamb survival to marking were analysed by least squares ANOVA procedures.

RESULTS

During the first 48 hours after birth, losses of lambs from the three treatments did not differ significantly (Table 1). Six percent (5/82) of lambs from the control group of ewes died in the period up to 48 hours post-partum, compared to 2% (1/59) from ewe-lamb groups penned on their birthsites and 0% from the groups penned 25 m away from their birthsites. By contrast, lamb survival to marking (6 weeks of age) was significantly different between treatments. Ewe-lamb groups that were penned on the birthsite had a lamb survival of 86% (51/59) and those penned away from the birthsite had 81% survival (57/64) (n.s; Table 1). Both were significantly higher than the survival of lambs from the control group, where only 72% (59/82) of lambs survived to marking. The control ewe-lamb groups suffered no post-partum interference and left their birthsites voluntarily after an average of 3.55 hours (± 0.28, s.e.m). Of control ewes, 53% lost 1 or more of their multiples, compared to only 30% and 17% for ewes penned on, or 25 m away from their birthsites. More triplets than twins died up to lamb marking in all groups and most of the improvement in lamb survival attributed to the penning treatments was related to greater twin than triplet survival. In the control group, 21% of twins died along with 40% of the triplets. In the group penned on the birthsite, only 9% of twins and 27% of triplets died and in the group that were penned 25 m from the birthsite, only 2% of twins and 33 % of triplets died to lamb marking (P = 0.10). Survival of lambs was lower in 1993 than 1992 and increasing ewe age generally produced an increase in lamb survival, but these differences were not significant.

Table 1. Rearing performance of ewes and lamb survival from birth to 48 hours post-partum and to marking of control ewes, ewes penned on the birthsite and ewes penned 25 m away from the birthsite for 6 hours post-partum with their lambs (numbers in parentheses are percentages)

Group	Litter size	Total ewes	Lambs lost to 48 hours	Ewes losing lambs to marking	Ewes rearing all lambs to marking	Total lambs born	Total lambs lost	Total lambs surviving
Control	2	26	3 (6)	10 (38)	16 (62)	52	11	41 (79)
	3	10	2 (7)	9 (90)	1 (10)	30	12	18 (60)
Total		36	5 (6)[a]	19 (53)	17 (48)	82	23	59 (72)[a]
Pen on birthsite	2	22	0	4 (18)	18 (82)	44	4	40 (91)
	3	5	1 (7)	4 (80)	1 (20)	15	4	11 (73)
Total		27	1 (2)[a]	8 (30)	19 (70)	59	8	51 (86)[b]
Pen 25 m from	2	23	0	1 (4)	22 (96)	46	1	45 (98)
birthsite	3	6	0	4 (67)	2 (33)	18	6	12 (67)
Total		29	0[a]	5 (17)	24 (83)	64	7	57 (81)[b]

Values in the same column with different superscripts are significantly different (P < 0.05).
Average time that control ewes spent on birth site was 3.55 hours (± 0.28 s.e.m).

Table 2 shows the characteristics of the lambs from the experiment. Neither the birthweights nor the weights of the lambs at marking differed between the 3 treatments, but these were significantly affected by litter size and the age of the ewe. Twin-born lambs had higher birthweights and marking weights than triplets ($P < 0.001$). Lamb birthweights generally increased as the age of the ewe increased from 2 to 5 years ($P < 0.001$), and these differences were still apparent at marking ($P < 0.001$). None of the treatments applied to the ewe-lamb groups at birth influenced the weights of the lambs at marking.

Table 2. Effects of the treatments, litter size and ewe age on average lamb birthweights (kg) and weights at marking (kg) for Booroola Merino lambs

		No. Ewes	No. lambs	Birthweight (± s.e.m.)	Marking weight (± s.e.m.)
Treatment	Control	36	82	3.03 ± 0.11[a]	7.53 ± 0.60[a]
	Pen on birthsite	27	59	3.23 ± 0.12[a]	8.79 ± 0.62[a]
	Pen off birthsite	29	64	3.24 ± 0.13[a]	7.71 ± 0.62[a]
Litter size	2	71	142	3.51 ± 0.09[a]	9.19 ± 0.40[a]
	3	21	63	2.83 ± 0.14[b]	6.83 ± 0.69[b]
Ewe age (years)	2	8	16	2.34 ± 0.20	5.13 ± 1.01
	3	42	95	3.16 ± 0.09	7.52 ± 0.44
	4	34	77	3.26 ± 0.10	9.49 ± 0.48
	5	4	9	3.66 ± 0.26	9.21 ± 1.30
	6	4	8	3.42 ± 0.27	8.70 ± 1.35

Values in the same column with different superscripts are significantly different ($P < 0.001$).
There was a linear effect of age of ewe on birthweight and marking weight of the lambs ($P < 0.001$).

DISCUSSION

This study shows that the survival of multiple-born lambs is enhanced when the mother and her lambs remain in close contact for the first 6 hours after birth. The significance of the birthsite in this process appears to rest only in its capacity to attract the ewe to remain in the close vicinity (Poindron et *al.* 1980). In this experiment and that of Putu *et al.* (1988), survival of multiple-born lambs was enhanced when the ewes were confined on the birthsite for longer than those in a control group. However, by confining the ewe-lamb groups a short distance away from the birthsite for the same period, we have shown that it is the early close contact that enhances lamb survival and not the ambience of the birthsite itself or the stimulatory effects of the amniotic fluids on maternal behaviour.

It must be remembered that any ewes delivering stillborn lambs, or lambs that died immediately post-partum were excluded from this experiment. Relatively few lambs died up to 48 hours post-partum in any of the groups, and treatment of the ewe-lamb groups had no effect. Most of the lambs died in the period between 48 hours of age and marking and the treatment of the ewe-lamb group had a pronounced effect on the survival of lambs. Mortality of lambs in the groups that were confined with their mothers was half that of those in the control group. The treatments in the first 6 hours that improved the bonding of the ewe-lamb group and improved the awareness of litter size were evidently long lasting, and this emphasises further the importance of events in the first few hours after birth on the survival of lambs.

Dams of triplets and twins are under more pressure to maintain the integrity of the mother-offspring group than are single-bearing ewes, and consequently lose more lambs. The reponses to the treatments imposed in this experiment are on the quality of the ewe-lamb bond rather than on its presence or absence. For example, the treatments had no effect on the growth of the lambs and all ewes seemed to have accepted and were attending to their lambs when they were moved to the larger paddock 48 hours after birth. It was only when they were in the more extensive and diverse landscape with greater opportunity for desertion and predation that the groups that had been confined after birth demonstrated a higher rate of lamb survival. The population of foxes was high, although we have no means of quantifying numbers, and this probably contributed to many of the losses. Nevertheless, had we used

single ewe-lamb groups in this experiment, where the task of maintaining close contact is presumably much easier than with multiple lambs, it is unlikely that we would have seen such clear-cut effects.

Comparisons of rates of lamb survival with other studies where the survival of multiples is involved is difficult because the conditions at lambing are rarely comparable. However, as Figure 1 shows, the average time spent on the birthsite by ewe-lamb groups, whether restricted or unrestricted, is strongly correlated with the subsequent survival of twin lambs. It is clear that the longer the time spent on or near the birthsite by the ewe with her multiples, the better the chances of survival of the lambs. In fact, any management technique that can induce the ewe and her lambs to remain together in one place for several hours post-partum can reduce post-natal losses of twin lambs to levels highly acceptable even for singles. The means of encouraging ewes to spend the optimum time at the birthsite, or at least in close contact with all of the lambs in their litter warrants further investigation.

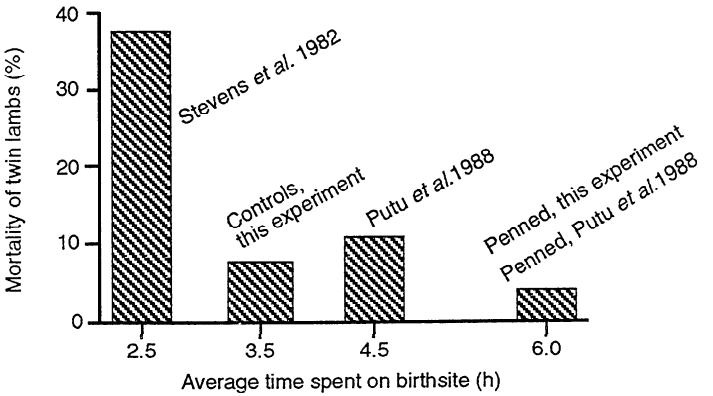

Figure 1. Relationship between the time spent by the ewe-lamb group on the birthsite and mortality in twin lambs

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