

“CLEAN, GREEN AND ETHICAL” MANAGEMENT: MAXIMISING THE SURVIVAL OF LAMBS

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There is an increasing need to improve the reproductive efficiency of Merino ewes so we can overcome the erosion of the Australian sheep flock and meet the growing demand for prime lamb. In the reproductive process there are several critical points where we can increase lamb output, amongst which the most important seem to be twinning rate and lamb survival. However, improvements in twinning rate will be seen as unethical if our management systems are inadequate for maximizing the survival of twin lambs born to Merino ewes.

McGuirk (1982) estimated that Australia loses 10-11 million lambs each year, mostly within the first week after birth. Recent data shows that this situation has not improved and confirms that mortality is higher in twin than in single lambs (Kleemann and Walker 2005). Both genetic and environmental factors contribute to neonatal mortality. Genetically, lamb survival is much worse with Merinos than with other genotypes. Environmentally, inadequate management of lambing ewes leads to high mortality of twin lambs.

Here we consider 3 opportunities for increasing lamb survival. The first involves breeding of ewes that provide high levels of maternal care – this is effective but direct measurements of maternal behaviour are impossible for large-scale operations. A better alternative is genetic selection for ‘calm’ temperament, for which a practical on-farm test is currently being evaluated across Australia. Using this test, Murphy (1999) found that neonatal mortality in twin Merino lambs could be reduced from 26% (‘nervous’ mothers) to 16% (‘calm’ mothers). Other benefits seem likely to flow from this: genetic selection for calm temperament increases the protein content in milk from Merino ewes (Sart *et al.* 2004), and it seems likely to improve meat quality because, when confronted with novel situations, calm sheep are less stressed than nervous sheep.

The second opportunity for reducing lamb mortality involves improvement of colostrum production. Banchemo *et al.* (2002) fed supplements to twin-bearing Merino ewes during the last week of pregnancy and almost doubled the amount of colostrum available at birth: 290 g in ewes fed lucerne hay; 650 g with lucerne hay plus barley; and 620 g with lucerne hay plus maize. The beneficial effects of barley and maize seem to be due to two factors: a) increases in the supply of intestinal (by-pass) starch, leading to more substrates being available for lactose synthesis, thus promoting more water absorption by the mammary tissue; b) a sharper decline in circulating progesterone concentrations in the ewe at parturition, leading to a better synchrony of the initiation of lactation with the emergence of the lambs (Banchemo *et al.* 2004ab). In addition, the colostrum that is produced by the energy-supplemented ewes is less viscous and seems to be easier for the lamb to suck. Boosting the colostrum intake by newborn lambs is of particular interest because colostrum is essential for providing nutrients, for conferring immunity to disease, and for shaping the early ewe-lamb bond. Successful sucking at birth facilitates attachment to the mother through a combination of the rewarding effect of colostrum intake and a neurophysiological effect of gastric distension (Val-Laillet *et al.* 2004). Delays in the provision of colostrum, or the provision of only small amounts, will thus be detrimental to the ewe-lamb relationship.

The third opportunity for reducing lamb mortality involves better management of ewe flocks during lambing. Most importantly, we need to ensure that shelter, feed and water are nearby, and that there is a calm lambing environment. This will promote, rather than disrupt, the formation of the ewe-lamb bond by ensuring that the mothers do not leave the birth site too soon after parturition and thus deny sufficient access to the udder for the newborn. Any loss of mother-young contact early after birth is likely to lead to the death of twin lambs.

Recent research into reproductive physiology and behaviour has allowed us to develop new strategies for increasing twin-lamb survival in Merinos. We now need to tailor these strategies to the type and location of sheep enterprise, and to evaluate interactions among feeding, management and selection for temperament.

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