Neonatal lamb mortality: factors associated with the death of Australian lambs

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Abstract

The objective of the present study was to examine the factors associated with the death of neonatal lambs. Postmortem autopsy data were collected from 3198 newborn lambs in the Sheep CRCs Information Nucleus Flock situated in various environments throughout southern Australia.

The proportion dying by category from highest to lowest was starvation-mismothering (25%), stillbirth (21%), birth injury (18%), dystocia (9%), death in utero-prematurity (10%), predation (7%), cold exposure (5%), undiagnosed (4%), infection (1%) or misadventure (1%).

Factors best explaining the probability of lambs falling into a death category included both birth type and birthweight for dystocia, stillbirth, starvation-mismothering and death in utero-prematurity. The probability of a lamb falling into any category was predicted at the mean birthweight, within birth type. Single-born lambs were more likely to die from dystocia and stillbirth, while twin lambs were more likely to die from birth injury, starvation-mismothering or from undiagnosed causes. Triplet lambs were more likely to die from starvation-mismothering or death in utero-prematurity. Sire type (Merino, maternal or terminal) did not affect the proportions of lambs within any category. The proportions lost to each cause of death were largely consistent among locations, despite the rate of death varying. Dystocia, stillbirth and birth injury, as evidenced by the presence of oedema around the head and neck or by lesions of the central nervous system, accounted for 48% of autopsied lambs. We conclude that for improvements to occur in the rates of lamb survival, the Australian sheep industry must focus on minimising losses due to dystocia, stillbirth, birth injury and starvation.

Additional keywords: autopsy, cause of death, dystocia, neonatal lamb mortality, starvation.

Introduction

Lamb marking percentages in Australia have changed little over most of the past century (Plant 1981), averaging $\sim 78\%$ until quite recently (Martin and Phillips 2011). This is despite improvements in breeding, nutrition and tools for managing pregnant ewes...
Lamb losses among years can be highly variable, ranging between 10% and 77% (Watson 1957; Kelly 1992). Even in well managed flocks, losses below 10% for singles and 30% for twin lambs are rare (Hinch and Brien 2014). Ideally, lamb survival can be maximised by the provision of assistance, food and a benign thermal environment at birth (Alexander and Peterson 1961; Alexander 1980), but, in practice, this is challenging to achieve economically. A report on lamb losses in commercial sheep flocks, based on ultrasound pregnancy diagnosis, demonstrated that little has changed since the early observations, where 16% of single lambs and 31% of twin lambs died before marking (Fowler 2007). Kleemann and Walker (2005) reported, similarly, twin-born lamb mortality being ~35% of total reproductive wastage.

The highest mortality occurs close to the time of birth and among the lightest and heaviest lambs (Alexander et al. 1959). The time of death for the majority of lamb losses falls within the first 3 days of birth (Alexander and Peterson 1961; Brien et al. 2009), declining from the first 24 h to lower levels by the third day (Watson 1957). Haughey (1973b) suggested that satisfactory progress in reducing losses cannot be made until all major causes of neonatal lamb death are identified. Thus, undertaking autopsies from lambs that die within 5 days postpartum is likely to capture the most important information relating to factors associated with lamb losses.

Autopsy methods are predominantly based on the initial guidelines of McFarlane (1965), which were further developed by Haughey (1973b, 1973c) who described lesions of the meninges of the brain and spinal parts of the central nervous system (CNS). The assessment of congestion and the vascular lesions provided information that implicated hypoxia as a causal factor in birth injury, whether as a function of delayed parturition (Haughey 1980), umbilical cord occlusion or rupture, or placental insufficiency (Dutra et al. 2007). Holst et al. (2002) defined the cranial and spinal lesion severity and assigned ordinal scores, which underpin the assignment of autopsied lambs to causes of death. Cranial lesions are significant when meningeal haemorrhage is present on the brain surface. Spinal lesions are significant when haemorrhage is obvious in the vertebral canal and blood is present in the spinal cord.

The present paper reports on the distribution of categories of death in lambs born in diverse environments across Australia as part the Sheep CRCs Information Nucleus Flock and discusses the implications of these observations for ewe management.

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