Review of sheep mortality in the Ethiopian highlands, 1982–86

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SUMMARY

THE FREQUENCY and causes of 1025 deaths observed during 1982–86 in sheep flocks around Debre Berhan, Ethiopia, were analysed retrospectively. Fascioliasis (44.7%) and perinatal losses (18.1%) were the major causes of mortality. Fascioliasis was common during the dry season, and became a major problem during July 1985–June 1986. Perinatal mortality occurred throughout the year, with a peak in the dry season. Five percent of the annual deaths were caused by coenuriasis

INTRODUCTION

In 1985, the mortality rate in sheep around ILCA’s research station in Debre Berhan (2870 m altitude) was 40% (343 deaths; end-of-year population 855). There is evidence that 148 of these animals died after infestation with liver flukes, but there was no direct evidence of the cause of death in most other cases.

Various studies of sheep flock performance provide information on the incidence of lamb mortality in different countries and different farming circumstances, and at different times between birth and weaning. Many authors (e.g. Wiener et al, 1983; Upton, 1985; Wilson et al, 1985) describe the effects of the number of lambs born, parity, management, nutrition and other environmental variables on mortality rate, but only a few (Dennis, 1970, 1974; Otesile et al, 1982; Eales et al, 1983) give information on the actual causes of death.

Stamp (1967) suggested that 12–15% of lambs born die during the first week of life, and that perinatal mortality is one of the major factors limiting sheep production. Wiener et al (1983) found that both infectious and non-infectious causes contribute significantly to the 26% of lamb mortality recorded in a grazing flock in the Scottish uplands. The relative importance of these factors changed with the age of the lamb: while disease was the primary cause of death in lambs younger than 6 weeks, it was only a contributory factor in other disabilities causing a large proportion of deaths in lambs older than 6 weeks. Infectious agents also appeared to be the cause of about 5% of deaths occurring in 0–4 month-old lambs in a hill flock in New Zealand (Dalton et al, 1980); the causes of the other deaths in that flock were undiagnosed.

Otesile et al (1983), who studied sheep mortality in the humid zone of Nigeria, reported that 55% of deaths occurred in sheep under 1 year. The most common pathological conditions were pneumonia (23.2%), haemonchosis (16.3%), peste de petits ruminants (12.2%), and enterotoxemia (11.3%). In Mali, most sheep mortalities were perinatal (18.5%), occurring on the first day of life (Wilson et al, 1985).

Information on the specific causes of sheep mortality is scarce in Africa. This is because while deaths are easily recognised, their causes are difficult to determine. Reid and Armour (1978) attempted an economic appraisal of the effects of helminth parasites by studying losses due to
reduced body growth and condition, liver condemnation, poor grades at slaughter, and mortality. They concluded that a study of deaths alone is likely to underestimate the effects of parasitism on animal productivity.

This paper reports on the most frequent causes of sheep mortality around Debre Berhan, Ethiopia, during 1982–86.

METHODS

Sheep in six flocks, each herded by a shepherd, were monitored daily for signs of ill health. Animals found sick were treated; those that succumbed to illness were necropsied, and the causes of their deaths diagnosed at ILCA’s Animal Health and Reproduction Laboratory. In addition, farm records for the period 1982–86 were examined to establish:

- the total number of sheep in the flocks;
- the year and month of disease;
- the numbers of live and dead sheep in each month during the study period; and
- the ages of the dead animals.

These data were used to calculate annual and seasonal crude death rates. The annual crude death rate was calculated by dividing total annual deaths by the average flock population at the start, middle and end of the year. The seasonal crude death rate was calculated by dividing the total number of sheep that died during a season by the average flock population for that season.

RESULTS

A total of 1025 sheep died in the Debre Berhan area between July 1982 and June 1986. The annual crude death rates for the June–July periods 1982/83, 1983/84, 1984/85 and 1985/86 were 20.8, 16.0, 43.0 and 72.2% respectively (Figure 1).
Figure 1. Annual crude death rates for sheep around Debre Berhan, Ethiopia, July 1982–June 1986.

Fascioliasis, a trematode infection, caused death in 468 sheep averaging 17.8 months (45.7% mortality rate), while perinatal losses accounted for 186 (18.1%) deaths (Table 1). Perinatal losses were associated primarily with first-lambing ewes. Starvation killed 142 lambs averaging 1.1 months (13.8% mortality). *Coenurus cerebralis* was associated with 51 (5%) deaths and unidentified causes with 118 (11.5%) deaths.

Table 1. Causes of sheep mortality, their frequency and age of animals at death, Debre Berhan, Ethiopia, July 1982–June 1986.

<table>
<thead>
<tr>
<th>Cause</th>
<th>Frequency</th>
<th>Age (months) at death</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of dead animals</td>
<td>Percent of total</td>
</tr>
<tr>
<td>Fascioliasis</td>
<td>468</td>
<td>45.7</td>
</tr>
<tr>
<td>Perinatal losses¹</td>
<td>186</td>
<td>18.1</td>
</tr>
<tr>
<td>Mismothering/starvation²</td>
<td>142</td>
<td>13.8</td>
</tr>
<tr>
<td>Unknown</td>
<td>118</td>
<td>11.5</td>
</tr>
<tr>
<td>Coenuriasis</td>
<td>51</td>
<td>5.0</td>
</tr>
<tr>
<td>Condition</td>
<td>Cases</td>
<td>Death Rate</td>
</tr>
<tr>
<td>---------------------------</td>
<td>-------</td>
<td>------------</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>19</td>
<td>1.9</td>
</tr>
<tr>
<td>Diarrhoea</td>
<td>19</td>
<td>1.9</td>
</tr>
<tr>
<td>Accidents</td>
<td>9</td>
<td>0.8</td>
</tr>
<tr>
<td>Bloat</td>
<td>3</td>
<td>0.3</td>
</tr>
<tr>
<td>Congenital defects</td>
<td>3</td>
<td>0.3</td>
</tr>
<tr>
<td>Lungworms</td>
<td>3</td>
<td>0.3</td>
</tr>
<tr>
<td>Gastro-intestinal parasites</td>
<td>1</td>
<td>0.1</td>
</tr>
<tr>
<td>Swayback</td>
<td>1</td>
<td>0.1</td>
</tr>
<tr>
<td>Predation</td>
<td>1</td>
<td>0.1</td>
</tr>
<tr>
<td>Dystocia</td>
<td>1</td>
<td>0.1</td>
</tr>
<tr>
<td>Total</td>
<td>1025</td>
<td>100.0</td>
</tr>
</tbody>
</table>

1 Include stillbirths, abortions and deaths in lambs within 3 days of birth.
2 Comprises weak lambs at birth, poor mothering and milking ability of the dam, and sick dam.
3 n.a. = not available.

Sheep that died of coenuriasis had a mean age of 13.3 months. The majority of the sheep that died of unidentified causes had been purchased from farmers and could not be accurately aged, but 21 had a mean age of 4.1 months at death. Ten rare causes of mortality (less than 2%) were identified, including pneumonia, diarrhoea, bloat, dystocia, predation, accidents (due often to molasses toxicity), congenital defects, lungworms, gastro-intestinal parasites, and swayback.

The seasonal crude death rates (Figure 2) were highest in most years during the dry season. Most sheep died during the 1984/85 and 1985/86 dry seasons, mainly of fascioliasis. This parasitic disease was diagnosed in 282 (71.5%) and 77 (66.4%) sheep that died in the late and early dry seasons of 1985/86 respectively. Perinatal losses ranked second during this period, while in the previous 3 years they were more serious than fascioliasis. Losses ascribed to coenuriasis were low and, like those of neonates, occurred throughout the year.
Figure 2. Seasonal crude death rates for sheep around Debre Berhan, Ethiopia. July 1982–June 1986.
DISCUSSION

Fascioliasis was the primary cause of sheep mortality in Debre Berhan during 1982-86, with the most severe effects from July 1985 to June 1986 (Figure 1). The deaths occurred mainly during the late dry season, following fascioliasis transmission during the wet and early dry seasons. Previous studies in the Debre Berhan area found that fascioliasis transmission was high towards the end of the wet season, resulting in fatalities 8–14 weeks later in the dry season (Scott and Goll, 1977; Jacinta, 1983).

Our data are consistent with data from Nigeria (Ogunrinade and Ogunrinade, 1980; Schillhorn Van Veen, 1979; Schillhorn Van Veen et al, 1980) and suggest that high transmission of fascioliasis in the early dry season, when both feed and animal health are poor, can cause severe mortalities in sheep during the following 34 months.

Severe chronic fascioliasis, which is common in livestock in Africa (Ogunrinade and Ogunrinade, 1980), is aggravated by the poor nutritional status of the hosts (Graber, 1971; Babalola, 1976). Fascioliasis predisposes hosts to other infections, particularly pulpy kidney disease (caused by Clostridium spp) and salmonellosis (Salmonellas pp Ogunrinade, 1978).

Susceptibility to salmonellosis increases 13 weeks after hosts have contracted fluke infection, i.e. when adult flukes arrive in the bile ducts. This observation is consistent with Jacinta’s (1983) observation that sheep mortality in the Ethiopian highlands increases between the eighth and fourteenth week of the dry season. It is therefore possible that the high mortality rate found in this study was due to liver fluke infections acting synergistically with other concurrent infections and poor host nutrition.

Neonatal losses (18.1%) ranked second as the cause of sheep mortality in Debre Berhan during 1982–86. Most of the neonatal deaths occurred in the offsprings of first-lambing ewes within 3 days of birth (perinatal mortality), while 13.8% of deaths occurred in lambs between 4 days and 2 months old (postnatal mortality). The perinatal mortality rate recorded in this study approximates the 22% reported for early lamb mortality in Australia by Dalton (1979). Eales et al (1983) and Haughey (1983).

Neonatal mortality occurred throughout the year with peaks during the late and early dry seasons. Lambs born during the dry season were more likely to die than those born at other times of the year (Wilson et al, 1985). Although neonatal losses appeared to be associated with lamb weakness at birth or poor mothering and milking abilities of the dam, their exact causes are frequently unknown (Dalton, 1979). In Australia about 65% of perinatal lamb losses were caused by the so-called starvation-mismothering-exposure (SME) complex (Haughey. 1983), a syndrome comprising birth injuries, cold-induced starvation, abnormal behaviour of newborn lambs, inadequate milk supply and udder and teat abnormalities.

CONCLUSION

ILCA’s study of sheep mortality around Debre Berhan during 1982–86 confirmed that fascioliasis and neonatal lamb losses are serious problems in the Ethiopian highlands. Lungworms, diarrhoea, gastro-intestinal parasites, coenuriasis and swayback were also encountered, causing relatively low lamb losses (<5%). While most of these rare causes of lamb mortality can be circumvented, swayback should be thoroughly investigated because it may be
a flock problem. Intensive surveillance at the flock level and accurate diagnosis of the specific causes of deaths are needed if sheep mortality in the area is to be controlled effectively.

REFERENCES


