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Lamb mortality on agricultural research stations

K.P. Croker

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LAMB MORTALITY ON AGRICULTURAL RESEARCH STATIONS

By K. P. CROKER, B.Sc. (Agric.), Adviser, Sheep and Wool Branch

Progress report of a study of lamb losses in experimental flocks on Department of Agriculture research stations in the agricultural areas.

THE major barrier to increased production by the West Australian sheep and wool industry is the shortage of sheep in the agricultural areas of the State, and much research has been directed towards overcoming this shortage.

Reproductive wastage—the failure of ewes to produce lambs, plus death of lambs soon after birth—limits the rate at which this shortage can be overcome.

Deaths of lambs are responsible for nearly 40 per cent. of the reproductive wastage, and if these lamb losses could be reduced sheep numbers could be greatly increased.

Lamb mortality surveys

The importance of lamb losses in W.A. was emphasised by the results of two surveys of a number of Shires conducted during 1958. In 1963 an investigation into the causes of lamb losses was started by the Department of Agriculture’s Animal Division. Dr. S. M. Dennis, former Senior Veterinary Pathologist,* has published progress reports on the findings in earlier issues of the Journal of Agriculture. Concurrent with this survey, dead lambs from various experiments on the Department’s Research Stations were autopsied for cause of death.

Results on research stations

Level of lamb mortality

Lamb carcasses were collected on the research stations during 1964, 1965 and 1966. In the research station Merino flocks surveyed, 6,121 lambs were born during the three years, and of these 871 died before marking. The lamb mortality to marking was 14.2 per cent. Of the total dead, 773 (88.7 per cent.) were examined and the time of death was assessed after post mortem examination. Some corpses were too decomposed or mutilated for time of death to be accurately determined. The observations that follow are based on the 88.7 per cent. carcasses classified.

Crossbred lamb carcasses were collected on Avondale Research Station, Beverley, during 1965 and 1966. Border Leicester x Merino ewes were mated to Southdown rams in a number of experiments at Avondale and 764 lambs were born in the flocks used in the survey. Sixty-four of these lambs died before marking (8.4 per cent. lamb mortality) and of these, 52 carcasses (81.3 per cent.) were examined and classified according to the time of death.

In the Corriedale flocks at the Esperance Downs Research Station, Gibson, during 1966, 1,240 lambs were born and 168 (13.5 per cent.) died before marking; 155 dead lambs (92.3 per cent. of the total dead) were examined.

* Now Professor of Veterinary Pathology, Kansas State University, U.S.A.
The combined results of deaths in each breed from the Research Stations are recorded for each year of the survey in Table 1. The total number of lambs considered each year is listed with the percentage lamb mortality recorded.

**Cause of Deaths**

All lambs examined were classified according to time of death and were placed in one of three main categories, namely:

- **APD**—Anteparturient death (died before the birth process began)—0.9 per cent.
- **PD**—Parturient death (died during birth)—21.1 per cent.
- **PPD**—Post-parturient death (died after birth)—78.0 per cent.

More than three quarters of the lambs died after birth, a fifth died during birth and only a very small proportion were dead before the birth process began.

The classifications have been grouped into broad categories. The main causes of lamb losses on the Research Stations were—

- Starvation/mismothering/exposure complex.
- Dystocia (difficult birth).
- Immediate post-parturient death (assumed to be the result of a slow or difficult birth).
- Late post-parturient death (accidents or due to infection).

The lamb mortality caused by each class of death is recorded in Table 2.

The crossbred ewes lost a noticeably lower proportion of lambs during and immediately after birth, but there was no clear breed difference in incidence of starvation/mismothering losses. This suggests that crossbred ewes give birth more easily than Merinos and Corriedales and that the three breeds are more-or-less equally able to mother-up and feed lambs which do not die very soon after birth.

Infections can cause lamb deaths in all classifications. It is difficult to determine an accurate percentage mortality resulting from infection, as infection is not necessarily the sole cause of death. However the post-mortem examination of carcasses indicated that infections were only involved in a low proportion of lamb mortalities.

**Table 1.—Lamb mortality on research stations**

<table>
<thead>
<tr>
<th></th>
<th>1964</th>
<th>1965</th>
<th>1966</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Merino</td>
<td>Merino</td>
<td>Crossbred</td>
</tr>
<tr>
<td>Number born</td>
<td>1,749</td>
<td>1,910</td>
<td>382</td>
</tr>
<tr>
<td>Per cent. mortality</td>
<td>14.4</td>
<td>14.5</td>
<td>7.1</td>
</tr>
</tbody>
</table>

**Table 2.—Percentage mortality caused by each class of death**

<table>
<thead>
<tr>
<th></th>
<th>1964</th>
<th>1965</th>
<th>1966</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Merino</td>
<td>Merino</td>
<td>Crossbred</td>
</tr>
<tr>
<td>Lamb mortality</td>
<td>14.4</td>
<td>14.5</td>
<td>7.1</td>
</tr>
<tr>
<td>Starvation/mismothering</td>
<td>6.7</td>
<td>5.0</td>
<td>3.7</td>
</tr>
<tr>
<td>Dystocia</td>
<td>1.7</td>
<td>3.2</td>
<td>0.5</td>
</tr>
<tr>
<td>Early deaths</td>
<td>2.6</td>
<td>2.5</td>
<td>0.8</td>
</tr>
<tr>
<td>Late deaths</td>
<td>1.7</td>
<td>1.3</td>
<td>1.0</td>
</tr>
<tr>
<td>Others and unclassified</td>
<td>1.7</td>
<td>2.5</td>
<td>1.1</td>
</tr>
</tbody>
</table>
The results of this survey conducted on the Research Stations provide some interesting information.

**Causes of perinatal lamb losses**

**Time of lambing**

The Department of Agriculture advocates a late winter-early spring lambing. Experiments have shown that lamb mortality is no higher in the late lambing groups than occurs in the autumn lambing ewes at most localities. This is so both with Merinos and crossbred ewes (Merino x Border Leicester). The figures in Table 3 illustrate the levels of difference experienced on the Research Stations.

At Newdegate the situation was confusing. In 1964 the mid-July lambing group had a significantly higher level of lamb mortality than did the May lambing group (38.5 per cent. compared with 23.3 per cent.). There was no large difference in 1965. During 1966 four times of lambing were compared and the late group, which commenced lambing at the start of August had a much lower level of mortality than the earlier groups. The mortality figures were: May—28.9 per cent.; June—25.0 per cent.; July—30.8 per cent.; August—5.6 per cent.

No large difference in lamb mortality between groups lambing early or late can be established from these figures.

**Stocking rate**

In several parts of the world stocking rate has been recognised as the factor of greatest importance in raising animal production per acre. Much research has been carried out investigating various aspects of stocking rates, and in the *Journal of Agriculture*, for October, 1966, some of the larger projects in Western Australia were reviewed.

One would expect that lamb mortality would increase with increased stocking rates. Analyses of the mortality figures from the Rate of Stocking and Rate of Super experiment at Avondale Research Station showed no significant difference between the four stocking rates in 1964, 1965 and 1966.

The combined lamb mortality results for the three years were:—2 ewes per acre—14.9 per cent.; 2½ ewes per acre—12.8 per cent.; 3½ ewes per acre—12.0 per cent.; 4 ewes per acre—12.7 per cent.

In this experiment stocking rate has obviously not influenced the level of mortality.

**Clover versus non-clover pastures**

It has been suggested that ewes running on subterranean clover continually may have a higher lamb mortality than ewes not on clover and to investigate this, mortality figures from the Clover Infertility Definition Trials at Avondale and Newdegate Research Stations were compared. In these trials the breeding performance of ewes running continuously on clover is compared with that of ewes which never graze green clover, over a number of years.

Percentage lamb losses to marking varied widely between groups and between seasons at Avondale. The differences between groups were not large in three of the years, but there were significantly more deaths on oats in 1963, and, by contrast, significantly more deaths in the clover group in 1965.

<table>
<thead>
<tr>
<th>Research station</th>
<th>Breed</th>
<th>Lamb mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Early lambing</td>
</tr>
<tr>
<td>Merredin (64, 65, 66)</td>
<td>Merino</td>
<td>11.3</td>
</tr>
<tr>
<td>Wongan Hills (64, 65, 66)</td>
<td>Merino</td>
<td>7.0</td>
</tr>
<tr>
<td>Badgingarra (65, 66)</td>
<td>Merino</td>
<td>11.5</td>
</tr>
<tr>
<td>Newdegate (64, 65)</td>
<td>Merino</td>
<td>23.5</td>
</tr>
<tr>
<td>Avondale (64, 65, 66)</td>
<td>Crossbred</td>
<td>8.8</td>
</tr>
</tbody>
</table>
Table 4.—Lamb mortality on clover and non-clover pastures

<table>
<thead>
<tr>
<th>Research station</th>
<th>Year</th>
<th>Clover group</th>
<th>Non-clover group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avondale</td>
<td>1961</td>
<td>15</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>1962</td>
<td>5</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>1963</td>
<td>3</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>1964</td>
<td>21</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>1965</td>
<td>15</td>
<td>4</td>
</tr>
<tr>
<td>Newdegate</td>
<td>1965</td>
<td>9</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>1966</td>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

At Newdegate the oat group had more lamb deaths than the clover group in 1965. This was due to underfeeding of the ewes in late pregnancy, so these results must be disregarded. In 1966, after two years grazing of the pastures, there was no significant difference in lamb mortality between the clover and oats group.

When all years are considered, the two clover disease definition experiments do not suggest that clover necessarily caused severe lamb mortalities, although there is no doubt that it progressively reduced ewe fertility.

Shedding

An experiment conducted at Esperance Downs Research Station during 1966 compared mortality in flocks lambing under standard field conditions with that in flocks lambing down in pens in a shed.

Ewes expected to drop lambs within the following 24 hours were shedded in the fold groups. Each morning the ewes that had lambed were removed to yards around the shed until the lambs had mothered-up successfully and were strong and healthy. All other lambing occurred outside.

A slightly lower level of mortality occurred in the shedded groups, 11.1 per cent compared with 13.6 per cent. in the non-sheded groups.* This difference is not statistically significant. Less dystocia deaths were recorded in the shedded groups than in the groups lambing down outside.

The ewes lambing down under normal field conditions were subjected to relatively mild conditions in 1966. If the weather had been more severe, as is often the case, different results might have been obtained.

Single versus multiple births

Having a large number of multiple births in a flock is one way of improving lambing percentage. This allows for more sheep to be available for selection or to help increase the size of flocks where properties are understocked.

Observations on some of the research stations over the last three years confirm the general belief that the mortality rate is higher among twin-born than among single lambs. The combined mortality figures from Merredin, Newdegate and Wongan Hills Research Stations (Table 5) show that usually the level of lamb mortality in twins is about twice that of singles.

Turner (1964) has shown that as long as the survival rate of the twins is greater than half the survival rate of the singles the total number of lambs weaned will be greater than if all the births had been singles. The research station figures show that with twins there is an advantage in total lambs surviving even when the mortality is much higher than that of the singles. In each of these cases the survival rate of the twins is more than half that of the singles.

Conclusions

• The level of lamb mortality (all breeds combined) on the research stations in 1964-66 was about 14 per cent. of all lambs born.

* Details provided by Sheep and Wool Adviser T. Marshall and Veterinary Surgeon M. T. Back, Department of Agriculture, Esperance

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Table 5.—Levels of mortality among single and twin-born lambs

<table>
<thead>
<tr>
<th>Research station</th>
<th>Single lambs</th>
<th></th>
<th>Twin lambs</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mortality rate</td>
<td>Survival rate</td>
<td>Mortality rate</td>
<td>Survival rate</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Newdegate</td>
<td>18·5</td>
<td>81·5</td>
<td>37·2</td>
<td>62·8</td>
</tr>
<tr>
<td>Merredin</td>
<td>9·4</td>
<td>90·6</td>
<td>21·2</td>
<td>78·8</td>
</tr>
<tr>
<td>Wongan Hills</td>
<td>6·6</td>
<td>93·4</td>
<td>12·5</td>
<td>87·5</td>
</tr>
</tbody>
</table>

- Starvation/mismothering was the major cause of loss (41.1 per cent. of all dead lambs or about 6 per cent. of lambs born). Difficult and prolonged births were also responsible for a high proportion of the lamb deaths (35 per cent. or about 5 per cent. of lambs born).
- Infections did not appear to cause severe loss of lambs on the research stations (less than 5 per cent. of deaths, which is less than 1 per cent. of births).
- Late winter lambing was not associated with higher lamb mortality than autumn lambing.
- Increased stocking rates did not lead to increased lamb deaths.
- Clover may affect the incidence of lamb losses, but experiments have not given consistent results.
- An experiment at Esperance suggested that some lambs could be saved when ewes due to lamb were shedded. Some ewe and lamb deaths could be avoided by close attention.
- Mortality among twins was about twice that among single lambs but twinning still gave a useful increase in the number of lambs raised.

Lamb mortality levels varied considerably on the different research stations. Differences in breed, body condition and husbandry are assumed to be largely responsible for this. The highest level of lamb mortality was on the Newdegate Research Station, the station with the greatest "clover disease" problem.

Acknowledgments

The information in this report is drawn from records of numerous experiments under the control of officers of the Sheep and Wool Branch on research stations in the agricultural areas.

Post mortem examinations were carried out by veterinary officers of the Animal Division at South Perth and district offices of the Department, whose assistance is gratefully acknowledged.

Acknowledgment is also made of the cooperation of research station managers and staff in collection lamb carcasses for examination and maintaining accurate lambing records for all experiments.

References

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