A SURVEY OF BORDER LEICESTER REPRODUCTIVE EFFICIENCY

A. O. TROUNSON* and E. M. ROBERTS*

Summary

Data have been analysed from the British Breeds’ Flock Books for 1966 and 1967 on the reproductive efficiency of Border Leicester studs (147 in 1966 and 140 in 1967) with 200 or more breeding ewes. This has revealed poor net reproductive efficiency in contrast to the breed’s proclaimed ability to produce large numbers of multiple births. A mean of 86 per cent of lambs reaching seven months of age, based on the number of ewes joined, is an indication of some failure in reproductive ability. The literature suggests that a high proportion of ewes failing to establish and maintain pregnancy, and a high lamb mortality, are contributory factors to these low net reproductive efficiencies.

I. INTRODUCTION

The Border Leicester breed has a reputed ability to produce large numbers of multiple births; for example, Nichols (1926) quotes a 181 per cent lambing for 12 intensively managed flocks in the United Kingdom. Yeates (1965), in a figure illustrating lambing percentages in different breeds, nominates Border Leicesters in the vicinity of 180 per cent and McGuirk (1967) reports 60 per cent of a ewe flock at Cowra as having twins.

A survey of net reproductive efficiency of Border Leicesters in New South Wales, Victoria and Queensland from data available in the 1967, 1968 and 1969 volumes of the Flock Books for British Breeds of Sheep in Australia was made in order to allow choice between studs when purchasing rams. This has provided information that may encourage a closer scrutiny of problems, often observed by commercial breeders, that are associated with the breeds’ reproductive performance.

II. MATERIALS AND METHODS

Data used from the Flock Books were based on the number of ewes put to the ram for the 1966 and 1967 lamblings and the addition of ram and ewe lambs present in the flock on May 1, 1967 and 1968. The net reproductive efficiency in this paper is therefore defined as the percentage of lambs alive at approximately

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seven months of age based on ewes joined to the ram. Where there were obvious differences between ewe and ram lamb numbers when ram lambs had been sold, the ewe lamb figure was doubled.

The population for the survey has been drawn from a wide range of environmental areas within the eastern states. There was no classification on area, the only restriction on sampling being on flock size. One hundred and forty-seven flocks with 200 or more breeding ewes have been analysed for 1966 net reproductive efficiencies, 140 of which were analysed again in 1967. Twenty flocks with 100 to 149 breeding ewes and twenty with 150 to 199 breeding ewes were also surveyed in each year.

The Border Leicester Breed Society insists on a 10 per cent culling of lambs. As this should be a constant source of lamb loss, a correction of 10 per cent was added to all lamb numbers present at March 1. All other sources of reproductive wastage were included in the net reproductive efficiency.

An examination was made of rainfall records and seasonal pasture evaluation in the 1966 and 1967 issues of the Pastoral Review and Graziers Record for four areas, the Eastern Riverina, Southern Tablelands and Central Western Plains of N.S.W., and the Upper North country of Victoria. These areas were chosen because they represent some of the major Border Leicester stud concentrations in Eastern Australia.

III. RESULTS

Total population figures and percentages are summarised in Table 1 from data in the respective Flock Books. Studs from the three eastern States, New South Wales, Victoria and Queensland, represent 85 per cent of the total Australian Stud Border Leicester ewe population. The percentage distribution of flock size in terms of the number of breeding ewes was 30 per cent < 50; 57 per cent < 100; 72 per cent < 150; 81 per cent < 200 in the eastern States during 1966 and 1967. The main portion of the survey was concerned with studs that have 200 or more breeding ewes as they represent 54 per cent of the breeding ewes in the States covered by the survey.

Table 2 gives a summary of corrected net reproductive efficiencies of studs grouped below 60 per cent and in 10 per cent groups above 60 per cent.

The corrected means and standard deviations for net reproductive efficiency were 86 ± 23.4 per cent and 86 ± 19.9 per cent in 1966 and 1967 respectively.

### TABLE 1

*Distribution of stud breeding ewes in Australia*

<table>
<thead>
<tr>
<th></th>
<th>Number of Breeding Ewes</th>
<th>Percentage of Australian Total</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1966</td>
<td>1967</td>
<td>1966 (%)</td>
<td>1967 (%)</td>
</tr>
<tr>
<td>N.S.W., Vict., Q'ld.</td>
<td>104,809</td>
<td>113,201</td>
<td>84.3</td>
<td>85.3</td>
</tr>
<tr>
<td>Other States</td>
<td>19,545</td>
<td>19,457</td>
<td>15.7</td>
<td>14.7</td>
</tr>
<tr>
<td>Survey: flocks&gt;200</td>
<td>57,342</td>
<td>60,728</td>
<td>46.1</td>
<td>45.8</td>
</tr>
<tr>
<td>Total Australia</td>
<td>124,554</td>
<td>132,682</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

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These mean percentages are compared in Table 3 with the net reproductive efficiencies of flocks randomly chosen from studs with 100 to 149 and 150 to 199 breeding ewes.

The records of rainfall and pasture conditions indicated that 1966 was slightly above average, while 1967 was well below average in the four areas examined.

The analysis of variance shown in Table 4, testing differences in flock size, years and the interaction of flock size and year, is made using flocks within sizes as the error term for stud size, while flocks within sizes by years is the error term for the other mean squares. The mean squares for stud size, years and stud size by years are smaller than their errors and hence non-significant.

The number of ewes mated to registered rams in flocks \( >200 \) breeding ewes were 51.0 and 52.5 ewes/ram in 1966 and 1967 respectively.
TABLE 4

Analysis of variance of studs for net reproductive efficiency

<table>
<thead>
<tr>
<th>Source of Variations</th>
<th>df</th>
<th>MS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stud size</td>
<td>1</td>
<td>664</td>
</tr>
<tr>
<td>Flocks within sizes</td>
<td>38</td>
<td>6679</td>
</tr>
<tr>
<td>Years</td>
<td>1</td>
<td>286</td>
</tr>
<tr>
<td>Stud size x years</td>
<td>1</td>
<td>112</td>
</tr>
<tr>
<td>Flocks within sizes x years</td>
<td>38</td>
<td>683</td>
</tr>
</tbody>
</table>

IV. DISCUSSION

The results presented indicate that Border Leicester studs in eastern Australia have net reproductive efficiencies well below that expected for the breed. It appears that the only estimate of lambing performance is based on Nichols (1926) whose results were obtained from a survey questionnaire in one year from 12 flocks that were receiving a high level of nutrition from supplementary feeding; the average flock size being only 18 ewes. Even though 59 per cent of studs in eastern Australia have less than 100 breeding ewes, the variability between years of “ewes put to the ram” and “lambs present at March 1” is extremely large and probably reflects management procedures not relevant to large commercial studs. The results for studs in the range of 100 to 199 breeding ewes do not show any advantage in net reproductive efficiency that may be expected from the more intensive management possible in smaller studs, the trend being to even lower values than those with more than 200 breeding ewes. Any effect of poor nutrition in 1967 is probably nullified by the wide range of environment the survey covers and the large variance within flocks between years probably associated with other factors. McGuirk’s (1967) values for lambs born and lambs weaned as a percentage of ewes joined being 93.8 and 80.0 respectively, would appear to be more realistic for eastern Australian conditions. They would tend to support the mean of 86 per cent for net reproductive efficiency found in this survey.

The reproductive wastage could be due to a large number of factors, including flock management, nutrition, age structure of the ewes within the flock, ram fertility and joining practices; however, certain trends have appeared in flocks under close observation. McGuirk (1967), from observations over a five-year period, found that in a flock mated for five weeks there were only 62 per cent of ewes lambing per ewes joined while nearly all the ewes were raddled by the rams. This indicates some inability of the ewes to establish or maintain pregnancy.

Young and Purser (1962) suggest that lamb mortality is high in this breed and Smith (1964) recorded deaths of 46.6 per cent and 68.4 per cent of lambs born and 33.7 per cent and 22.7 per cent of lambs born in two years for twins and singles respectively. McGuirk (1967) confirms this finding with a 20 per cent lamb loss of those ewes born against less than 7 per cent for Merino and the reciprocal crosses with the Border Leicester. Lamb survival, if low, could be a major contribution to low net reproductive efficiencies as lamb numbers are recorded at approximately seven months of age.
McGuirk (1967) has evidence that pneumonia in breeding ewes and possibly lambs may be correlated with lower reproductive performance and Smith (1964) found lesions of pneumonia in the lungs of some lambs in the age group five to ten days post-parturition.

These results do not provide sufficient evidence to accurately diagnose the cause nor even determine where the reproductive wastage is occurring; but they do highlight the fact that the Border Leicester breed in eastern Australia as a whole does have a low net reproductive efficiency.

V. REFERENCES


