INFLUENCE OF THE TIMING OF SHEARING AND JOINING ON PRODUCTIVITY OF SHEEP IN THE ARID ZONE OF WESTERN NEW SOUTH WALES

J.P. KENNEDY,* I.H. AULDIST,* S.J. GRAY* and J.A. REYNOLDS*

SUMMARY

Two experiments with strong wool Merino sheep were conducted near Broken Hill in far western New South Wales. In one, ewes were shorn in either 'autumn or spring for six years. In the other, ewes were joined in either December or March and were shorn in February/March, April/May, August or October/November for three years. In both studies there was a significant correlation between the rate of wool growth and rainfall in the woolgrowing period. When wool growth was corrected for rainfall, shearing time did not have a significant effect on wool growth. Losses of ewes and the percentages of dry ewes did not differ between shearing times but there were more dry ewes in the December-joined flock than in the March-joined flock.

INTRODUCTION

In the arid zone of western New South Wales two of the most important management decisions are likely to be when to join (and therefore lamb) and when to shear. We have shown (Kennedy, 1978) that net reproduction rate from joinings in January, April, June, August or November was highest from the April joining, however, all sheep were shorn in February/March so it was not possible to test for interactions between time of shearing and joining nor to examine any influence of the time of shearing on productivity or survival. Wilson (1979) reported that in north-western Queensland, November-shorn sheep cut 0.4 kg more greasy wool than their counterparts shorn in June and, in Western Australia, sheep shorn in April produced 0.23 kg more clean wool than sheep shorn in October (Lightfoot, 1967).

Two studies of the influence of the time of shearing on productivity of sheep in far western New South Wales were conducted. In the first, sheep were shorn in either autumn or spring and, in the second, sheep were shorn at one of four times in the year and joined in either December or March.

MATERIALS AND METHODS

The experiments were conducted on Fowlers Gap Research Station, 110 km north of Broken Hill in far western New South Wales. The sheep were Merinos of the strong wool strain.

Experiment 1

In September, 1973, 417 two- and three-year old ewes were chosen from the Collinsville type sheep on the station and randomly allocated to two groups of approximately equal size (TA and TB). Ewes in the TA group were shorn in March or April and the TB group were shorn in September or October, from 1974 to 1978 inclusive. All ewes were finally shorn on February 28, 1979. All ewes were joined in December, 1973 and 1974, February, 1976 and 1977 and January, 1978. Young ewes were added to each group in 1975 and 1976. The sheep grazed together in the one paddock at all times.

* School of Wool and Pastoral Sciences, The University of New South Wales, P.O. Box 1, Kensington, N.S.W. 2033.
Experiment 2

In December 1976, 554 Bungaree-type ewes were randomly divided into eight groups of approximately equal size and age composition. Sheep in four of the groups were joined with rams in December from 1976 to 1979 while the remaining ewes were joined in March from 1977 to 1980.

The ewes were shorn on either February 8, 1977 or March 21, 1977. Subsequently, one group of ewes from each joining time treatment was shorn in February/March, April/May, August, and October/November. The design therefore was a factorial with two joining times and four shearing times. The experiment concluded in February 1981 when all sheep were shorn. The ewes grazed in the same paddock except during the joining and lambing periods each year.

Collection of data

At each shearing the weight of greasy fleece wool was recorded and a mid-side sample was collected and later scoured to determine yield. In some years vegetable matter content also was determined. Weights of clean fleece wool were calculated and divided by the number of days between shearings to provide an estimate of average clean wool growth per day.

At the conclusion of each lambing the number of ewes and lambs present at marking and the number of ewes which had not lambed (dry), had lambed but were not rearing any lambs, and were rearing lambs, were recorded. Whenever the ewes were yarded, those which were suffering from fly-strike were treated and recorded. Ewes were crutched approximately six months before shearing each year.

Rainfall for the duration of the experiments varied greatly between and within years. The annual rainfall (mm) from 1973 to 1980 inclusive were 396, 629, 309, 275, 64, 298, 275, and 146. The rainfall from December 1973 to November 1974 was exceptionally high for the region whereas drought conditions prevailed throughout 1977 and until May, 1978.

RESULTS

Experiment 1

Average rates of wool growth over the periods between successive shearings are shown in Table 1. The overall mean rate of wool growth was 0.57 g/d higher in spring-shorn than autumn-shorn sheep but this difference was not significant. In wool shorn in spring 1974, there was much greater contamination by vegetable matter than at any other time. This resulted from growth of Noogoora burr (Xanthium pungens) in the paddock following heavy rain in the summer of 1973/74. In other years the vegetable matter % was low and similar in the two groups.

The regression relationships between mean daily wool growth (W, g/day) and rainfall during the woolgrowing period (R, mm) were calculated for each time of shearing and were not significantly different so all the data were pooled to derive the following relationship: \[ W = 6.98 + 0.0096 (\pm 0.009)R \] \[ (r = 0.958). \]

Losses of ewes between successive lamb markings were similar in each group (Table 1). Heavy losses occurred in both groups in the summer of 1973/74 when the paddock was flooded.

In the first three years there were significantly more dry ewes in the spring-shorn group however in 1978 there were significantly more dry ewes in the autumn-shorn group and there was no difference between the groups in 1977 and overall.

The environmental conditions throughout 1974 were favourable for the development of blowfly strike. The sheep were checked in February, March, July and October. On the first of these occasions, 11.9% of autumn-shorn sheep were struck...
compared with 3.6% of spring-shorn sheep. On the other occasions there was no difference between groups in the proportions of struck sheep (3.2% vs. 3.2%; 4.5% vs. 6.0% and 0.7% vs. 0.0% in autumn vs. spring-shorn).

TABLE 1 Mean (+ S.E.) annual rates of growth of clean wool, losses of ewes between successive lamb markings and percentages of dry ewes at lamb marking.

<table>
<thead>
<tr>
<th>Experiment</th>
<th>Time of shearing</th>
<th>Wool growth (g/d)</th>
<th>Losses of ewes (%)</th>
<th>Dry ewes (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mean S.E.</td>
<td>Mean S.E.</td>
<td>Mean S.E.</td>
</tr>
<tr>
<td>1</td>
<td>Autumn</td>
<td>9.96 1.52</td>
<td>16.2 3.6</td>
<td>42.2 8.4</td>
</tr>
<tr>
<td></td>
<td>Spring</td>
<td>10.53 2.02</td>
<td>15.6 2.8</td>
<td>46.4 4.7</td>
</tr>
<tr>
<td>2(i) Joined in December</td>
<td>February/March</td>
<td>9.45 1.10</td>
<td>7.7 3.4</td>
<td>24.4 2.0</td>
</tr>
<tr>
<td></td>
<td>April/May</td>
<td>9.71 1.56</td>
<td>9.5 5.0</td>
<td>20.5 2.7</td>
</tr>
<tr>
<td></td>
<td>August</td>
<td>9.90 1.41</td>
<td>8.9 5.9</td>
<td>19.4 3.2</td>
</tr>
<tr>
<td></td>
<td>October/November</td>
<td>10.70 1.15</td>
<td>12.5 5.7</td>
<td>19.1 3.4</td>
</tr>
<tr>
<td>(ii) Joined in March</td>
<td>February/March</td>
<td>9.52 1.15</td>
<td>9.8 2.1</td>
<td>14.8 2.2</td>
</tr>
<tr>
<td></td>
<td>April/May</td>
<td>9.37 1.39</td>
<td>8.9 2.7</td>
<td>15.2 8.5</td>
</tr>
<tr>
<td></td>
<td>August</td>
<td>10.47 1.45</td>
<td>6.1 2.0</td>
<td>17.5 8.5</td>
</tr>
<tr>
<td></td>
<td>October/November</td>
<td>10.64 1.18</td>
<td>12.1 4.9</td>
<td>14.3 10.6</td>
</tr>
</tbody>
</table>

Experiment 2

The mean rate of wool growth in sheep shorn in October/November was higher than for sheep shorn at other times (Table 1), however, analysis of covariance, with rainfall in the wool growth period as the covariate, revealed that time of shearing was not a significant effect. Regression relationships between mean daily wool growth (W, g/day) and rainfall during the woolgrowing period (R, mm) were calculated for each shearing time and regression coefficients were found to be homogenous. The pooled relationships for each shearing time were:

\[ W = 7.26 + 0.0103 (\pm 0.0075)R \quad (r = 0.8861) \]
\[ W = 7.03 + 0.0117 (\pm 0.0097)R \quad (r = 0.8550) \]
\[ W = 3.37 + 0.0280 (\pm 0.0107)R \quad (r = 0.9649) \]
\[ W = 8.12 + 0.0104 (\pm 0.0309)R \quad (r = 0.4232) \]

for the February/March, April/May, August and October/November shearings, respectively.

Month of joining had a significant effect on the proportions of dry ewes, owing to more December-joined ewes being dry than March-joined ewes. Time of shearing and the interaction were not significant effects.

Analysis of variance of arcsine transformed percentages of ewes lost (Table 1) revealed that neither the main effects nor the interaction were significant although within the December-joined group losses were highest in the October/November shorn ewes in three of the four years. In the spring-summer of 1978/79, 0.0%, 3.6%, 1.7% and 6.0% of ewes were flystruck in groups shorn in February, April, August, and November, respectively.
DISCUSSION

The evidence from these experiments leads to the conclusion that time of shearing usually has no significant effect on production in arid western New South Wales. Rainfall was very variable both within and between years and the main effect on wool growth was total rainfall during the wool growth period which was very significantly correlated with the rate of wool growth. Graetz (1980) obtained a similar result for a property in the same region but the dependence of annual wool production on rainfall was greater in our study than in his.

Chudleigh (1971) found that an important reason given by pastoralists for choosing a particular shearing time was control of blowfly strike. Our results do not support this because there were no significant differences in either experiment in losses of sheep shorn at different times although, in the second experiment, losses in three out of four years were highest in ewes shorn in October/November and more of these ewes were flystruck in spring-summer of 1978/79.

Overall, there was no significant effect of shearing time on vegetable matter content of the wool which agrees with survey information collected in the Western Division by Warr et al. (1979). In the one year, however, when Nooogoora burr flourished in the paddock there was appreciably less burr contamination in autumn-shorn wool than in spring-shorn wool.

The effect of shearing time on reproductive performance of the ewes was inconsistent and overall was not significant. It was shown again that autumn joining was superior to early summer joining (Kennedy 1978) and there was no interaction with shearing time.

ACKNOWLEDGEMENTS

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REFERENCES