THE EFFECT OF UREA BLOCK SUPPLEMENTATION ON THE UTILISATION OF ROUGHAGE BY SHEEP

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Summary

Blocks containing urea were provided to groups of penned sheep fed ad libitum on roughage of either 2.3 % or 5.1 % crude protein content and the results were compared with unsupplemented groups. One block contained 7.1% urea with finely ground sorghum, distillers solubles, common salt and rock phosphate. The other block contained 30.070 urea with common salt, rock phosphate, molasses and pollard. When the low protein roughage was fed, the low urea block, at the end of 103 days, had significantly increased survival rate and clean fleece weight, and decreased body weight loss. Roughage intake was increased by 2.6 times. The high urea block significantly increased survival rate but did not affect body weight loss nor clean fleece production. When the medium protein roughage was fed, the low urea block, at the end of 75 days, had significantly increased body weight gain and clean fleece production but roughage intake was not significantly different from the unsupplemented group. No significant differences were observed when the high urea block was fed with this roughage.

I. INTRODUCTION

It has been observed in trials with penned sheep that urea supplements combined with cereal grains or molasses can increase the utilization of low-protein roughages (Briggs et al. 1960; Coombe and Tribe 1963). However Tulloh, Watson and Burnell (1963) did not obtain a response when urea at a level of 10% was partly substituted for wheat in a block fed to sheep grazing a pasture with an average crude protein content of 5.9%. Beames (1963) obtained a response in body weight gain from pen-fed cattle when a block containing 40% urea was fed with a roughage of 3.5 % crude protein.

The aim of the trial reported in this paper was to examine the effect of blocks containing levels of urea similar to that used by Tulloh, Watson and Burnell and that used by Beames in sheep fed two roughages of different protein contents.

II. EXPERIMENTAL

The trial commenced in February 1964 at Temora Agricultural Research Station, New South Wales. The sheep used were 48 Corriedale and 48 Polwarth wethers, aged three years, which had grazed together from weaning.

The sheep were shorn on February 7, and weighed the following day after a 15-hour fast. Six groups containing eight Polwarths and eight Corriedales were selected by restricted randomization on body weight. On February 20, groups were assigned at random to the six treatments as shown in Table 1. The

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<table>
<thead>
<tr>
<th>Group No.</th>
<th>Treatment*</th>
<th>Nos. of Survivors</th>
<th>Initial Mean Body Weight ± S.E.M. (kg)</th>
<th>Final Mean Body Weight ± S.E.M. (kg)†</th>
<th>Mean Daily Intake Roughage (oven dry) (g)</th>
<th>Food Block (g)</th>
<th>Mean Clean Fleece Weight ± S.E.M. (g)§</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Low protein roughage <em>ad libitum</em></td>
<td>4</td>
<td>45.7 ± 1.4</td>
<td>26.7 ± 1.6</td>
<td>290</td>
<td>—</td>
<td>360 ± 50</td>
</tr>
<tr>
<td>2</td>
<td>Low protein roughage <em>ad libitum</em> + high urea block <em>ad libitum</em></td>
<td>12</td>
<td>43.8 ± 1.1</td>
<td>26.9 ± 0.7</td>
<td>340</td>
<td>13</td>
<td>320 ± 20</td>
</tr>
<tr>
<td>3</td>
<td>Low protein roughage <em>ad libitum</em> + low urea block <em>ad libitum</em></td>
<td>16</td>
<td>43.2 ± 1.3</td>
<td>43.2 ± 1.9</td>
<td>760</td>
<td>335</td>
<td>550 ± 40</td>
</tr>
<tr>
<td>4</td>
<td>Medium protein roughage <em>ad libitum</em></td>
<td>16</td>
<td>43.3 ± 1.4</td>
<td>41.5 ± 1.3</td>
<td>940</td>
<td>—</td>
<td>490 ± 40</td>
</tr>
<tr>
<td>5</td>
<td>Medium protein roughage <em>ad libitum</em> + high urea block <em>ad libitum</em></td>
<td>16</td>
<td>42.0 ± 1.4</td>
<td>42.4 ± 1.4</td>
<td>920</td>
<td>21</td>
<td>490 ± 30</td>
</tr>
<tr>
<td>6</td>
<td>Medium protein roughage <em>ad libitum</em> + low urea block <em>ad libitum</em></td>
<td>16</td>
<td>43.1 ± 1.3</td>
<td>48.6 ± 1.5</td>
<td>1,130</td>
<td>193</td>
<td>630 ± 10</td>
</tr>
</tbody>
</table>

* Sixteen sheep per treatment. Groups 1-3, 103 days; Groups 4-6, 75 days.
† Body weight corrected for wool production.
‡ Intake corrected for water content in block.
§ Clean fleece weight includes 13 days pre-treatment.
low protein (cereal straw) and medium protein (oaten chaff) roughages contained 92.6\% and 90.8\% dry matter and on a dry matter basis 2.3 \% and 5.1\% crude protein respectively (methods of A.O.A.C. 1955). The compositions of the blocks are given in Table 2.

Between February 8 and 20, all sheep were allowed ad libitum quantities of the same medium protein chaff as fed in the trial.

During the trial, groups were fed in separate, bare unshaded yards and allowed unrestricted access to water. Roughage was offered ad libitum from self-feeders and intake was measured weekly. Blocks weighing 18-22 kg were fed from sheets of flat iron placed on the ground. Each group receiving blocks was allowed access to one block, which was removed and replaced by a fresh block when a residue of less than 2 kg remained. Block intake was measured weekly.

At weekly intervals, each group was taken from the yards and weighed immediately. A sheep was removed from a treatment and was recorded as dead if it had difficulty in rising or was unable to stand, and if it was considered (from experience with similar trials) that it would not survive the following weighing.

Treatments were terminated after 103 days for Groups 1, 2 and 3 and after 75 days for Groups 4, 5 and 6.

All groups were shorn and greasy fleece weights recorded on the day the treatments terminated. Clean fleece weights were determined from scoured wool samples taken at shearing.

III. RESULTS

The numbers of survivors, the initial and final mean body weights, the mean daily dry matter intakes of roughages and of blocks, and the mean clean fleece weights of all groups are given in Table 1.

(a) Survivors

There was significantly more survivors in all other Groups than in Groups 1 or 2 (P<0.001). There were also more survivors in Group 2 than in Group 1 (P<0.05).
Deaths were recorded from the eighth week onwards in Groups 1 and 2. Of a total of 16 deaths recorded in Groups 1 and 2, 11 occurred in the Polwarths. However, there was no significant difference in survivors between breeds.

**(b) Body weight**

Groups 1 and 2 steadily lost weight during the trial, while Groups 3, 4 and 5 remained relatively constant throughout, while Group 6 increased in weight during the first 56 days and thereafter remained constant. The final corrected mean body weight of Group 3 was significantly greater than that of Groups 1 or 2 $(P<0.001)$. The final corrected mean body weight of Group 6 was significantly greater than that of Groups 4 or 5 $(P<0.01)$.

**(c) Food intake**

**(i) Roughage**

The mean daily roughage intakes of Groups 1 and 2 steadily declined during the trial while the intake of Group 3 increased during the first 21 days and thereafter ranged between 774 and 1053 g per day. The intakes of Groups 4, 5 and 6 remained relatively constant after seven days. The mean daily roughage intake of Group 3 was significantly greater than that of Groups 1 or 2 $(P<0.001)$. There were no significant differences in the mean intakes between Groups 4, 5 and 6.

**(ii) Blocks**

The mean daily block intakes varied in the groups between weeks and no consistent pattern could be detected. The mean daily intake of the low urea block was significantly greater than that of the high urea block within both roughage treatments (both $P<0.001$). The mean daily intake of the low urea block was significantly greater in Group 3 than Group 6 $(P<0.001)$.

**(d) Clean Fleece Weight**

Groups 3 and 6 respectively grew significantly greater clean fleece weights than Groups 1 and 2 and Groups 4 and 5 (both $P<0.01$).

**IV. DISCUSSION**

The urea block containing a low amount of urea and a high level of energy in the form of grain and distillers solubles, stimulated intake of low protein roughage to 2.6 times that of unsupplemented sheep. The block prevented deaths, maintained sheep at a constant body weight and increased wool production. However, intake of the block was high; the consumption of urea being 25 g per sheep per day.

The effect of the block was reduced by the roughage of higher protein content. Block consumption was reduced and roughage intake was not significantly greater than unsupplemented sheep fed the same roughage. However, the block provided sufficient nutrients to increase body weight and wool production.

The only significant effect of the high urea block on either roughage treatment was to increase the number of survivors on the low protein roughage. The practical significance of this effect is doubtful. As the trial was of short duration it could not be termed an experiment typical of drought feeding conditions. As the body weight loss of the sheep in this group was not significantly different from
that of the unsupplemented sheep fed the same roughage, this type of block is not likely to prevent losses during an extended dry period.

The results indicate that the block containing a low level of urea and a high level of energy could be of value when there is ample pasture of low protein content. However in view of the results of more recent field trials (McInnes et al., unpublished data) it would not be wise to infer that results of this order will be obtained by using urea block supplements for dry feed under normal paddock conditions in many areas of New South Wales. It is also doubtful that sufficient low protein pasture material is available in a genuine drought situation (McDonald I., personal communication) to justify supplementation with urea blocks as an economic proposition in comparison with other drought-feeding practices.

V. ACKNOWLEDGMENTS

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VI. REFERENCES


