THREE WINTER FORAGE SYSTEMS FOR PREGNANT EWES

G. J. BURCH,* F. G. SWAIN† and J. V. LOVETT‡

Summary

Three forage systems were grazed during the winter by pregnant ewes at two stocking rates. By comparison with an improved natural pasture, forage systems incorporating oats or Italian ryegrass increased ewe live weights after mid-pregnancy. Lamb birth weights were heaviest from a system of oats grazed during mid and late pregnancy. There was no effect of forage system or stocking rate on lamb mortality.

I. INTRODUCTION

In cool temperate regions of Australia, extensive areas of natural pasture continue to support a large wool and fat lamb industry. These natural pastures can be improved by the application of fertilizer and the introduction of a suitable legume (Simpson and Robinson, 1967). The existing grasses are usually summer growing perennials, which degenerate during the winter into poor quality forage at a time when the introduced legume is also least productive (Hindmarsh and Blumer 1937; Brougham 1959). Such pastures are frequently inadequate for maintaining sheep numbers, particularly breeding ewes, at a level of stocking that can easily be carried during the spring and summer months (Tucker, Clinton and Manglesdorf 1968). In this situation winter forage crops could provide a means of maintaining higher stocking rates, an approach which may be an economic alternative to the complete replacement of natural pasture by an expensive sown pasture, or the purchase of supplementary feed (Taplin 1963).

The object of this investigation was to examine the response by breeding ewes to the supplementation of an improved natural pasture with winter forage and nitrogen fertilizer. Ewe liveweight response, lamb birth weight and survival were determined for different forage systems, maintained at two stocking rates.

II. MATERIALS AND METHODS

The grazing study was conducted at the University of New England, Armidale (lat. 30°31′ S; altitude 1070m). Armidale is representative of the New England Tableland region, a cool temperate area with summer dominant, highly variable

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Fig. 1.—Liveweight change of ewes grazing three forage systems, together with mean weekly rainfall and temperature: O——O, P at 7.4 ewes/ha; •—•, P at 14.8 ewes/ha; □——□, O/K at 7.4 ewes/ha; ■——■, O/K at 14.8 ewes/ha; △——△, O at 7.4 ewes/ha; ▲——▲, O at 14.8 ewes/ha; | R/O | period on Italian ryegrass of system O/R; | O | period on oats of system O.
The O system gave pronounced increases in ewe liveweights, following periods of grazing on 40 per cent areas of oats. The O/R system maintained a stable liveweight trend throughout pregnancy. In contrast, ewes grazing pasture (P) lost weight rapidly during late pregnancy, with the exception of ewes at a low stocking rate in 1971.

At both stocking rates, the pattern of ewe liveweight response to each forage system was similar. However, at the high stocking rate, ewe liveweights were significantly lower (P < 0.05) during the last 30 days of pregnancy in each year.

TABLE 1

<table>
<thead>
<tr>
<th>Forage System</th>
<th>1970</th>
<th>1971</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean birth weight (kg)</td>
<td>Total number born</td>
</tr>
<tr>
<td>P</td>
<td>4.18</td>
<td>23</td>
</tr>
<tr>
<td>O/R</td>
<td>4.75</td>
<td>25</td>
</tr>
<tr>
<td>O</td>
<td>4.83</td>
<td>24</td>
</tr>
</tbody>
</table>

High Stocking Rate

<table>
<thead>
<tr>
<th>Forage System</th>
<th>1970</th>
<th>1971</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean birth weight (kg)</td>
<td>Total number born</td>
</tr>
<tr>
<td>P</td>
<td>3.84</td>
<td>27</td>
</tr>
<tr>
<td>O/R</td>
<td>4.29</td>
<td>25</td>
</tr>
<tr>
<td>O</td>
<td>4.66</td>
<td>24</td>
</tr>
<tr>
<td>L.S.D.</td>
<td>0.50</td>
<td>—</td>
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</tbody>
</table>

Details of the lambs born on each forage system are presented in Table 1. Birth weights were heaviest in the O system, with weights in the O/R system only slightly lower. Pasture (P) consistently gave lower birth weights, with the difference between P and O systems being significant (P < 0.05) in both years. There were no significant differences between the number of lambs born or the number of lamb mortalities in each system for both years. The occurrence of ewe pregnancy toxaemia (Table 1) showed a slightly higher incidence in P systems, particularly at a high stocking rate in the second year.

Results of nitrogen treatments showed no effect on ewe liveweight in the first year. However, in the second year a response was evident in ewes on the O system after grazing oats for a 28 day period. There was no lamb birth weight or survival response to nitrogen fertilizer in either year.

IV. DISCUSSION

Although the liveweights of the ewes were similar after mid-pregnancy in both years, in the first half of pregnancy there were dissimilarities as a consequence of an earlier mating and more favourable autumn conditions for pasture growth in 1971. Better nutrition in early pregnancy may have masked the effect of sown forage on ewe liveweights during the latter half of pregnancy in that year.
It has been shown by Reid (1960) that undernutrition in late pregnancy adversely affects ewe health, causing pregnancy toxaemia and lamb mortalities. In this study the advantage of the forage systems, O and O/R, lay in their ability to increase or maintain ewe liveweight during pregnancy relative to an improved natural pasture. A corollary of increased ewe liveweight was improved reproductive performance expressed as a reduced incidence of pregnancy toxaemia and heavier lamb birth weights in the two forage systems, 0 and O/R.

Reid (1960) has suggested that adequate nutrition during pregnancy is necessary to provide sufficient energy, as glucose, for normal growth and development of foetal tissues, particularly when multiple conception has occurred. Hogan and Weston (1969) found that ruminal digestion of immature forage oats produced increased amounts of propionic acid, the principal precursor of glucose. The diet from systems 0 and O/R could therefore be expected to provide a higher proportion of energy which would be available to the developing lamb, and heavier birth weights could result.

Heavier lambs from well fed ewes have a greater ability to survive during adverse weather conditions at birth (Alexander 1962). The higher incidence of lamb mortality on pasture systems at the high stocking rate could be a reflection of poor ewe nutrition during pregnancy and lower lamb birth weights. Conversely, it has been suggested by Healey (1967), that ewes consuming excessive forage in late pregnancy can suffer dystocia if lamb birth weights are too high. Lamb mortalities observed in 1970 for 0 systems at a low stocking rate could be partly attributed to difficulties at birth.

The results reported in this paper form part of a study designed to assess the significance, in a fat lamb producing enterprise, of feed production over the entire year. The complete study will be evaluated at a later date.

V. ACKNOWLEDGMENTS

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VI. REFERENCES