SAC trial on Feed bucket/blocks to enhance Colostrum antibody levels

Introduction

Lamb survival is a key issue on most UK sheep farms and is of increasing importance with recent changes to more prolific breeds and to systems, which involve low labour inputs such as outdoor lambing of large flocks.
Colostrum quality and uptake is an important component of lamb survival, providing both nutrients for combating hypothermia and protection against disease. Nutrition of the pregnant ewe has a major effect on the amount and quality of colostrum produced, This trial was designed to study the effect of feed block formulation on colostrum production and uptake as measured by colostrum IgG content at lambing.

Materials and Methods

Feed blocks formulated to improve colostrum quality were compared with control blocks in a trial involving 200 May-lambing predominantly twin- bearing Lleyn ewes selected from a flock of 310 ewes run on Walltower farm (Mr G. and Mr M. Marwick), Penicuik Midlothian. Treated and control feed blocks were fed for approx. 4 weeks pre-lambing, initially in a sheep house along with silage (ME 10.3MJ. ME/kg DM, CP 127g/kg) in four straw bedded pens and latterly at pasture in two fields.
Ewes were weighed on 31/3/04 and on the basis of weight, ewe age and scanning data, allocated to pens and treatments in a balanced randomised design so that allocation weight could be used as a covariate in the analysis. It was agreed to use only one shed which had similar sized pens (4) and to allocate treatments to pens at random. Each pen contained 50 ewes, pens 2 and 4 (bottom right and bottom left) received treated blocks at the rate of 3 per pen from April 1.Pens 1 and 3 were given control blocks at the same time at the same initial rate. When blocks were eaten they were replaced and block usage was recorded.

On April 10, approx. 21 days before expected lambing date ewes were turned out to predominantly perennial ryegrass pasture which had been rested from grazing and which had a sward height of over 6 cm. From turnout to lambing ewes had access to adequate pasture and the same type of supplementary feed blocks as fed in the house. Pens 1 and 3 were combined on one field and pens 2and 4 on a similar adjacent field.
As soon as practicable after lambing (within 12 hrs) the ewes were caught and a colostrum sample expressed into a 30ml sterile plastic container which was labeled with the ewe tag no. and placed in a domestic deep freeze (-18 degrees centigrade). At the end of lambing the samples were delivered frozen to the analytical laboratory of Harper Adams. Colostrum IgG concentrations were measured using radial immunodiffusion kits (Sheep IgG Vet-RID kit, Bethyl Laboratories, Montgomery, Texas) using the method published by Fahey and McKelvey (1965)

Statistical analysis

Statistical analysis was restricted to the variate IgG. As well as two treatments (the feed blocks) there were two pens within each of the two treatments, so they needed to be regarded as part of the treatment structure. Allocation liveweight was used as a covariate with the intention of increasing the precision of the treatment comparison.

Two very high values of IgG (one treatment and one control) were treated as missing values, because they were beyond the measuring capability of the test. Because IgG has a skewed distribution, the analyses was repeated on their square roots.

The raw data in an Excel spreadsheet and the text output from the Genstat analyses is shown in Appendix 1 for analysis both with and without the liveweight covariate. The analysis of variance on IgG (line 102) provides strong evidence of a treatment difference (P = 0.007), and no evidence of differences between the pens. The increase in mean IgG is 25%. When the covariate is included (line 108), there is a very slight reduction in the residual mean square, suggesting that blocking on initial liveweight would not have had much effect: the conclusions about the treatments are unchanged.

When the square root of IGG is used as the response (lines 114 and 119), the evidence of a treatment difference is less strong (P = 0.028), and the covariate is again not very effective. The distribution of the residuals appears to be closer to normality, though.REML analyses was also tried but gave no advantages.

Results

The allocation live weight was on average 72 Kg with both treatments having this as their initial weight. It was not possible to take a turnout weight, but there was no visible effect of treatment on ewe performance or condition.
Bucket intake was higher on silage at 150g/ewe/day compared to 78g/ewew/day on grass.
A total of 167 samples of colostrum were used in the statistical analysis, the balance being due to ewes not being sampled/missed , misread tags and ewes with an too small a sample for analysis. Table 1 shows the results of the IgG analysis

Table 1 IgG levels (units) in colostrum samples at lambing of ewes given treated (T) and control (C) feed blocks.

	IgG rep 1	1gG rep2	Mean	s.e.d	Level of sig
Treated	**236.5**	**220.5**	**228.5**		
				16.79	**0.007**
Control	**176.6**	**189.2**	**182.9**		

The intra-assay coefficient of variation was 5.83% There was a significant increase of approx 25% in IgG content of colostrum with the treated blocks($P>0.05$).

Discussion

The effects of the treatments on colostrum quality were considerable given that nutritional intervention to achieve this aim through the provision of supplementary DUP has not always been successful. Annett and Carson 2004 fed lambs additional DUP to achieve intakes of 12,25,50 and 60 gDUP /day from a grass and supplementary (Treated soya) diet but failed to increase colostrum yield(colostrum quality not estimated). Success on silage based diets has been more common with Robinson and Mcdonald(1989) showing yield responses to fishmeal and Vipond et al(1966) demonstrating response in colostrum gammaglobulin content and milk protein from diets supplemented with DUP. In this feedblock trial the pre-lambing diet of silage (intake estimated at 1.0 -1.2kgDM/day) and 0.2 Kg block would probably have been marginal for MP supply prior to turnout. Feedbyte estimates for ewes losing 100g/day being a requirement for 93g/day vs a feedbyte estimate of dietary supply of 83g/day.