OPPORTUNITIES AND POSSIBILITIES FOR MEAT PRODUCTION IN THE HILLS AND UPLANDS OF THE UK

(Abstracts of poster presentations)

MANIPULATION OF REPRODUCTIVE PERFORMANCE

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EFFECT OF IMMUNISATION AGAINST STEROID HORMONES ON THE REPRODUCTIVE PERFORMANCE OF EWES OF TWO BREEDS IN DIFFERENT LEVELS OF BODY CONDITION AT MATING

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Ewe reproductive performance depends on levels of body condition and intake at and before mating. It can be improved by active or passive immunisation against steroid hormones. The aim of this work was to investigate the relationship between body condition at mating and reproductive response to immunisation against steroids. In experiment 1, from 8 weeks before mating at a synchronised oestrus in mid-November, 180 Scottish Blackface ewes were fed to achieve body condition scores of ≤2.00 (low), 2.25/2.50 (moderate) or ≥2.75 (high). Half of the ewes were passively immunised against testosterone during the week before mating. The ovulation rates and potential litter sizes of 50 passively-immunised (group P) and 50 control ewes (group C) were determined at slaughter 8 weeks after mating. The litter sizes of the remaining ewes were recorded at lambing. Both mean ovulation rates and mean litter sizes of immunised ewes were generally higher than in control ewes in low condition (Table 1).

The conception rate to two cycles of mating was greater than 0.9 in all but the low condition control group (0.70). Lambing rates were therefore also improved by immunisation (Table 1). In experiment 2, 354 Border Leicester × Scottish Blackface (Greyface) ewes were fed for 2 months to achieve a wide range of condition score (1.5 to 4.0) before a synchronised mating in mid-October. One third of the ewes (group F) representing all condition scores were actively immunised against androstenedione (Fecundin, Coopers/Glaxo). Ewes of a second group (group P) were passively immunised against testosterone using the same dose as in experiment 1. The remainder (group C) were not treated. Mean ovulation rates and litter sizes were determined when the ewes were slaughtered on return to service or about 40 days after mating. Both active and passive immunisation increased the mean ovulation rate above that of control animals at all levels of condition but the increase was much greater in actively-immunised ewes. These increases were generally reflected in the mean litter sizes but not in ewes at the lowest condition scores (Table 2).

The conception rate of the actively-immunised ewes to a single cycle of mating was near to normal in the ewes of the highest condition score category but it was substantially depressed in ewes in suboptimal condition scores at mating. This trend also occurred in passively-immunised ewes but was less marked. Consequently, the increases in ovulation rate and litter size were not generally reflected in lambing rate. In practice, a second cycle of mating might have resulted in a more normal conception rate and consequently an improved lambing rate following immunisation.

The results of the two experiments suggest that both active and passive immunisation techniques can increase the ovulation rates and litter sizes of ewes in all but the poorest levels of condition. However, when the ewes are in less than optimal body condition their conception rate following immunisation may be reduced, particularly if the ovulatory response to immunisation is very large, so that the lambing rate following a single cycle of mating is not improved.

TABLE 1

Mean ovulation rates, litter sizes and lambing rates of passively-(P) immunised and control (C) ewes

Condition score	≤2.00			2.25/2.50			≥2.75		
Treatment	P	C	Sig.	P	C	Sig.	P	C	Sig.
Mean ovulation rate†	1.67	1.07	*	2.35	1.69	**	2.42	2.08	NS
Range	1-2	1-2		1-3	1-2		2-3	2-3	
Mean litter size†	1.63	1.13	***	1.91	1.48	**	2.00	1.86	NS
Range	1-2	1-2		1-3	1-2		1-3	1-3	
Mean lambing rate/ewe put to ram	1.47	0.80	***	1.87	1.33	*	1.81	1.74	NS

† Ovulation rates based on 100 ewes; litter sizes based on 180 ewes.

TABLE 2

Reproductive performance of passively- and actively-immunised and control ewes in different body condition at mating

Condition score	≤1.75					2.00/2.25					2.50/2.75					≥3.00				
Treatment Group	F	P	C	Sig.		F	P	C	Sig.		F	P	C	Sig.		F	P	C	Sig.	
				FvC	PvC				FvC	PvC				FvC	PvC				FvC	PvC
Mean ovulation rate	2.03	1.67	1.41	***	*	2.69	2.14	1.82	***	×	3.18	2.40	2.00	***	×	3.46	2.73	2.29	***	*
Range	1-3	0-3	1-3			1-7	1-3	1-3			2-5	1-4	1-3			2-8	1-4	1-3		
Mean litter size	1.67	1.54	1.75	NS	NS	2.14	1.63	1.87	NS	NS	3.00	2.33	1.90	*	NS	2.54	2.33	1.92	**	*
Range	1-2	1-2	1-3			2-3	1-2	1-3			2-5	1-4	1-3			1-4	1-4	1-3		
% of ewes mated pregnant at slaughter	30.0	37.1	28.6	NS	NS	35.0	44.4	68.2	×	NS	33.3	69.2	83.3	*	NS	66.6	75.0	75.8	NS	NS
Mean lambing rate/ewe mated	0.50	0.57	0.50	NS	NS	0·75	0·72	1.28	×	×	1.00	1.61	1.58	*	NS	1.69	1.75	1.48	NS	NS

× = $P < 0.1$.