The effects of drenching regimen and pasture larval contamination on gastrointestinal parasitism of lambs

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ABSTRACT

The minimal drenching recommendations for lambs of the N.Z. Society of Animal Production Study Group (2 or 3 drenches) were compared with 5 and 12 fortnightly drench regimens on safe (low larval count) and contaminated (high larval count) pastures.

Lambs grazing safe pastures had lower ($P<0.05$) gastrointestinal worm burdens than lambs grazing contaminated pastures, and increased drenching frequency significantly reduced ($P<0.01$) the average faecal egg count. The minimal drenching regimen did not adequately control parasitism in lambs. Increasing the number of drenches improved parasite control and increased wool and live-weight production.

INTRODUCTION

The concept of minimal drenching, integrated with grazing management to produce safe pasture, was introduced by a study group of the N.Z. Society of Animal Production (Brunsdon and Adams, 1975) in their recommendations for control of gastrointestinal parasites of sheep and cattle. The trial reported here assessed these recommendations for lambs at Woodlands Research Station, Southland.

MATERIALS AND METHODS

Trial Design

The trials compared 3 drenching regimens under 2 grazing management systems. The treatments were replicated twice in each of the 1978/9 and 1979/80 seasons, and ran for 24 weeks from weaning in December to late May.

Treatments

(a) Pasture management systems
- (i) Safe pastures—prepared by grazing with hoggets or ewes for at least 12 weeks prior to introduction of lambs.
- (ii) Contaminated pastures—continually grazed by ewes and lambs from lambing to weaning and then by experimental lambs until May.

(b) Drenching regimens
- (i) NZSAP Study Group Recommendations (SAP)—on contaminated pastures 3 drenches, in February, March and April; on safe pastures 2 drenches, the first at weaning and the second 12 weeks later when lambs were shifted to a second area of safe pasture.
- (ii) "Farmer Practice" (FP)—5 drenches, namely at weaning, late January, and 3 at 4 weekly intervals in autumn.
- (iii) Suppressive Drenching (SUP)—12 drenches from weaning, 14 days apart.

At weaning 360 mixed-sex Romney lambs averaging 22 kg live weight were randomly allocated to the 12 treatment groups. Lambs were set stocked throughout the trial except for the movement of safe SAP treatment mobs to new safe pasture in the autumn. The stocking rate was initially 45/ha and diminished as lambs were removed for slaughter.

Panacur drench was used at the recommended dose rate.

Measurements

Four lambs/treatment group were slaughtered in weeks 6, 12, 16, 20 and 24 of the trial and gastrointestinal worm counts made. Faecal samples for worm egg counts were collected from 20 lambs per treatment group every 2 weeks. Parasite contamination of pastures was assessed by introducing 4 parasite-free tracer lambs to each treatment plot 17 days prior to slaughter. These tracer lambs were slaughtered at the same time as the experimental lambs and worm counts made.

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Live weights were recorded at the beginning and end of the trial. Greasy fleece weights were measured in August, 3 months after the trial finished. All lambs were run together after the end of the trial.

Statistical Analysis

Analyses of variance of mob means on all measurements were performed by collectively considering both years' data. As a variance stabilising procedure, the mean counts of eggs and worms for each treatment group were subjected to a logarithmic transformation before analysis.

RESULTS AND DISCUSSION

Mixed infections of *Ostertagia, Trichostrongylus, Nematodirus* and *Cooperia* genera affected all groups.

The treatments produced differences in the level of parasite infection and pasture contamination. Mean worm counts, faecal egg counts and tracer lamb worm counts are presented in Tables 1, 2 and 3 respectively. The SAP treatment was the most heavily parasitised and produced the most pasture contamination. The FP treatments were intermediate, differing ($P<0.01$ in most instances) from both the SAP and SUP treatments. Safe pastures produced significantly lower worm burdens and had lower larval counts than contaminated pastures.

The production parameters, live-weight gain and greasy fleece weight (Table 4), exhibited an inverse relationship to parasite burden. Live-weight gains showed a response ($P<0.01$) to drenching regimen and pasture management. Fleece weight showed a smaller response (but nevertheless of economic

TABLE 1 Experimental lamb worm counts; mean logarithmic values (mean worm counts in brackets)

Pasture	Drenching regimen				
	SAP	FP	SUP	Mean	S.E.D
Safe	0.640	7.595	5.751	7.328	
	(5653)	(1988)	(315)		
					0.2174
Contaminated	8.952	8.398	6.376	7.909	
	(7723)	(4438)	(588)		
Mean	8.796	7.997	6.063		
S.E.D.		0.2662			

TABLE 2 Experimental lamb faecal egg counts; mean logarithmic values (mean faecal egg counts epg in brackets)

Pasture	Drenching regimen				
	SAP	FP	Mean	S.E.D.	SUP[1]
Safe	5.190	3.333	4.261		1.601
	(180)	(28)			(5)
				0.1779	
Contaminated	4.911	3.889	4.400		1.339
	(136)	(49)			(4)
Mean	5.050	3.611			
S.E.D.	0.1779				

1 Owing to the different order of magnitude the suppressive drench treatment data have been excluded from the analysis.

TABLE 3 Tracer lamb worm counts; mean logarithmic values (mean worm counts in brackets)

Pasture	Drenching regimen				
	SAP	FP	SUP	Mean	S.E.D.
Safe	8.319	7.924	6.482	7.575	
	(4101)	(2763)	(653)		
					0.1530
Contaminated	9.642	8.957	7.433	8.677	
	(15398)	(7762)	(1691)		
Mean	8.980	8.441	6.957		
S.E.D.		0.1874			

TABLE 4 Live-weight gains for experimental lambs and fleece weight for surviving animals in August

	Drenching regimen				
	SAP	FP	SUP	Mean	S.E.D.
Live-weight gain (kg)					
Safe	11.16	13.00	15.13	13.10	
Contaminated	7.84	11.88	14.36	11.36	0.438
Mean	9.50	12.44	14.75		
S.E.D.		0.538			
Fleece weight (kg)					
Safe	2.06	2.19	2.31	2.19	
Contaminated	1.83	2.13	2.24	2.07	0.064
Mean	1.94	2.16	2.28		
S.E.D.		0.078			

significance) where the SAP treatment was significantly inferior to the other treatments.

The treatments with the highest levels of the live-weight gain and wool production had the lowest worm burdens and egg counts and caused least pasture contamination, suggesting the effects on production were the result of parasitism.

It is evident that the SAP minimal drenching regimen did not control parasites as well as the other regimens; a single drench on safe pasture was insufficient to give protection for 12 weeks, while on contaminated pasture parasitism became moderately high. On the other hand, SUP drenching resulted in negligible parasite levels on safe pasture and also on contaminated pasture after about 12 weeks. The moderately successful FP regime would probably have been more effective had the drenches been given in the summer (cf. Vlasoff and Brunsdon, 1981) rather than the autumn.

The results lead us to endorse the general recommendations of Brunsdon (1981) and Vlassoff and Brunsdon (1981), with particular emphasis being placed on a drench after each shift to safe pasture:

1. Where safe pasture is available. Shift lambs to safe pasture (lamb-free for the previous 12 weeks) at weaning and again late February/early March. Drench at each shift followed by a further drench 4 to 6 weeks later (i.e., a total of 4 drenches).
2. Where safe pasture is not available. Drench at weaning, followed by 2 drenches at 21-day intervals and 2 more drenches at 28-day intervals.

ACKNOWLEDGEMENTS

The technical assistance of B. N. Nichol, S. Fraser, S. Rutherford and the Invermay Animal Health Laboratory staff is gratefully acknowledged.

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