STUDIES OF ILLTHRIFT OF LAMBS ON THE MORNINGTON PENINSULA

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Summary

Studies were made over three years to investigate illthrift in prime lambs. The illthrift was characterized by scouring during the spring flush and a failure of up to 60% of the lambs to finish as suckers. Pasture observations showed that herbage availability was seldom below 450 kg dry matter/acre. The clover percentage ranged from 2-40% dry matter. Chemical analysis of the herbage (dry basis) showed copper levels of 3.9-8.7 p.p.m. Nitrogen levels ranged from 2.07-3.66% and herbage potassium from 1.4 l-2.4 1 %.

Growth rates of lambs and degree of scouring were not affected by treatment with (a) thiabendazole, (b) copper, (c) cobalt, or (d) selenium. Applications of potassium and copper fertilizer had little effect on lamb growth rates.

I. INTRODUCTION

A problem of poor lamb growth, or "illthrift", appears to be common to many of the higher rainfall districts of Victoria. The classic syndrome occurs in lambs born in July-August. Normal growth occurs up to 6-8 weeks, then from 8-10 weeks of age an increasing number of lambs lose their bloom and show a dried-out appearance and scouring. In severe cases, up to 40-60% of the lambs may fail to finish before the end of December.

Field trials were undertaken during 1962-64 by the Victorian Department of Agriculture, in co-operation with the Mornington Peninsula Fat Lamb Producers' Association.

II. EXPERIMENTAL

(a) Genera5 Natureof Observations

Observations were carried out on four private properties on the Mornington Peninsula, Victoria. The climate and seasonal changes in the pasture have been described by Tribe and Seebeck (1962). The animals used were first cross Merino ewes on their second or subsequent lambings. In each case they lambed in July or August.

The pastures were principally white clover (*Trifolium repens* L.) , subterranean clover (*Trifolium subterranean* L.) , perennial rye grass (*Lolium perenne* L.), and annual grasses. They were all topdressed with at least 130 lb superphosphate per acre annually and most received some potassium annually.

(b) 1962

Observations were made on all four properties using, in each case, groups of 25 lambs matched on the basis of birth weight, marking weight and sex. On

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each property, a treated group of lambs received thiabendazole anthelmintic at six weeks of age and then at monthly intervals. The dose rate was 7.0 g up to 22.6 kg liveweight, and 10.6 g over 22.6 kg. Untreated control groups were run with the treated groups.

The lambs were weighed monthly and faecal samples were taken from the control groups for worm egg analysis. The lambs were also scored for scouring on a four point scale.*

Thirteen lambs were selected, from the range in bloom and scouring, for post-mortem examination.

Herbage samples were collected for chemical and species analyses and determination of dry matter production.

(c) 1963

Observations were continued on two of the properties.

(i) Property 1

The number of animals involved and the areas of land used are illustrated in Figure 1.

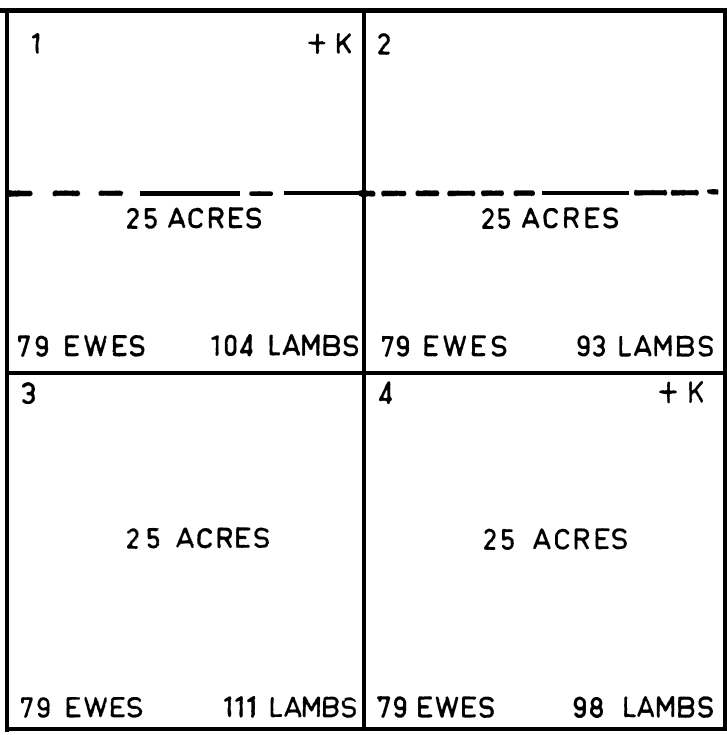

Fig. 1.-Design of 1963 Trial.

Scour Scale:

3—large area soiled. wet
2—large area soiled, drying up
1-small area soiled
O-no sign of scour

The ewes and lambs in paddocks 1 and 2 had their grazing areas halved by electric fences in October. The whole area was top dressed with 130 lb superphosphate and 15 lb potassium per acre, and paddocks 1 and 4 received an extra 94 lb per acre of potassium (as potassium chloride). In addition, paddocks 1 and 4 were renovated with pasture harrows.

The lambs in each paddock were divided into four matched groups receiving the following treatments :—

(a) Copper—2 doses, at 8 and 14 weeks, each of 142 mg Cu^{++} per lamb.

(b) Cobalt-l cobalt bullet (5.7 g cobalt oxide) per lamb at 8 weeks of age.

(c) Copper + Cobalt-doses as in (a) and (b) .

(d) Control-no treatment.

At monthly intervals, the lambs were weighed, drenched with thiabendazole and scour-scored. Herbage samples were also collected at monthly intervals to measure pasture availability and for chemical and species analyses.

(ii) Property 2

Sixty lambs were divided into two matched groups. One group received two doses of selenium (each of 5 mg per lamb) at 8 and 12 weeks of age; the other group was untreated. All the lambs were run together and at monthly intervals, they were weighed, drenched and scour-scored.

(d) 1964

Observations were continued on Property 1 using the same experimental paddocks but different animals. The number of animals in each paddock was varied

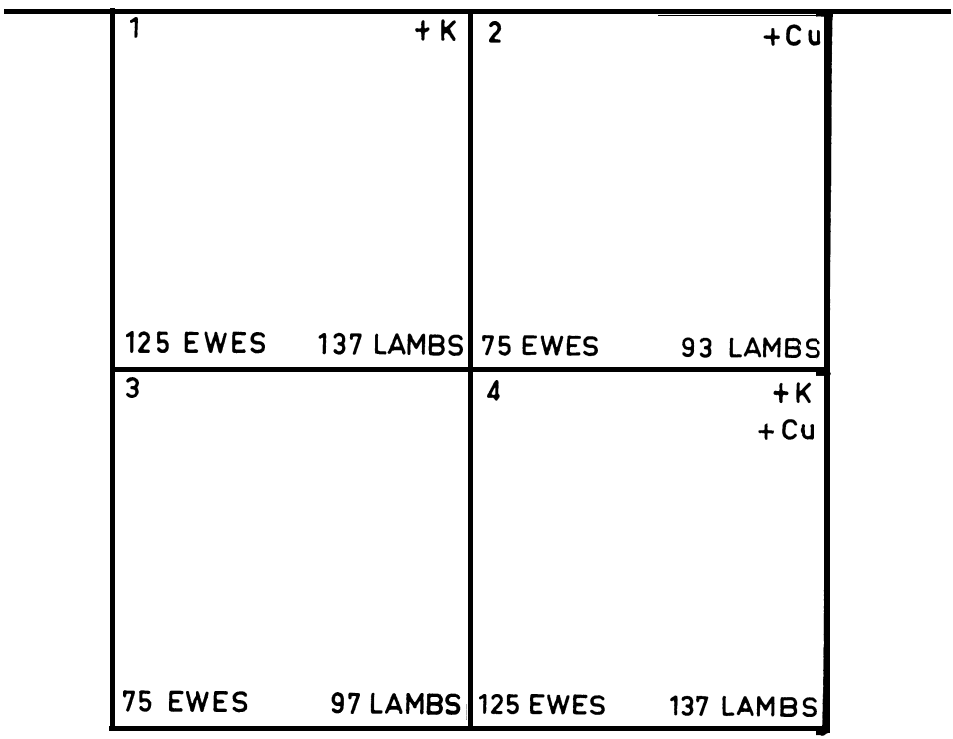

Fig. 2.—Design of 1964 Trial.

so as to impose stocking rates of three and five ewes per acre. The paddock treatments are illustrated in Figure 2.

The whole area was top dressed with 130 lb superphosphate and 24 lb of potassium per acre; and paddocks 2 and 4 received 0.88 lb copper (as copper sulphate) with an additional 56 lb superphosphate per acre. Paddocks 1 and 4 received extra potassium in 1963.

The lambs were weighed at monthly intervals. They were also dosed with thiabendazole in early October.

Pasture observations were made and herbage samples were collected throughout the period.

III. RESULTS

Scouring at the peak of the spring flush, and poor growth rates by many lambs, occurred each year. There was, however, no consistent relationship between high and low scour-scores and the body weights or growth rates of the lambs.

The anthelmintic treatment in 1962 did not affect growth rates (Table 1) or scouring. Faecal egg counts in the untreated lambs averaged 52 eggs/g at 7 weeks of age, 403 eggs/g at 11 weeks, and 276 eggs/g at 15 weeks. The post-mortem examinations did not reveal any clinical signs of disease nor any obvious differences between lambs that were scouring and those without signs of illthrift. Liver copper levels of untreated lambs averaged 81 p.p.m. and ranged from 14 to 230 p.p.m.

The results of the trace element trials in 1963 are summarized in Table 2. Growth rates were not affected by the administration of copper, cobalt or selenium.

The grazing and fertilizer treatments in 1963 also failed to affect growth rates (Table 3).

TABLE 1

Lamb responses to anthelmintic treatments

Property	Treatment	Mean Body Weight (kg)		Mean Growth Rate (kg/day)
		11.ix.62	19.xi.62	
1	Test	18.2	34.3	0.23
	Control	18.2	34.7	0.24
		24.viii.62	19.xi.62	
2	Test	13.0	33.1	0.22
	Control	12.9	33.4	0.23
		18.ix.62	30.xi.62	
3	Test	11.3	29.2	0.24
	Control	11.3	29.6	0.25
		10.ix.62	19.xi.62	
4	Test	17.1	30.9	0.22
	Control	17.3	30.0	0.20

TABLE 2

Lamb responses to trace element treatments

Property	Treatment	Mean Body Weight (kg)		Mean Growth Rate (kg/day)
		27.viii.63	11.xii.63	
1	Control	11.4	34.2	0.21
	Copper	11.3	33.6	0.21
	Cobalt	11.3	34.4	0.22
	Copper + Cobalt	11.3	33.5	0.21
		8.x.63	11.xii.63	
2	Control	22.2	38.1	0.25
	Selenium	22.3	38.8	0.26

Growth rate L.S.D. $P<0.05$ level = 0.10.

TABLE 3

Lamb responses to grazing and fertilizer treatments

Property	Treatment	Mean Body Weight (kg)		Mean Growth Rate (kg/day)
		27.viii.63	11.xii.63	
1	Grazing area halved in spring	11.3	32.6	0.20
	Whole area available for grazing	11.1	34.2	0.22
	Extra Potassium Fertilizer	11.2	34.2	0.22
	Normal Potassium Fertilizer	11.1	32.9	0.20

Neither the application of copper fertilizer, in the 1964 trial, nor increased stocking rate, affected lamb growth rates (Table 4).

Estimates of available herbage were made at monthly intervals in each season and averages for each season are shown in Table 5.

In all cases the pastures were grass dominant. In 1962, the dry matter percentage of grass (as against clover) ranged from 60 to 85 over the four properties. The grass percentages for the four paddocks on Property 1 ranged from 64-90 in 1963; and in 1964 the same paddocks had grass percentages between 84 and 98.

Analyses for copper, molybdenum, nitrogen and potassium were made on three sets of pasture samples (early, mid- and late-season) each year. On the untreated paddocks they yielded values within the following ranges:—

copper 3.9-8.7 p.p.m.
molybdenum 0.3-1.4 p.p.m.
nitrogen 2.07-3.66%
potassium 1.41-2.20%

TABLE 4

***Lamb responses** to **fertilizer and** stocking rate treatments*

Property	Treatment	Mean Body Weight (kg)		Mean Growth Rate (kg/day)
		4.ix.64	22.xii.64	
1	Copper fertilizer	10.7	29.8	0.18
	No copper fertilizer	11.1	29.1	0.16
	3 ewes/ac	11.2	30.5	0.18
	5 ewes/ac	10.6	28.4	0.16
	Growth rate L.S.D. $P<0.05$ level = 0.12			

TABLE 5

Herbage availability (kg dry matter/ac)

Property	Paddock No.	1962	1963	1964
1	1		575	762
	2		371	1192
	3	549*	901	1185
	4		1010	853
2		759	not available	
3		166		
4		476		

Average of samplings through the season.
*Total area before subdivision.

The paddocks topdressed with extra potassium in 1963 yielded herbage potassium levels within the range 2.00-2.41% , and the herbage copper levels in the paddocks topdressed with copper in 1964 were within the range 5.4-6.7 p.p.m.

IV. DISCUSSION

Scouring commenced in each season about the time of the spring flush but there was no marked depression of growth rates at this time. Therefore, these trials indicate that it is important to differentiate between the two major signs of lamb illthrift, scouring and poor growth rates.

Although the degree of scouring is often taken as an index of illthrift, there was no consistent relationship here between scour-score and growth rates. Moreover, the scouring was apparently not associated with high worm burdens because (a) the anthelmintic treatments did not improve the scour-score or the lamb growth rates; and (b) the post-mortem examinations and faecel egg counts showed that the numbers of worms in the untreated lambs were not unusually high (Gardiner and Craig 196 1) .

Although pasture copper levels were relatively low (Underwood 1962) and liver copper levels apparently marginal (Cunningham 1946), copper was not definitely implicated as a causative factor. There was no consistent association

between liver copper levels and the illthrift. 'The best lamb (no signs of illthrift) and the worst lamb (full signs) had the two lowest liver copper levels, 17 and 14 p.p.m. respectively.

The herbage molybdenum levels were all below 1 p.p.m. for Property 1, and so any copper-molybdenum interaction is unlikely. Work by Ellis *et al.* (1958) suggests that the molybdenum levels may have been marginal, especially if preferential grazing of clovers occurred.

Hartley (1961) in New Zealand, and Skerman and Sutherland (1957) in Victoria have described a form of illthrift and emaciation of lambs associated with cobalt deficiency. However, there was no response to cobalt, either alone or -with copper, in this trial. The figures shown by Skerman (1959) indicate that the treatment should have been sufficient to overcome any deficiency.

Hartley, Drake and Grant (1959), Robertson and During (1961), and Skerman (1962) also found selenium deficiency to be associated with some forms of illthrift, but no response was obtained in this trial.

Reduction of available pasture gave a small reduction in growth rates although availability seldom dropped below 450 kg/ac. The relatively low clover percentage in the pastures may have contributed to the low average growth rates, but not to the poor growth by individual lambs unless some grazed selectively for and others against the clover component.

Little evidence is available on optimum levels of herbage potassium but the levels occurring may have been marginal for ovine nutrition.

Crude protein levels as indicated by percentage nitrogen appear adequate in all cases.

None of the factors investigated were positively identified as being associated with illthrift. Some of the factors, including copper, molybdenum and potassium may possibly be implicated but obviously there are a number of environmental aspects about which little is known.

V. ACKNOWLEDGMENTS

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