Observations on Helminth Parasites and Hogget Unthriftiness in New Zealand

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LACK of thrift in hoggets is a world-wide problem and not peculiar to New Zealand. The causes are many and varied, and in many cases are well known. Specific diseases such as the mineral deficiency diseases, vitamin deficiencies, parasitic infestations, as well as under-nutrition, are among the causes.

In this discussion we are concerned with a wide-spread ill-thrift in hoggets in New Zealand, which seldom commences before late February or March and may persist until July. From June or July onwards it is our experience that hoggets can be fattened in the same paddocks in which they previously "faded away" under pasture conditions of apparent plenty. The trouble varies widely in its incidence, severity and duration from season to season, from locality to locality, and indeed from paddock to paddock within a farm. In a less severe form the death rate may be negligible, the animals merely failing to thrive well over a period of one to two months. In its most spectacular form a heavy death rate may follow this ill-thrift from a variety of ultimate causes.

Much loss may also accrue from a lighter fleece weight, in the extra care and attention expended on hoggets not doing well, and in the use of costly medicaments, anthelmintics and concentrates. Furthermore there is evidence from work in the United States and from our own work, that hoggets poorly reared in the winter may, as two-tooth ewes, give a lambing percentage 10 to 15 per cent lower than that of well-reared hoggets.

Within a flock there is marked individual variation in the incidence and intensity of hogget ill-thrift resulting in what is popularly referred to as the "tail-enders" in the mob. It is a common belief also that these "tail-end" hoggets are the late born lambs and the twins. In our experience this is not the case, the incidence of ill-thrift not being correlated with age or weight at weaning.

Post-mortem findings vary considerably and include pneumonia, pleurisy, anaemia, various infections of the vital organs, abnormalities of the gut, lung and the bones particularly the ribs and skull. The most consistent finding however, is a heavy parasitic burden and it is tacitly assumed too often, that parasites have caused the ill-thrift. A further factor supporting this assumption is that the problem is generally worse in the wet seasons, and during those periods of the year most favourable to the development and survival of the free-living stages of the parasites.

Further, it is a popular belief that old established pastures are less suitable than new pastures for rearing hoggets. This again has often been explained as being due to a greater risk of parasitism on old pastures. The superior thrift in hoggets often achieved with light rates of stocking and on dairy farms, has also been attributed to the lesser opportunities for animals to acquire heavy parasite burdens.

While parasitism may indeed be the cause of this ill-thrift, we believe that it should be kept in mind that parasites may in many cases, be a secondary factor: the result rather than the cause of ill-thrift. This concept is engendered by our experiences over the past two years, in the rearing of hoggets, when drenching and/or changing to pastures spelled from sheep and prepared by cattle, rotational grazing, and such well recommended practices, have so frequently failed to produce anticipated good results.

In the 1952 season hoggets were reared on long pastures in two paddocks similar in area, which had been spelled from sheep for a month and prepared by mature cattle. Both paddocks carried new pasture predominantly red and white clover and rye grass. In one paddock 60 hoggets were drenched with phenothiazine at the intervals and dosages shown in figure 1. Body condition subjectively estimated on an arbitrary scale of 1 (fat) to 10 (emaciated) is also shown. In the other paddock 60 similar hoggets were undrenched. The growth curves of these hoggets are shown in figure 1. An apparent result from drenching is seen. The curves for egg counts however, do not support the contention that a drenching response in live weight has been obtained, since in both groups mean egg counts are low and differences between groups are relatively small. Furthermore, although the pastures in these two paddocks were similar in botanical composition and stage of growth, that grazed by the drenched group had been sown in the

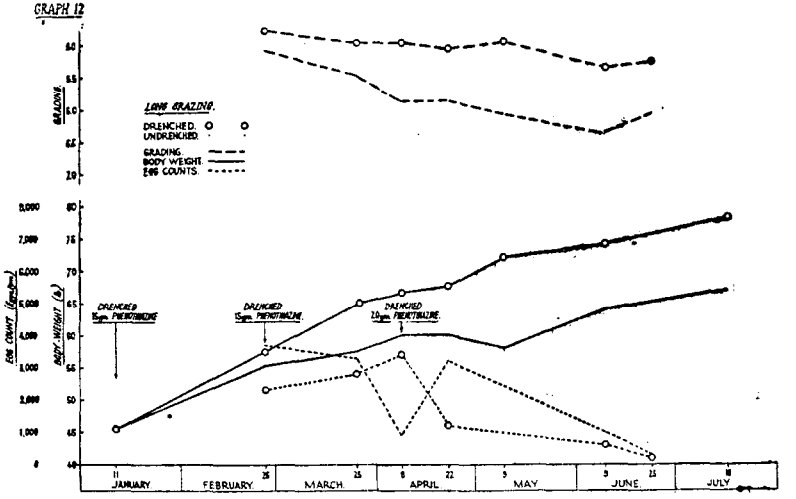

Figure 1.

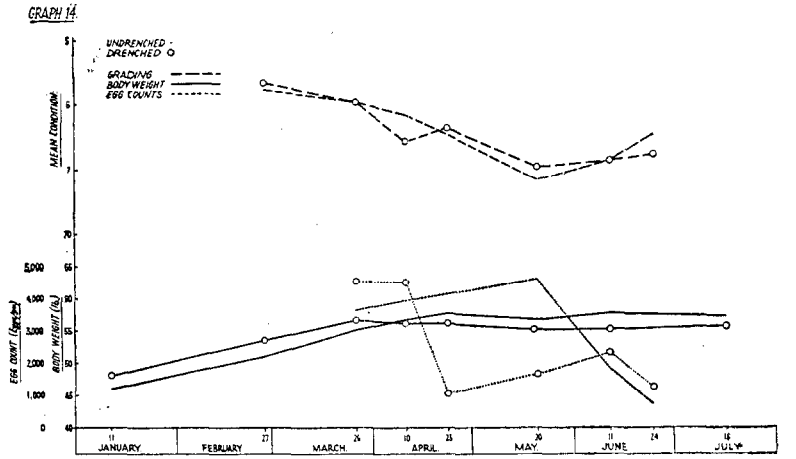

Figure 2.

spring of 1950 following two crops, one of swedes and one of chou moellier. These considerations led us to suspect not a drenching effect but a possible paddock effect.

In contrast to long grazing, two similar paddocks were prepared by cattle to a short sward. One carried a group drenched with phenothiazine at the same intervals as in the previous trial, and the other a control group of 60 similar undrenched hoggets. The growth curves in figure 2 illustrate the typical picture of hogget ill-thrift with a complete lack of response in body weight to drenching despite marked lowering of the egg count in April and May in the drenched group. These two field trials suggested that the conventional belief that parasites were responsible for hogget unthrift should be questioned, and in the following season further trials were laid down to contrast the growth curves of hoggets under drench and control treatments and under conditions designed to eliminate possible paddock effects.

When drenched and control hoggets are run together in the same paddock it has been argued that the full benefit from drenching cannot be achieved, since the undrenched hoggets are continually seeding the pastures with the eggs of the parasites they carry. Where the drenched and control groups are run in different paddocks possible paddock effects cannot be entirely eliminated. To overcome these weaknesses a 12 acre paddock was subdivided into 12 equal blocks and six blocks allocated at random to each group. Each set of six paddocks carried 30 ewe hoggets rotationally grazed, the rotation consisting of four to five days grazing of each paddock and the sheep were followed by cattle to control pastures. The cattle grazed each plot four to five days after the hoggets were moved, it being believed that this would achieve good decontamination of the pastures from parasites. Along with this trial another trial was run with similar hoggets where the drenched and control animals were run in the same paddock under set stocked conditions but at a rate of stocking of about three hoggets per acre.

It should be pointed out that in these trials the aim was to attempt to eliminate parasites with regular drenching with phenothiazine, purported to be the most efficient anthelmintic available, to see whether hoggets similar to those raised under extensive grazing conditions on the dairy farm could be achieved.

The results of these trials are shown in figures 3 and 4. On the randomised block (figure 3) the differences in the growth curves of the

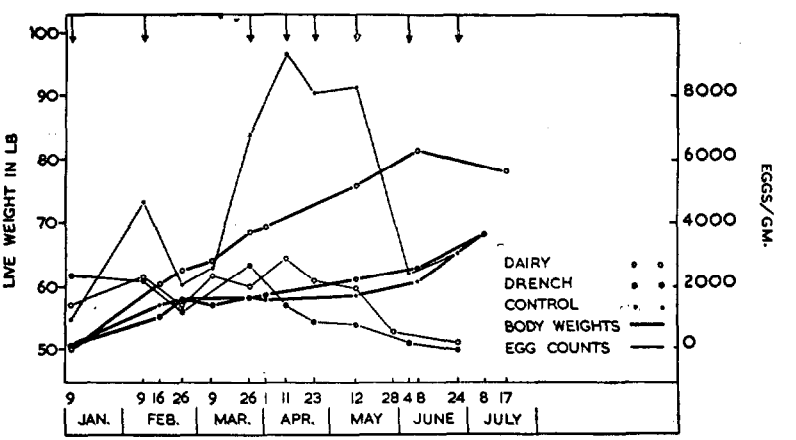

Figure 3.

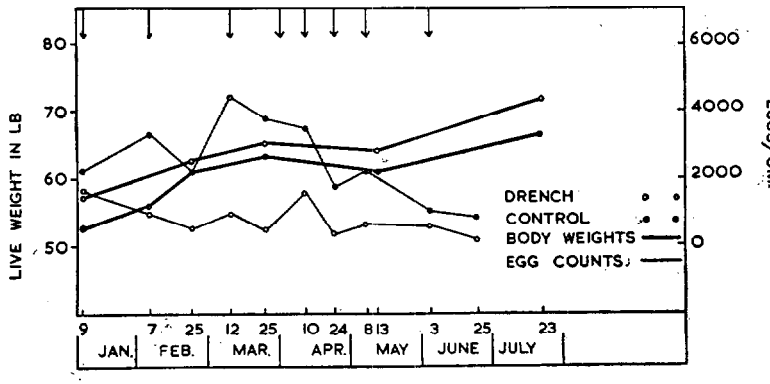

Figure 4.

drenched and control hoggets are negligible, whereas very marked differences in the mean egg counts are shown. For comparison the growth curve of a group of undrenched hoggets run on the dairy farm is shown. Here a very satisfactory growth rate was achieved, with hoggets initially similar in every respect to those used in the drenching trial. The interesting feature in these data is that drenching resulted in a reduction in mean egg count to a level below that in the dairy group, which was so markedly thrifty. That the frequency of drenching depressed the growth of the drenched hoggets is not supported by the fact that from June 8 onwards, both the drenched and control hoggets commenced to grow rapidly at the rate of 2 to 2½lb. live weight increase per week, although the drenching programme continued until June 24.

It is also clear from these results that the rotational grazing system adopted was markedly inefficient in the control of parasitism.

Hoggets run with these groups were killed at intervals to determine the species of nematodes present. The results are summarised in Table 1 and in general, are in support of the egg count data. It is clear, however, that while drenching has a marked effect on parasite burdens carried, it is much more efficient in the control of **Haemonchus contortus** than in the control of **Trichostrongylus Spp.** Animals killed on March 9 and on April 1 were selected at random. Those killed after these dates were unthrifty hoggets in extremis which probably carried heavier burdens than average animals of the groups.

TABLE I.

Group	Abomasum			Small Intestine
	Haemonchus	Ostertagia	Trich. axei	Trich. spp.
9/3/53 Dairy	1140	2100	200	2900
Drench	40	2000	Nil	4000
Control	4360	2700	1300	1700
1/4/53 Dairy	540	1000	1200	4100
Drench	40	700	100	1200
Control	11100	4200	3200	6400
9/4/53 Drench	Nil	100	Nil	5500
11/4/53 Control	7460	3600	2600	13100
13/5/53 Drench	Nil	Nil	200	3400
13/5/53 Control	Nil	100	8000	13000
19/5/53 Dairy	11	600	3700	8300
22/5/53 Control	2560	6100	7300	14500
25/5/53 Control	11200	3300	4800	——

Figure 4 summarises the results for the drenched and control groups (30 each) run together. From February 25 growth is very unsatisfactory in both groups and the mean differences in live weight between groups are small and non-significant. Drenching has markedly reduced egg counts but has not resulted in any marked improvement in body weight. In passing, it is interesting to note that very low levels of parasites, as indicated by egg counts, were achieved whether drenched and controlled groups were run together or separately.

It is not claimed that these data clearly relegate nematode parasitism to a secondary role in the development of the hogget ill-thrift syndrome. It is to be borne in mind that egg counts may give a too imperfect picture of the parasite burden carried since nematode species differ in their egg-laying capacity and also under a drenching programme egg laying may be depressed. These data do indicate however, that in the light of present knowledge intensive efforts aimed at eliminating or reducing parasitism cannot be relied upon appreciably to prevent the development of ill-thrift in hoggets nor to alleviate it once it has developed.

Discussion

Dr. McMEEKAN: From the shape of the growth curves it appears that these animals were on a maintenance ration only, over the autumn and winter months, except on the dairy farm. It is not known what factors are responsible for the difference between the dairy and the sheep pastures but quantity is certainly not one of them. Phenothiazine gives a 3-4 lb. body weight response and this at a time when no one sells sheep.

Dr. MELVILLE: What was the rate of stocking?

Mr. CLARKE: It was 3-4 per acre but with those grazed on the hills extensively it was only 2 per acre and these grew as well as those on the dairy farm.

Mr. ANDERSON: There are good hoggets in Southland where they graze crops for 3 months at 80-100 per acre.

Mr. CLARKE: We have also had good results in crops, where they made an immediate response of 3 lb. gain per week. Hogget raising presents a problem on good pasture with ample feed.

Mr. SINCLAIR: What was the clover content of the pasture? In Poverty Bay lambs can be fattened from December till mid-winter on clover dominant pastures. With ryegrass dominant pastures growth is definitely poorer.

Mr. CLARKE: In 1952 the pastures were clover dominant but in 1953 they were grass dominant though there was still plenty of clover present.

Mr. HAUGHEY: In the South Island unthriftiness is a problem on irrigated pastures or elsewhere when the summer is wet. It appears in mid-November. Is this the same problem?

Mr. CLARKE: The first signs appear from mid-February to mid-March. The P.M. results are confusing. A few lambs die of pulpy kidney and after that the flock slips back. After July recovery occurs and by September or October the hoggets are fat.

Mr. ANDREWS: Were any mineral supplements used?

Mr. CLARKE: None were used in this trial. All hoggets were drenched with Calciferol. The previous year cobalt was used but it gave no response.