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From the Department of Hygiene and Microbiology, and Department of Internal Medicine, Royal Veterinary and Agricultural University, National Veterinary Laboratory, and National Institute of Animal Science, Denmark.

A Study on the Effects of Tactical Drenchings with a Benzimidazole against Ostertagiasis in Calves

By *P. Nansen, R. J. Jørgensen, Sv. Aa. Henriksen* and *J. Foldager.*

Nansen, P., R. J. Jørgensen, Sv. Aa. Henriksen and J. Foldager: A Study on the effects of tactical drenchings with a benzimidazole against ostertagiasis in calves. Acta vet. scand. 1988, 29, 85-90. – In the present study tactical fenbendazole treatments against ostertagiasis in calves were given at short intervals towards the end of the grazing season. This prevented clinical disease and had moderate effects on parasitic loads in animals that stayed on the same pasture throughout the season. The feasibility of tactical treatments is discussed in relation to various strategical control measures.

anthelmintic treatment; fenbendazole; tactical drenching; production losses; pasture.

Introduction

A number of early-season suppressive anthelmintic strategies aiming at lowering build-up of high larval pasture loads in late summer, have been advocated and gradually taken into use. All of them, in the form of repeated anthelmintic treatments (e.g. *Armour* 1978), the use of intra-ruminal anthelmintic release bolus (*Veterinary Parasitology,* vol. 12, spec. issue, 1983), or one or two treatments with avermectins, may significantly lower parasitism and increase performance of the grazing stock.

However, many farmers do not take action before their animals obviously suffer from loss-producing infections in late summer or autumn, when single or repeated drenching may be undertaken on grounds such as evidence of diarrhoea or suspected unthriftiness. We decided to design an experiment to investigate, under controlled conditions, the effects of repeated treatments during this time of the year. According to *Gordon* (1973) and others, treatments given under known epidemiological conditions characterized by continuous high larval uptake, are classified as *tactical* (as opposed to strategic treatments such as the preventive early-season suppressive treatments mentioned above). Under the given experimental conditions we were able to analyze the effects of such tactical treatments, both in animals grazing the same pasture throughout the season, and in animals moved to aftermath in midsummer.

Materials and methods

The experiment was located in North Zealand on grasslands belonging to a research station under the National Institute of Animal Science. A pasture, grazed by young stock the preceding years and consequently widely contaminated with trichostrongyle larvae, was used. Prior to the experiment it was divided into four plots of equal size (0.62 hectare).

The experiment comprised twenty-four first-season Black Pied Danish heifer calves, which at the start of the experiment had an average age and weight of 4.6 months and 133 kg, respectively. Four groups of six animals each were formed on the basis of age, weight, and sires.

On May 18th the four groups of calves were turned out; groups a_1 + a_2 on plot A_1, and groups b_1 + b_2 on plot B_1 (Table 1). It was the intention to let the calves graze these plots until mid-July because based on epidemiological grounds it would be the time normally recommended for moving to aftermath. However, low rainfall in May and June resulted in scarcity of grass, which again was reflected in low weight gains. It was therefore decided to transfer animals to aftermath already on June 29th. As it will appear from Table 1, groups a_2 and b_2 were then transferred to the plots A_2 and B_2 which had been cut for silage shortly before the animals arrived. By this procedure the initial stocking rate was reduced by 50% on all plots. This is to be seen as an adaptation to the normally occurring reduction in grass yield on Danish pastures from July onwards.

The calves of groups a_1 and a_2 were given three anthelmintic treatments at two-week intervals, i.e. on August 16th, August 30th, and September 13th. Each animal received 7.5 mg fenbendazole (Panacur[R], Hoechst Ltd.), per kg body weight. All animals were housed on September 29th.

Parasitological analyses

Herbage samples and blood and faecal samples were obtained at two- or three-week intervals. Collection of herbage and determination of larval counts were made according to *Henriksen et al.* (1976a). Faecal egg counts were made according to a modified McMaster method and pepsinogen in serum was determined according to the procedure used by *Ross et al.* (1967).

Other recordings

The calves were weighed in combination with samplings, on which occasions also grass on offer on the plots was subjectively evaluated and compared. The animals were inspected daily.

Results

Herbage larval counts, dominated by Ostertagia ostertagi, were rather low in the early part of the season (Fig. 1), but nevertheless

Table 1. Experimental design. Use of grazing plots and application of anthelmintic treatments.

Grazing periods	Plots	Animal groups	Anthelmintic treatment (dates)
May	A_1	$a_1 + a_2$	-
18th	B_1	$b_1 + b_2$	-
to			
June	A_2	ungrazed	-
29th	B_2	ungrazed	-
June	A_1	a_1	16/8, 30/8, 13/9
29th	B_1	b_1	-
to			
Sept.	A_2	a_2	16/8, 30/8, 13/9
29th	B_2	b_2	-

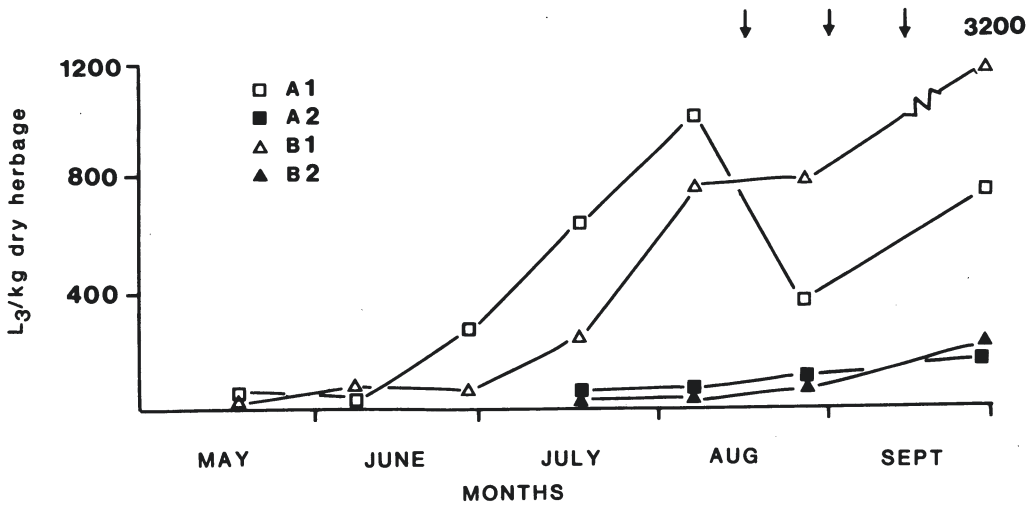

Figure 1. Herbage trichostrongyle larval counts on the four experimental plots (see Table 1 legends). Treatments indicated by arrows.

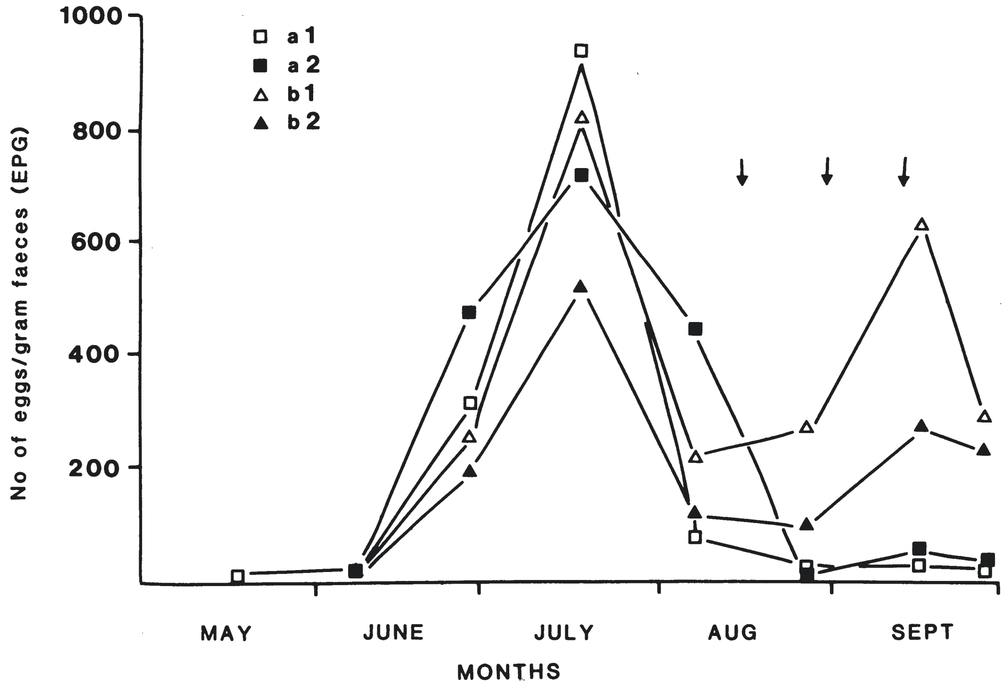

Figure 2. Mean faecal trichostrongyle egg counts of the groups of experimental calves (see Table 1 legends). Treatments indicated by arrows.

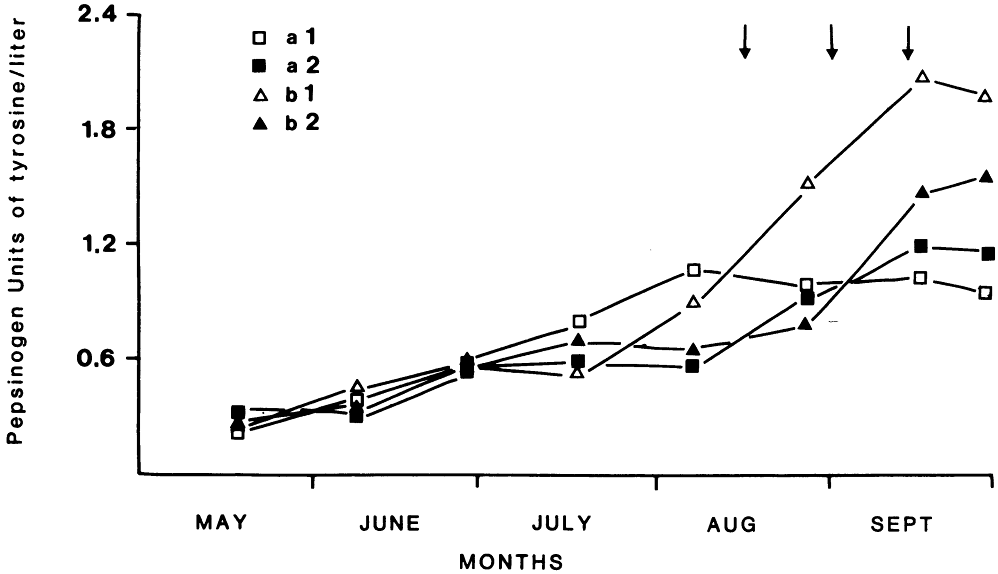

Figure 3. Mean serum pepsinogen levels of the experimental groups of calves (see Table 1 legends). Treatments indicated by arrows.

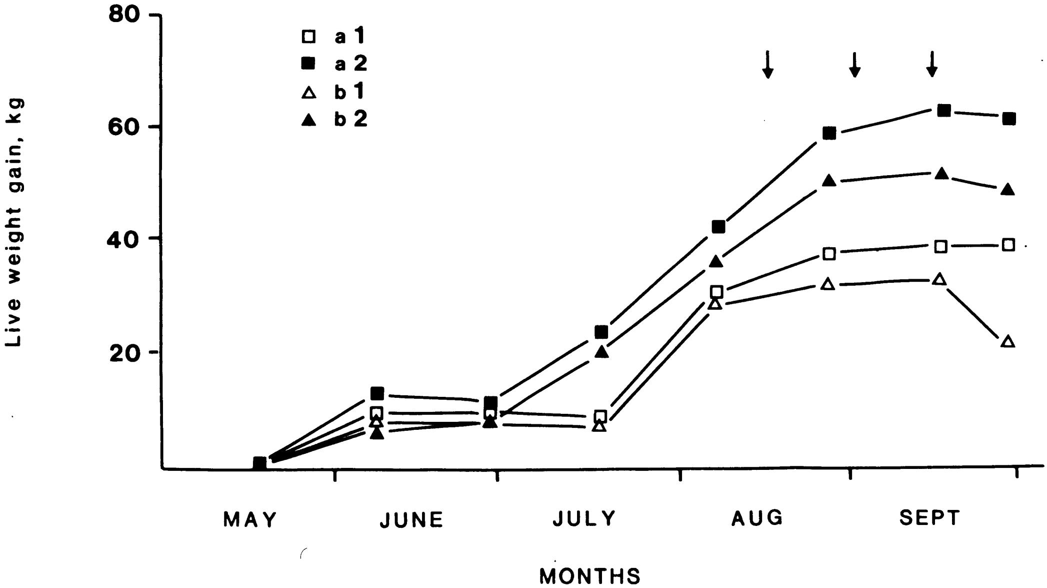

Figure 4. Mean weight gain figures of experimental groups of calves (see Table 1 legends). Treatments indicated by arrows.

all groups of calves acquired substantial worm burdens, as reflected in moderate to high egg counts around July (Fig. 2).

A predictable herbage infectivity pattern followed in that significant rises were observed only on the permanently grazed plots A_1 and B_1 from midsummer onwards, whereas counts remained very low on aftermath plots (A_2 and B_2) apart from a minor rise towards the very end of the season (Fig. 1).

The results show that the repeated drenchings in August and September were able to suppress pathogenic worm loads. Thus, among the calves that grazed on the same plots throughout, the treated ones (group a_1) remained symptom-free, in contrast to the untreated (group b_1) which gradually developed overt clinical ostertagiasis in September. This was well reflected in differences between egg counts (Fig. 2), pepsinogen levels (Fig. 3), and weight gains (Fig. 4). All these differences became statistically significant ($p < 0.05$) at housing time in late September. It is noteworthy that there were also slight treatment effects among moved calves towards the end of the season, yet this was statistically reflected only in egg count differences ($p < 0.001$).

By visual inspection scarcity of grass was recorded in the grazed plots in June, and, as mentioned earlier, this hastened the date of moving to June 29th. In plots A_2 and B_2 which were now taken into use, there was a temporary increase in grass availability, which may partly account for the relative weight gain rises in groups a_2 and b_2 already in July (Fig. 4). Towards the end of September grass scarcity became evident on all plots, and this presumably explained the rather poor performance recorded in all groups of calves during the last weeks prior to housing.

Discussion

Under the given conditions, the multiple anthelmintic drenchings during late summer prevented the precipitation of clinically overt disease in the non-moved calves by ensuring a lowering of the parasitic loads. But this treatment scheme, although reducing egg excretion persistently, did not cause any absolute decrease in the pepsinogen levels. This was to be expected in the present situation where a continuous uptake of larvae from an excessively infected pasture took place. Anthelmintic treatment, no matter how efficacious, will have only a temporary effect, and within a short period of time the worm burden will return to its former level. The beneficial results, which after all were achieved in this study, have undoubtedly been due to the fact that drenchings were repeated at relatively short intervals, and at the peak of parasitism.

The expected finding, that animals moved to aftermath performed better than non-moved ones, may be explained by lower parasite burdens, and partly by more herbage on offer in July. The observed tendency to treatment effects may be seen in the light of the rather early transfer of calves to aftermath that provided a sufficiently long period for cycling and build-up of parasites on pasture. Such a build-up is indicated by rises in September in larval counts (Fig. 1), egg count (Fig. 2), and pepsinogen levels (Fig. 3) of plot B_2 and in group b_2, respectively.

In our country a number of strategies have been developed and recommended to prevent build-up of high pasture infectivity during the second part of the grazing season. These strategies which comprise e.g. midsummer move to safe grazing on aftermath (*Henriksen et al.* 1976b), late turnout in spring (*Nansen et al.* 1987), or use of an in-

tra-ruminal anthelmintic release bolus given at turnout (*Jørgensen* 1983), seem generally to ensure less parasitism and higher performance than tactical treatments such as those given in the present experiment.
However, late-season tactical treatments may nevertheless be the choice in a variety of situations, e.g. where worm control for various reasons has not been planned in advance, where transfer to aftermath takes place very early, or where grass scarcity occurs and no alternative grazing is at hand. This study on set-stocked calves on permanent pasture suggests that clinical disease may be prevented and losses alleviated, yet not avoided.

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Sammendrag

En undersøgelse af virkningen af taktiske doseringer med et benzimidazol over for ostertagiose hos kalve.
I undersøgelsen foretoges taktiske fenbendazole-behandlinger af kalve med korte intervaller mod græsningssæsonens slutning. Dette forebyggede opståen af klinisk ostertagiose og havde en vis reducerende effekt på parasitbyrderne hos kalve, som opholdt sig på samme græsmark hele sæsonen. Anvendelsen af taktiske behandlinger diskuteres i relation til en række strategiske kontrolmetoder.

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Reprints may be requested from: P. Nansen, Department of Hygiene and Microbiology, Royal Veterinary and Agricultural University, 13 Bülowsvej, DK-1870 Frederiksberg C, Denmark.