THE EFFECT OF REPEATED ANTHELMINTIC TREATMENT ON BODY WEIGHT GAINS OF CALVES

R. K. KEITH, A.R.A.C.I.

Division of Animal Health, CSIRO, Veterinary Parasitology Laboratory, Yeerongpilly, Queensland

Introduction

Several highly efficient anthelmintics for cattle have become available in recent years. At present, however, they are mainly used in a curative role following outbreaks of helminthosis. Little attention has been directed to the possible use of these drugs in preventing the clinical disease in cattle, and to the effect of treatment on host-parasite relations.

Studies on these aspects of anthelmintic treatment are being undertaken at this laboratory. Observations on the effect of frequent treatment on the body weight gains of grazing calves are reported in this paper.

Experimental Procedure

Two trials were conducted on the laboratory's field station at Amberley, about 25 miles west of Brisbane in south eastern Queensland. The natural pastures in this area have been described by Durie (1962).

Trial 1

Fifteen Australian Illawarra Shorthorn calves, about three months old, were obtained from dairy farms in the district. The animals were placed on a natural pasture of 20 acres that had been grazed previously by helminth-infected calves. The animals were weighed at weekly intervals, when faecal samples were taken for egg counts and larval cultures, made according to the methods described by Roberts *et al* (1962).

After four weeks grazing the animals were divided into two groups of comparable mean body weights. One group of eight calves was dosed orally with trichlorphon* at a dose rate of 2.5 g per 100 lb body weight. Treatment was repeated at intervals of four weeks until the egg counts of the control group of seven calves, which were not treated, declined to low levels. Nine treatments were given. Observations on body weights and egg counts continued until two weeks after the final treatment.

Trial 2

Fifteen calves about four months old, and of similar breed and origin to those used in the first trial, were placed on the same pasture at the conclusion of that experiment. A similar procedure was followed. The treated animals received eight treatments.

All animals in both trials were sprayed frequently with acaricides in order to keep infestations of the tick *Boophilus microplus* at a minimal level.

In order to simplify the graphs (Figures 1 and 2) all points, with the exception of the initial and final points, represent the means of data obtained in the preceding periods of four weeks.

*Neguvon Liquid Worm Drench. Bayer Leverkusen Ltd.

Results

Trial 1

Body weight and egg count data are shown in Figure 1.

The egg count data for the untreated calves indicated that *Cooperia* spp *(C. punctata* and *C. pectinata)* and *Oesophagostonum radiatum* were the more abundant helminths.

The lower egg counts recorded for the treated calves showed that treatment was effective against these species. There was, however, a tendency for *Cooperia* spp counts to rise during some intervals between treatments.

Infections with *Hæmonchus placei, Bunostomum phlebotomum,* and *Trichostrongylus axei* were also recorded during the trial. The maximum mean counts for these species in the un-

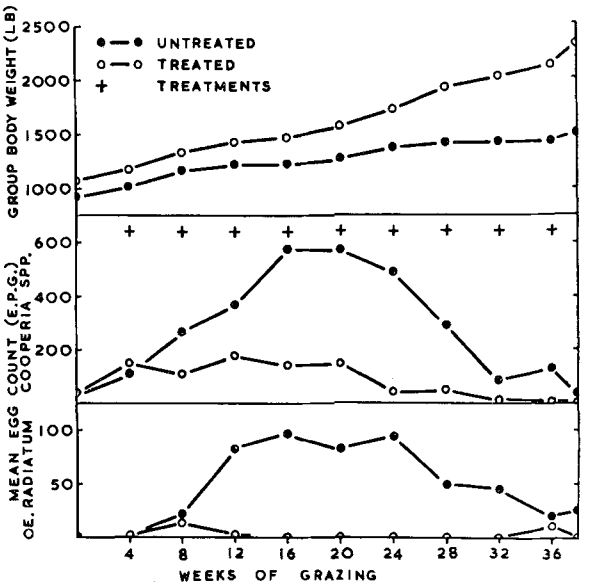

Figure 1 — Group body weight and egg count trends of *Cooperia* spp and *Oesophagostomum radiatum* for a group of eight calves treated at intervals with an anthelmintic, and for an untreated group of seven calves grazing the same pasture.

treated group, however, were only 10, 20, and 10 eggs per gram (epg), respectively. The corresponding counts for these species in the treated group were 0, 5, and 5 epg.

Body weight gains of both groups were similar during the first nine weeks of grazing, but thereafter the treated group made greater gains. From the time of the first treatment to two weeks after the final treatment, the weight gains of the treated and untreated calves ranged from 87-185 lb (mean 135 lb), and from 8-116 lb (mean 62 lb), respectively. 'Student's' *t*-test indicated that the difference of 73 lb between means was highly significant ($P < 0.01$).

Trial 2

Body weight and egg count data are shown in Figure 2.

Egg counts for the untreated calves indicated that *Cooperia* spp, *Oe. radiatum,* and *H. placei* were the more prevalent helminths. Two untreated calves died, one after nine weeks grazing; the other after 14 weeks. The maximum counts shown by these animals were, for *Cooperia* spp 1480 and 1150 epg, and for *Oe. radiatum* 660 and 1100 epg, respectively.

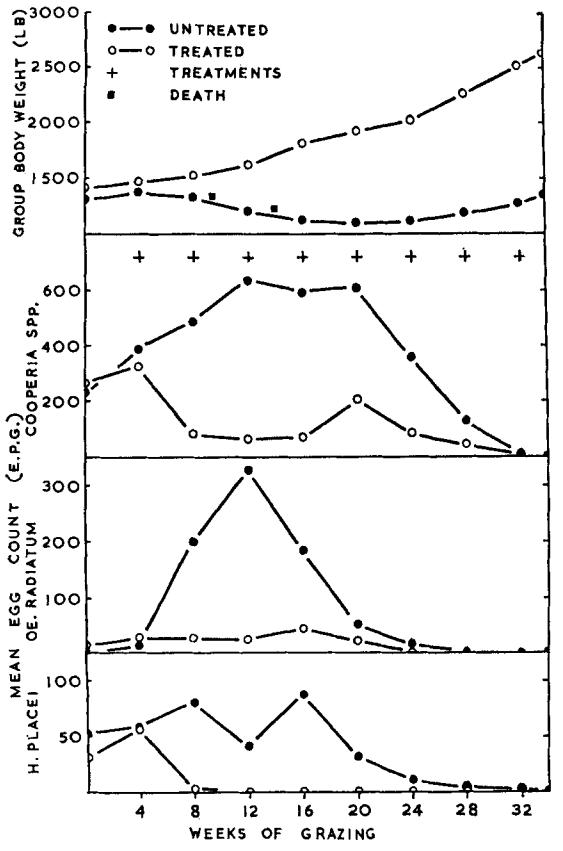

Figure 2 — Group body weight and egg count trends of *Cooperia* spp *Oesophagostomum radiatum,* and *Haemonchus placei* for a group of eight calves treated with an anthelmintic, and for an untreated group of seven calves grazing the same pasture.

The egg count trends of the treated calves showed that treatment was effective against *Cooperia* spp, *Oe. radiatum* and *H. placei.* However, counts of *Cooperia* spp and *Oe. radiatum* tended to rise during some intervals between treatments.

The maximum mean counts recorded for the untreated and treated groups for *B. phlebotomum* were 20 and 5 epg, and for *T. axei* 50 and 10 epg, respectively.

Both groups showed comparable weight gains in the first five weeks of grazing, but subsequently the treated group made greater gains. From the time of the first treatment to two weeks after the final treatment the treated calves gave weight gains of 50-236 lb (mean 146 lb). During the same period the five survivors of the untreated group showed weight gains of 49-104 lb (mean 72 lb). The difference of 74 lb between means was significant ($0.01 < P < 0.05$).

Discussion

All of the helminth species present in the untreated calves have been reported as being pathogenic (see Soulsby 1965). However, the egg count levels and relative pathogenicity suggest that *Cooperia* spp and *Oe. radiatum* were mainly responsible for the deaths and reduced weight gains recorded in the present trials. Comparable infections with these species, as judged on egg counts, were encountered by Roberts *et al* (1952) in their studies on the epidemiology of parasitic gastro-enteritis in Queensland cattle.

The effect of the treatments with trichlorphon on these species was consistent with the report of Riek and Keith (1958) on the anthelmintic efficiency of this drug at the dose rate used. The increase in egg count recorded during the intervals between some treatments was attributed to reinfection, and to the maturation of histotropic larval stages.

The relatively poor quality of the pasture was reflected in the moderate weight gains shown by the treated animals in the two trials. The low plane of nutrition may well have enhanced the effect of the infections on the untreated animals. However, calves on a higher plane of nutrition have also been reported as showing increased weight gains in response to treatment (Cairns and Gallagher 1964).

In the present trials anthelmintic treatment at intervals of four weeks resulted in a significant improvement in body weight gains, and prevented deaths from helminthosis. However, calves may succumb rapidly following ecological conditions leading to heavy pasture infection (Durie and Elek 1966). In such circumstances treatment at intervals as short as two weeks may be required to prevent deaths.

Summary

Studies are reported on the effect of frequent anthelmintic treatment on the body weight gains of grazing calves.

In one experiment, eight calves treated nine times with trichlorphon at intervals of four weeks gained an average of 73 lb more than seven untreated calves grazing the same worm-infected pasture.

In a second and similar experiment eight calves treated eight times gained an average of 74 lb more than the survivors of seven untreated calves, two of which died of helminthosis.

The helminths mainly responsible for the deaths and reduced weight gains of the untreated calves were *Cooperia* spp *(C. punctata* and *C. pectinata),* and *Oesophagostomum radiatum.*

References

Cairns, G. C. and Gallagher, R. M. (1964)—*N.Z. vet. J.* **12:** 26.

Durie, P. H. (1962)—*Aust. J. agric. Res.* **13:** 767.

Durie, P. H. and Elek, P. (1966)—*Aust. J. agric. Res.* **17:** 91.

Riek, R. F. and Keith, R. K. (1958)—*Aust. vet. J.* **34:** 93.

Roberts, F. H. S., Elek, P. and Keith, R. K. (1962)—*Aust. J. agric. Res.* **13:** 551.

Roberts, F. H. S., O'Sullivan, P. J. and Riek, R. F. (1952)—*Aust. J. agric. Res.* **3:** 187.

Soulsby, E. J. L. (1965)—"Textbook of Veterinary Clinical Parasitology." Vol. 1. Blackwell Scientific Publications, Oxford.

(Received for publication 16 *May* 1968*)*

CORRECTION

PARENTERAL CHEMOTHERAPY OF OVINE FOOT-ROT

J. R. EGERTON, B.V.Sc., Dip. Bact., I. M. PARSONSON, B.V.Sc., and N. P. H. GRAHAM, B.V.Sc.

Aust. vet. J. **44:** 275.

In Table 1, on page 276, of the above paper the minimum bactericidal concentration of erythromycin thiocyanate should read 1.0 μg/ml instead of > 10 μg/ml.