

# PERSISTENT ANTHELMINTIC EFFECT OF IVERMECTIN IN CATTLE

G.E. SWAN and R.G. HARVEY\*

**ABSTRACT:** Swan G.E.; Harvey R.G. **Persistent anthelmintic effect of ivermectin in cattle.** *Journal of the South African Veterinary Association* (1983) 54 No. 4, 249-250 (En). MSD Research Centre, Private Bag 3, 1685 Halfway House, Republic of South Africa.

The persistent anthelmintic effect of ivermectin given subcutaneously at 200 mcg/kg was evaluated against induced infections of *Haemonchus placei*, *Ostertagia ostertagi*, *Cooperia* spp. (*C. pectinata* and *C. punctata*), *Bunostomum phlebotomum* and *Oesophagostomum radiatum* in cattle. Forty-four Friesian bull calves raised under worm-free conditions were restrictively randomized to one untreated control group and 3 ivermectin treated groups of equal size according to mass. Animals in the different treated groups were treated either 9, 7 or 5 d before infestation, which was induced in all animals on the same day. The results are presented as percentage reduction and Non Parametric claims. Nine days after treatment the effect of ivermectin was virtually undiminished against *O. ostertagi* and *B. phlebotomum* and 7 d after treatment against *Cooperia* spp. Counts of all worms were reduced by 99 % or more following the treatment given 5 d before infection. According to the Non Parametric Method, "A" claims (i.e. 80 % effective in 80 % of the treated animals) were achieved against all 5 worms up to 7 d after treatment and against *O. ostertagi* and *B. phlebotomum* up to 9 d after treatment.

Key words: Persistent anthelmintic effect, ivermectin, *Haemonchus placei*, *Ostertagia ostertagi*, *Cooperia pectinata*, *Cooperia punctata*, *Bunostomum phlebotomum*.

## INTRODUCTION

The broad spectrum antiparasitic effects of ivermectin have been documented in many publications<sup>4,5</sup>. It has been noted that the effect of ivermectin against ectoparasites persists for at least some days after the medication is given<sup>1,6</sup>. Subsequently, Bremner et al.<sup>3</sup> and Barth<sup>2</sup> reported that the persistent activity is also effective against nematodes. This paper describes the results of a trial in South Africa confirming this persistent anthelmintic activity.

## MATERIALS AND METHODS

Forty-four Friesian bull calves raised under worm-free conditions were ranked according to weight and 11 replicates formed. Within each replicate the animals were then randomly allocated to one of 4 treatment groups. Infestations were induced in all on the same day by administration of infective larvae. *Bunostomum phlebotomum* larvae were applied dermally. A mixture of *Haemonchus placei*, *Ostertagia ostertagi*, *Cooperia* spp. (*C. pectinata* and *C. punctata*) and *Oesophagostomum radiatum* was given orally on filter paper discs in gelatin capsules.

Group 1 was unmedicated. The animals in Group 2 were given 200 mcg/kg (the recommended level) of ivermectin (Ivomec, Merck & Co., Inc.) by subcutaneous injection 9 d before infestation with the larvae while those in Groups 3 and 4 were given the same medication 7 d and 5 d resp. before the larvae were administered.

The animals were slaughtered and processed for worm recovery 26–30 d after the nematode infestation had been induced.

The worm burdens of the different treatment groups were ranked separately for each parasite and the efficacy determined by the modified Non Parametric Method (NPM)<sup>7</sup>.

## RESULTS

Percentage reduction and NPM efficacy claims were as follows:

\*MSD Research Centre, Private Bag 3, 1685 Halfway House.

	200 mcg/kg of ivermectin number of days before infection			
	Unmedicated*	5 days	7 days	9 days
<i>H. placei</i>	1122.7 ± 389.1	99.6(A)**	84.9(A)	37.2(X)
<i>O. ostertagi</i>	916.4 ± 386.7	100. (A)	99.8(A)	95.8(A)
<i>Cooperia</i> spp.	1622.7 ± 444.7	99.9(A)	99.6(A)	87.8(B)
<i>O. radiatum</i>	996.8 ± 348.2	99.9(A)	95.1(A)	73.3(C)
<i>B. phlebotomum</i>	319.1 ± 171.8	100. (A)	95.5(A)	97.0(A)

\*Arithmetic mean of worm counts ± standard deviation.

\*\*NPM efficacy claim given in parenthesis.

A = More than 80 % effective in more than 80 % of treated cattle.

B = More than 60 % effective in more than 60 % of treated cattle.

C = More than 50 % effective in more than 50 % of treated cattle.

X = Ineffective.

According to the NPM, "A" claims (i.e. 80 % effective in 80 % of the treated animals) were obtained against all worms up to 7 d after treatment, as well as against *O. ostertagi* and *B. phlebotomum* at 9 d after treatment.

## DISCUSSION

It is evident that in this trial the effect of the ivermectin was virtually undiminished 9 days after administration against infections of *O. ostertagi* and *B. phlebotomum*, and 7 days after treatment against infections of *Cooperia* spp. Counts of all worms were reduced by 99 % or more following the treatment given 5 days before infestation.

As has been mentioned by Barth<sup>2</sup>, such persistent activity could be exploited by using treated cattle to reduce populations of infective larvae on pasture. This should have effects much more far-reaching than is usually expected from treatment of an established infestation.

## ACKNOWLEDGEMENTS

The authors wish to thank Mesdames I. Penderis and S. Meyer for their technical assistance.

## REFERENCES

1. Barth D, Sutherland I H 1980 Evaluation of the efficacy of ivermectin against ectoparasites of cattle. Proceedings of 9th meeting German Society of Parasitology, Giessen, Germany, Abstract No. 57
2. Barth D 1983 Persistent anthelmintic effect of ivermectin in cattle. Veterinary Record (Submitted for publication)
3. Bremner K C, Berrie D A, Hotson I K 1983 Persistence in calves of the anthelmintic activity of ivermectin. Veterinary Record (submitted for publication)
4. Campbell W C 1981 An introduction to the avermectins. New Zealand Veterinary Journal 29: 174
5. Hotson I K 1982 The avermectins: a new family of antiparasitic agents. Journal of the South African Veterinary Association 53: 87
6. Meleney W P, Wright F C, Guillot F C 1982 Residual protection against cattle scabies afforded by ivermectin. American Journal of Veterinary Research 43(10) 1767
7. Reinecke R K 1973 The larvae anthelmintic test in ruminants. Technical communication No. 106, Department of Agricultural Technical Services, Rep of South Africa

## BOOK REVIEW

## BOEKRESENSIE

## KEEP YOUR PIGEONS FLYING

LEON F. WHITNEY

2nd ed. Faber and Faber, London. 1983. pp. 252, Figs. 15, ISBN 0-571-11541-1. Price: R10,40

Although the author specifically states that this book is intended for racing pigeon fanciers and not for scientists, it can be a valuable asset on the veterinarian's bookshelf. As the title indicates, the main object of the book is to keep the pigeons flying by proper health care, disease prevention and optimal nutrition.

A wide variety of viral, bacterial, fungal and parasitic diseases and ailments of pigeons are dealt with. Other chapters include elementary physiology, nutrition, pigeon

surgery, drugs and their uses and public health hazards caused by pigeons.

The book was first published in 1961. The second edition appeared in 1968. The copy received for reviewing is the 1983 paperback format of the second edition. During the 15 years new drugs and especially more effective anthelmintics and insecticides have become available. In this respect the book is outdated.

**J.F.W. Grosskopf**