

## The Use of Ivomec® in the Gulf District of the Northern Territory

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### SUMMARY

A trial was conducted in the Gulf district of the Northern Territory to measure the response in weight gain of export steers to the use of Ivomec®. One hundred (100) Brahman, Brahman x Shorthorn and Shorthorn steers were randomly selected. Forty nine (49) of the steers received two treatments of Ivomec®, and the remaining fifty one (51) steers formed the control with no treatment. There was no significant difference ( $P > 0.05$ ) in the mean weight gain of the steers in the treated group and the control group. Similarly, there was no significant difference ( $P > 0.05$ ) in the mean weight gain of steers in different weight classes. A visual response in some steers treated with Ivomec® was observed in that a "shiny" coat developed.

It was considered uneconomic to use Ivomec® in export steers in the Gulf district of the Northern Territory unless a premium price was received as a result of the "shiny" coat.

### INTRODUCTION

The aim of this demonstration was to contribute local field data to information enabling extension officers to make recommendations to pastoralists on the use of Ivomec® in steers suitable for export, in the Gulf district of the Northern Territory.

In recent times ivermectin has become widely used in beef cattle husbandry to improve weight gain in export steers. There is also anecdotal evidence that steers treated approximately six weeks before sale tend to command higher prices when sold through the auction system at saleyards. Animals treated with Ivomec® develop a "shiny" coat and look better when presented for sale, and so command premium prices.

Positive production and economic benefits of internal parasite control of cattle in the Northern Territory has not been demonstrated with the exception of shorthorn cattle in high rainfall areas. Stockwell (1989) found no significant response in liveweight gain in steers treated with Avomec® on Hodgson River in the Gulf district of the Northern Territory. In an unpublished report by Coventry *et al.* (1990), a trial conducted in the Alice Springs district using ivermectin or oxfendazole did not produce a weight gain response in weaners.

Radunz (1992) reviewed the published and some unpublished literature on cattle worms in northern Australia. *Ostertagia sp* has not been demonstrated in the Northern Territory. Consequently effective worm treatment can be done with the older lower cost anthelmintics. See Appendix A for alternative drenches and costs.

The aim of this trial was to determine whether there was a significant production and economic response in weight gain to the use of Ivomec® in weaner and yearling steers suitable for export, in the Gulf district of the Northern Territory.

## MATERIALS AND METHODS

### I. Location

The trial was conducted at McArthur River Station 136° 50'E 17° 40'S situated in the Gulf district of the Northern Territory. Details of climate, vegetation and edaphic conditions are detailed by Christian *et al.* (1954), Holmes (1986) and Michell and Stockwell (1982). Average annual rainfall of 749 mm is concentrated in the months of December to March.

### II. Treatments

The trial commenced in November of 1991 when 100 steers were randomly allotted to two groups. Forty nine (49) steers were treated with 5 mL of Ivomec® via subcutaneous injection. These steers received another 5 mL of Ivomec® via subcutaneous injection in March 1992 after the wet season. The remaining fifty one (51) steers formed the control group that had no treatment.

### III. Animals and Management

- a. Brahman, Brahman x Shorthorn and Shorthorn breeds of cattle of mixed ages were used in this study. Animals were allocated by a simple random allocation to groups.
- b. All steers were individually identified with numbered ear tags.
- c. Both the control group and the treatment group were run together in the same paddock, stocked at a rate of 5 beasts/km<sup>2</sup> representing district stocking rates.

Previous studies in the Northern Territory demonstrated a paddock effect on weight gain that usually exceeded response to anthelmintics. It is recognised that this design will not provide optimal worm control due to the potential larval contamination by the control group. However, it is the best compromise to measure weight gain response to treatment with Ivomec®.

### IV. Measurements

- a. Each animal was weighed at the commencement of the trial in November of 1991. The steers were weighed as soon as possible after the wet so that the response in weight gain over the wet season could be measured.
- b. In May of 1992 the steers were mustered and weighed for the final time, and sold.

### V. Analysis

The data was analysed by an independent t-Test of treatments and treatments x weight. An economic analysis of the results was performed.

## RESULTS

Of the 100 animals in the trial, data analysis was restricted to only the fifty eight animals that were present for all three recording periods. This was due to the difficulty in mustering, and recovery of animals after the wet season. Of these fifty eight animals, twenty nine (29) were in the control group and twenty nine (29) in the treated ivermectin group.

Table 1 is a summary of the results for the steers that were present for all three successive recordings. Table 2 summarises the data for all the steers that were present at each recording. At the commencement of the trial, the initial mean weight of the treatment group (ivermectin treated) was 179 kg compared to the control group which weighed on average 170 kg (see Table 2). At the trials completion, the average mean weight for the treatment group was 267 kg compared to the control group which weighed 275 kg (see Table 2).

The wet season mean weight gain for the treatment group was 72 kg compared to 71 kg for the control group (see Table 2). The mid dry season mean weight gain for the treatment group was 37 kg compared to 44 kg for the control group (see Table 2). The total wet season/dry season mean weight gain was 105 kg for the treatment group compared to 107 kg for the control group (see Table 2).

Table 3 displays the weight gain performance of steers in different weight classes. The steers varied in age from 8 months to 3 years upon initiation of the trial.

No ticks or lice were visible on either the control or the treated steers. No samples for faecal egg counts were taken.

## DISCUSSION

This trial did not demonstrate a significant response in weight gain to the use of Ivomec® in steers in the Gulf country of the Northern Territory, thus supporting the findings of Stockwell (1989). Egg counts were not performed, therefore initial worm burden of the steers could not be assessed. However, the steers had not been treated at any time prior to the trial, and the trial was conducted at the time of the year when optimal worm burdens are expected. The aim of the trial, however, was to determine the effect of one or two wet season treatments with Ivomec® on weight gain of export steers, not to measure optimal control of internal parasites.

The results in Table 1 vary somewhat from the results obtained in table 2. The results in Table 1 represent data obtained from animals present at all three successive recordings. However, these results do not reflect the even distribution of the animals in terms of weight in the initial groups. The initial mean weight of the treatment group was 153 kg according to table 1, when in actual fact the initial mean weight of the treatment group was 179 kg (see Table 2). This lighter weight of the treatment group had an adverse effect on the results in Table 1, and does not allow an accurate comparison of the results in terms of the effect of ivermectin on weight gain in steers of the gulf district of the Northern Territory. For this reason and for the purposes of this discussion the comparisons made will be in reference to Table 2.

The difference between the initial mean weights of the control and the treatment group of 9 kg was not significant ( $P > 0.05$ ). This suggests that the random selection of animals was relatively uniform. After the initial dose of Ivomec® was administered, the performance of the steers was analysed to measure the response to ivermectin over the wet season. The mean wet season weight gain for the treatment group was 72.0 kg compared to 71.4 kg for the control group (see Table 2). This difference was not significant ( $P > 0.05$ ).

After the wet season the steers in the treatment group received another dose of Ivomec®. A mid dry season mean weight gain was measured. The treatment group mean weight gain was 37.0 kg compared to 40.7 kg for the control group (see Table 2). This difference was not significantly different ( $P > 0.05$ ). A total wet season/dry season mean weight gain was calculated. The treatment group achieved a total mean weight gain of 105 kg compared to 107 kg for the control group (see Table 2). This difference was not significant ( $P > 0.05$ ).

The data for the two groups was stratified by weight, and a comparison of the treatment and control group by weight was made. There was no significant difference between the means for weight and between the means for weight gain in any of the different weight classes of steers for the treatment and control group (see Table 3). There was no significant difference in the lighter weight categories where one might have expected a significant response to the use of Ivomec®. That is, had worm burdens been high, the younger lighter animals that are more likely to be affected did not show a response.

Despite the results not being considered to be statistically significantly different, it is worth analysing what cost benefit, if any, was achieved through using Ivomec®. A breakdown of costs for the treatment with Ivomec® is shown in Appendix B. For the use of Ivomec® to be economical, the estimated increase in live weight of 7.82 kg

was required (see Appendix B). Table 3 shows that a response of this magnitude across the range of weight classes was not obtained. Therefore, in terms of weight gain, it is not economical to use Ivomec®.

A notable feature of some of the steers treated with Ivomec® was that they did indeed develop "shiny" coats. A possible explanation for this, is that ivermectin aids in control of the cattle tick *Boophilus microphus* and the cattle mite *Choriophthes bovis* (Badewitz-Dodd and Turnanow-West 1992), as well as internal parasites. Visually, this certainly attracted the eye, and may have appealed to a buyer in the saleyard or live exporter, therefore possibly attracting a higher price. Therefore, if we assume a premium of five cents/kg liveweight is paid for the treated animals at an average liveweight of 270 kg, this is a gross return of \$13.50, less the cost of the treatment of \$8.60, leaving a nett return of \$4.90 per animal (see Appendix C).

Ivomec® has sustained activity against *Ostertagia* species and *Cooperia* species acquired up to 7 days after treatment, and lung worm (*Dictyocaulus viviparus*) acquired up to 14 days after treatment (Badewitz-Dodd and Turnanow-West 1992). However, treatments in the trial were administered at approximately three month intervals to determine the response in weight gain to the use of Ivomec® as it would be used in the commercial situation. The trial was conducted at a time of the year when conditions were optimal for larvae survival. Studies by Henderson and Kelly (1978), and Radunz (1985) indicated low worm populations in beef cattle of Northern Australia. Radunz (1992) suggests that this finding is due mainly to the effect of both the harsh environment on the larval worms, and low stock density in Northern Australia. It is probably due to these low worm populations that Ivomec® has failed to produce a significant response in weight gain. Wormicides are unlikely to produce significant weight or economic responses in this environment. This together with the fact that Ivomec® is short acting and effective for up to only 7-14 days after treatment may explain why there was no response to the use of Ivomec®. The use of a slow sustained release anthelmintic such as recently developed overseas may in fact produce a response. It was thought that Ivomec® may have had a more positive response in terms of weight gain on younger recently weaned steers, more susceptible to parasitic burdens than older less stressed animals, however, this was proven not to be the case (see Table 3).

Both the treatment group and the control group were run together in the same paddock, and this may have resulted in a less than optimal response to Ivomec® due to reinfection of larval worms, however, this is unlikely due to the above mentioned reasons.

This study did not produce a significant weight response in steers treated with Ivomec® in the gulf district of the Northern Territory. Therefore, this study did not demonstrate that it was economic to treat weaner and yearling steers with Ivomec® to increase wet season weight gain in the Gulf district of the Northern Territory. However, it may be economical to treat weaners or yearlings with Ivomec® prior to sale through abattoirs if a premium price is obtained by "shiny" coated animals. Further studies are required using replication to provide for paddock effects in the comparison of control groups and treatment groups, as criss-cross designs do not provide for assessment of external and internal parasites.

**Table 1.** Summary means of steers present grazing native pastures either treated with ivermectin or untreated in the Gulf district of the NT for all three recordings

	<b>Control group n = 29</b>	<b>Treated ivermectin group n = 29</b>
Initial mean weight (kg)	172 ± 23.5	153 ± 20.2
Wet season mean weight gain (kg)	71.3 ± 9.2	67.4 ± 4.7
Mid dry season mean weight gain (kg)	40.7 ± 5.1	37.0 ± 3.2
Wet season/dry season mean weight gain	112.1 ± 10.6	104.4 ± 5.5

\* (Confidence interval of 95%)

\*\* (No significant difference between the means at  $P > 0.05$ )

**Table 2.** Summary means of all steers in the trial either treated with ivermectin or untreated grazing native pastures in the Gulf district of the NT

	<b>November 1991</b>		<b>March 1992</b>		<b>May 1992</b>	
	<b>Control</b>	<b>Ivermectin</b>	<b>Control</b>	<b>Ivermectin</b>	<b>Control</b>	<b>Ivermectin</b>
Number	51	49	38	40	42	38
Initial mean weight (kg)	170 ± 16.6	179 ± 22.3	-	-	-	-
Wet season mean weight gain (kg)	-	-	71.4 ± 7.2	72.0 ± 5.0	-	-
Mid dry season mean weight gain (kg)	-	-	-	-	40.7 ± 5.1	37.0 ± 3.2
Wet season/dry season mean weight gain (kg)	-	-	-	-	107 ± 10.0	105 ± 5.9

\* (Confidence interval of 95%)

\*\* (No significant difference between the means at  $P > 0.05$ )

**Table 3.** Comparison of mean weight and mean weight gain for different weight classes of steers either treated or untreated with ivermectin grazing native pastures in the Northern Territory gulf district of the NT

<b>Error! Bookmark not defined.Class</b>	<b>Steers &lt; 150 kg</b>		<b>Steers &lt; 200 kg</b>		<b>Steers &lt; 300 kg</b>	
<b>Treatment</b>	<b>Control n=25</b>	<b>Ivermectin n=20</b>	<b>Control n=35</b>	<b>Ivermectin n=27</b>	<b>Control n=51</b>	<b>Ivermectin n=37</b>
Initial mean weight (kg)	121	116	136	131	170	162
s.e.	3.42	4.24	5.02	5.90	8.26	9.74
Wet season mean weight gain (kg)	68.4	62.8	69.1	64.7	71.4	70.2
s.e.	3.09	2.00	3.94	1.93	3.54	2.28
Mid dry season mean weight gain (kg)	37.9	38.2	37.7	37.9	40.7	37.0
s.e.	3.60	2.27	2.93	1.74	2.51	1.58
Wet season/dry season mean weight gain (kg)	104.1	100.8	105.4	102.0	107.2	104.4
s.e.	4.22	3.15	4.80	2.80	4.97	2.70

No means were significantly different ( $P > 0.05$ ).

## APPENDIX A

Worm treatment for a 200 kg weaner.

Avomec Injection	\$1.90
Nilverm Injection	\$0.80
Nilvern Pour-on	\$1.25
Systemex intra rumen	\$0.58
Systemex oral	\$0.30

Source:

Alice Springs Rural Review - Vol 21 No 1 January/February, 1991

## APPENDIX B

### Treatment

Cost of 500 mL Ivomec® is approximately \$280.00 or \$2.80/5 mL dose. Therefore for two doses.  
Treatment cost of experimental animals = \$2.80/5 mL dose x 2 doses  
= \$5.60/animal

### Mustering and Handling Costs

Labour and handling \$1.50/head. Therefore the total cost fro two musters = \$1.50 x 2  
= \$3.00 per animal

### Total Cost

Therefore \$5.60 + \$3.00 = \$8.60 per animal

### Estimated Return Required

Total cost per beast = \$8.60  
Therefore as live export steers average price of \$1.10/kg (Queensland Country Life - June 24 1993)  
= 860/110  
= 7.82 kg

Therefore treated steers would have to weigh 7.82 kg heavier (liveweight) than untreated steers to break even.

## APPENDIX C

### Response due to "Shiny Coat"

Estimated increase in price due to shiny coat is \$0.05/kg liveweight. Therefore assuming average 270 kg liveweight/head = \$13.50

Less cost of treatment \$13.50 - \$8.60

= \$4.90/head gross return

Therefore economical to treat with Ivomec®.

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