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Canadian Journal of Comparative Medicine, v. 35 (January 1971), pp. 82-86.
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Effects of Thiabendazole Treatment on Weight Gains by Nebraska Range Cattle

D. L. Ferguson, D. A. Reynolds and M. J. Twiehaus*

SUMMARY

The results of these studies indicate that a high percentage of Nebraska range cattle are infected with gastrointestinal parasites, but at a subclinical level of infection. However, significant differences were not observed in average daily gain between thiabendazole-treated range cattle and unmedicated controls in three of four field trials. In the three trials the average improvement in daily gain in animals receiving thiabendazole once averaged .01 lb greater than untreated controls. During a 120 day grazing period this improvement would not be sufficient to pay for the wormer or cost of additional labor.

RÉSUMÉ

Les résultats obtenus indiquent qu'un pourcentage élevé des animaux de ranch, au Nebraska, sont infestés par des parasites gastro-intestinaux. Ces infestations ne se traduisent cependant pas cliniquement. Dans trois expériences sur quatre, on n'observa pas de différence sensible entre le gain pondéral quotidien moyen des animaux traités à la thiabendazole et celui des animaux de contrôle. Dans les trois expériences, la gain pondéral quotidien moyen des animaux traités dépasse de .01 lb seulement celui des animaux non traités. Cette augmentation ne serait pas suffisante, compte tenu d'une période de pâturage de 120 jours, pour défrayer le coût du vermifuge ou du travail additional requis.

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Published with the approval of the Director, as paper no. 2683, Journal Series, Nebraska Agricultural Experiment Station.

INTRODUCTION

In 1968, Ferguson (1) reported on the incidence and distribution of gastrointestinal parasites in Nebraska range cattle. Parasitic infections were observed in 98% of 286 herds surveyed in 49 counties. From an examination of 2,054 fecal samples, 89% of the cattle were infected with one or more species of roundworms, 13% with tapeworms, and 67% with one or more species of coccidia. The predominant roundworms were *Haemonchus, Trichostrongylus, Cooperia,* and *Nematodirus,* respectively. Ferguson concluded that Nebraska range cattle did not in general suffer from serious internal parasitism, although a few individual animals had 300 or more worm eggs per gram of feces (EPG), the level taken as suggestive of borderline or subclinical infection (3). In addition, an occasional herd was heavily infected with worms.

Cattlemen, both ranchers and feeders, frequently inquire about the need for or benefits from worming range cattle. Certain individuals are recommending that we treat all of our cattle. The field trials reported in this paper were conducted to determine the effects of treatment with thiabendazole on internal parasite control and weight gains of Nebraska range cattle.

MATERIALS AND METHODS

TRIAL NO. 1 — WINTER PASTURE

This field trial was conducted at a ranch located a few miles north of Valentine, Nebraska, and the calves originated in western Nebraska. Steers and heifers of Angus-Hereford crosses and a few purebred Angus and Hereford calves approximately seven months of age were used in the two groups.

Calves were identified with an aluminum eartag. Treated and control calves were determined as they came through the chute; every other calf being treated with a bolus containing 15 gm of thiabendazole. Individual weights were obtained on the day of treatment and 140 days post treatment (PT). A fecal sample was collected manually from the rectum of each calf on the day of treatment and 50 days PT. Worm eggs and coccidial oocysts were counted using a direct centrifugal flotation method. Saturated sodium nitrate was used for the flotation medium. The calves were fed a mixture of half and half upland prairie hay and alfalfa, corn silage, and protein supplement while grazing on native short to medium grasses. The season was extremely cold during December and the rate of feed consumption was reduced.

TRIAL NO. 2 — WINTER DRY-LOT

This field trial was conducted at a ranch a few miles north of Arnold, Nebraska. The Angus and Hereford calves were nine to ten months of age and originated in the central Nebraska area. Calves were identified with a freeze mark on the right shoulder and an aluminum eartag. The tag was placed in the left ear of treated calves and in the right ear of untreated controls. Treated and control calves were handled as described in Trial 1. Individual weights were obtained on the day of treatment and 170 days PT. A fecal sample was collected manually from the rectum of each calf on the day of treatment and 14 days PT. The calves were fed a ration consisting of corn silage, 4 lbs of grain and 1 lb of protein.

TRIAL NO. 3 — SUMMER PASTURE

This field trial was conducted on the same ranch as Trial No. 1. Angus and Hereford steers approximately 11 to 12 months of age were identified by placing a Ritchey tag[1] in the left ear of treated animals and in the right ear of untreated controls. Treated and control cattle were handled as described in Trial 1. Fourteen of the treated steers from Trial No. 2 (winter dry-lot) were selected and treated a second time with a 15 gm bolus of thiabendazole. Individual weights were obtained on the day of treatment and 101 days PT. A fecal sample was collected manually from the rectum of each animal on the day of treatment. The cattle were fed 1 lb of grain per 100 lbs of body weight while grazing on non-irrigated pasture of both native and domestic grasses.

TRIAL NO. 4 — NATIVE SUMMER PASTURE

This trial was conducted at a ranch located in the area of Callaway, Nebraska. Hereford heifers between the ages of 12 to 13 months were identified by placing a Ritchey tag in the left ear of treated animals and in the right ear of untreated controls. Treated and control cattle were handled as described in Trial 1. Individual weights were obtained on the day of treatment and 127 days PT. A fecal sample was collected manually from the rectum of each animal on the day of treatment and 127 days PT. The cattle were grazed on native Sandhill pasture. The season was dry during July and August, but late summer rains brought additional feed.

RESULTS

TRIAL NO. 1 — WINTER PASTURE

At the beginning of the field trial an average of 37 worm eggs per gram of feces was observed in the feces of the 55 untreated controls. Egg counts ranged from four to 336. Fifty days later the average was 46 worm eggs with a range of two to 252 (Table II).

The average number of worm eggs in the feces of 55 calves prior to treatment with thiabendazole is shown in Table II. Worm eggs counts ranged from four to 86 with an average of 25. Post treatment egg counts (50 days) ranged from two to 88 with an average of ten.

The average daily gain per animal and the difference in gain between calves treated with thiabendazole and the untreated controls is shown in Table I. During a 140 day grazing period calves treated with thiabendazole gained an average of 13.8 lbs more per head than the untreated controls.

TRIAL NO. 2 — WINTER DRY-LOT

The average pretreatment worm egg counts for Trial No. 2 are shown in Table II. Egg counts ranged from two to 36 with an average of 12. Worm egg counts for the 18 untreated control calves at the beginning of the trial are shown in Table II.

[1]Ritchey Manufacturing Company, Fort Lupton, Colo.

Egg counts ranged from two to 30 with an average of 12. Fourteen days later fecal samples from the 18 untreated calves were examined. Counts ranged from four to 22 with an average of eight. Post treatment egg counts (14 days) for the 20 calves treated with thiabendazole are shown in Table II. The worm egg counts for the treated calves were considerably lower at 14 days PT than those from the untreated controls. Worm eggs were not observed in the feces of 14 of 20 treated calves and in the six positive samples the counts ranged from two to eight with an average of four.

TABLE I. Weight Gains of Range Cattle Following Treatment with Thiabendazole

Trial 1 — Winter Pasture	**Untreated**	**Treated**
Number of Cattle	55	59
Av. Initial Weight	319 lbs	323 lbs
Av. Final Weight	360 lbs	379 lbs
Av. Daily Gain (ADG)	.2948 lbs	.3935 lbs
Duration of Trial: 140 days		

Trial 2 — Winter Dry-lot	**Untreated**	**Treated**
Number of Cattle	18	20
Av. Initial Weight	424 lbs	433 lbs
Av. Final Weight	623 lbs	634 lbs
Av. Daily Gain (ADG)	1.17 lbs	1.18 lbs
Duration of Trial: 170 days		

Trial 3 — Summer Pasture	**Untreated**	**Treated**	**Treated (two times)**
Number of Cattle	50	44	14
Av. Initial Weight	619 lbs	623 lbs	637 lbs
Av. Final Weight	875 lbs	880 lbs	898 lbs
Av. Daily Gain (ADG)	2.53 lbs	2.54 lbs	2.58 lbs
Duration of Trial: 101 days			

Trial 4 — Summer Pasture	**Untreated**	**Treated**
Number of Cattle	104	103
Av. Initial Weight	471 lbs	484 lbs
Av. Final Weight	636 lbs	650 lbs
Av. Daily Gain (ADG)	1.30 lbs	1.31 lbs
Duration of Trial: 127 days		

TABLE II. Worm Eggs Per Gram of Feces of Naturally Infected Cattle Before and After Treatment with Thiabendazole

Trial 1	**Untreated**		**Treated**	
	Before	**PT-50 days**	**Before**	**PT-50 days**
Av. E.P.G.	37	46	25	10
Range	4-336	2-252	4-86	2-88

Trial 2	**Untreated**		**Treated**	
	Before	**PT-14 days**	**Before**	**PT-14 days**
Av. E.P.G.	12	8	12	1[a]
Range	2-30	4-22	2-36	2-8

Trial 3	**Untreated**	**Treated**	**Treated - two times**
	Before	**Before**	**Before**
Av. E.P.G.	12	17	15
Range	2-44	2-78	4-34

Trial 4	**Untreated**		**Treated**	
	Before	**PT-127 days**	**Before**	**PT-127 days**
Av. E.P.G.	13	13	12	14
Range	2-102	2-34	2-56	2-36

[a]Worm eggs were observed in six of the 20 treated cattle

TABLE III. Nested Analysis of Variance of Weight Gains Trial 1 (Winter Pasture)

Source	DF	Sum of Squares	Mean Squares	F-Ratio
Total	113	116015		
Treatments	1	5430	5430	5.5[a]
Error	112	110585	987	

[a]Significant at the .05 level.

The average daily gain per calf and the difference in gain between calves treated with thiabendazole and the untreated control calves is presented in Table I. During a 170 day feeding period the treated calves gained an average of 1.7 lbs per head more than the untreated controls.

TRIAL NO. 3 — SUMMER PASTURE

Fecal samples were collected from the 50 untreated controls at the beginning of the trial. Worm egg counts ranged from two to 44 with an average of 12. Pretreatment worm egg counts for the 44 cattle receiving thiabendazole are shown in Table II. The egg counts ranged from two to 78 with an average of 17. Post treatment fecal samples were not collected.

Fourteen treated calves from Trial No. 2 (winter dry-lot) were selected at random for this trial. Fecal samples were collected prior to treatment and examined for worm eggs. Egg counts ranged from four to 34 with an average of 15.

The average daily gain per animal and the difference in gain between the cattle treated one time or two times is shown in Table I. During the 101 day grazing period cattle treated with thiabendazole gained an average of 1.0 lbs more per head than the untreated controls. During the 101 day grazing period the 14 cattle from the winter dry-lot trial that received a second treatment of thiabendazole gained an average of 5.1 lbs more per head than the untreated controls.

TRIAL NO. 4 — NATIVE SUMMER PASTURE

The average number of worm eggs in the feces of the 104 untreated controls at the beginning of the trial is shown in Table II. Egg counts ranged from two to 102 with an average of 13. The cattle were examined 127 days later. Worm egg counts ranged from two to 34 with an average of 13.

Pretreatment worm egg counts for the 103 cattle receiving thiabendazole are shown in Table II. Egg counts ranged from two to 56 with an average of 12. Fecal samples were collected from the cattle 127 days PT and examined for worm eggs. Counts ranged from two to 36 with an average of 14.

The average daily gain per animal and the difference in gain between cattle treated with thiabendazole and the untreated controls is shown in Table I. During a 127 day grazing period the treated cattle gained an average of 1.31 lbs more per head than the untreated controls.

DISCUSSION

In 1964, Green *et al* (2) reported on the effect of thiabendazole treatment on pastured cattle. In five studies, cattle treated with thiabendazole were compared with unmedicated controls. The average improvement in animals receiving thiabendazole was 0.11 lb of gain per day greater than the controls. This improvement in gain is not large, but over a 120 day grazing period yields an advantage of 16 or 17 lb per animal.

Michaud (4) summarized the results of 65 pasture trials conducted in various parts of the United States, where cattle treated with thiabendazole one or more times were compared to nontreated cattle. In these trials the treated cattle had an average daily gain advantage of 0.15 lbs.

In the present studies, significant differences in average daily gain between thiabendazole-treated cattle and unmedicated controls were not observed in three of four field trials (Tables I and III). In Trials No. 2, 3, and 4 the average improvement in daily gain in animals receiving thiabendazole once averaged .01 lb greater than the controls. During a 120 day grazing period this improvement in gain by the treated cattle would not be sufficient to pay for the wormer or cost of additional labor.

In Trial No. 1 (winter pasture) the average daily gain for the thiabendazole-treated cattle was .0987 lb of gain per day greater than the untreated controls. This was statistically significant at the .05 level (Table III). During the 140 day grazing period this resulted in an advantage of 13.8 lb per head. This increased weight gain paid for the wormer and resulted in additional profit from the cattle receiving treatment over the untreated controls.

Green *et al* (2) obtained the most significant differences in average daily gain when cattle were wormed several times during a 120 day grazing period. In Trial No. 3 (summer pasture), fourteen cattle from Trial No. 2 (winter dry-lot), were selected and treated a second time with thiabendazole. During the 101 day grazing period these cattle evidenced an improvement in average daily gain of 0.05 lb more than the untreated controls and 0.007 lb more than the cattle treated once with thiabendazole. Therefore, the cattle treated two times with thiabendazole averaged 5.1 lb more per head during the 101 day grazing period than the controls. However, this improvement in average daily gain by the treated cattle would not bring sufficient additional profits into the operation to pay for the wormer or cost of additional labor.

The interpretation of worm egg counts has been discussed by a number of workers. Levine (3) reported that a count of 300 or more strongylinate eggs per gram of feces was suggestive of borderline or subclinical infection. In the present study the average egg count was above 300 in only one of the 453 animals. Therefore, the results indicate that under normal climatic conditions a high percentage of Nebraska range cattle are infected with roundworms, but at a subclinical level of infection.

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