

Anthelmintic Usage in Feedlot Cattle: To Worm or Not To Worm:

John M. Cheney, DVM, MS
Veterinary Diagnostic Laboratory
Colorado State University
Fort Collins, CO 80523

Cattle feeding in the United States has changed dramatically over the past two decades. In the past, most of the cattle were fed by farmer-feeders in lots with less than 1000 head capacity. Today the majority of cattle fed are in much larger lots. Colorado feedlots last year fed approximately 2.4 million head of cattle and about one half of these were fed in lots with a capacity of over 32,000 head. All indications today point to this trend continuing with more and more cattle being fed in larger lots. As these lots have become larger, management practices have also changed. Cattle feeders are no longer farmers and cowboys, rather they are businessmen who know the entire cattle industry.

As the cattle feeding industry has changed, so has the role of the feedlot veterinarian. The veterinarian is no longer asked to vaccinate, dehorn, castrate or even treat most sick animals in the feedlot. The role of the feedlot veterinarian today is to advise and consult the feedlot operator. To do this effectively, the veterinarian must also understand the entire cattle industry and give economically sound advice to management. Part of that advice is an internal parasite control program which does not cost the producer but rather makes money for him. It may not sound like much when you figure it only costs \$1.50 to \$3.00 to worm a 700 pound steer, but when you worm 30,000 animals and the cost is \$45,000 to \$90,000 you talk real money. This brings me to the title of this paper: *To Worm or Not To Worm*.

Reasons For Worming

An important fact regarding gastro-intestinal parasites in feedlot cattle is that they DO NOT acquire nematode infections in the feedlot. Unlike bacterial and viral diseases, cattle have all gastro-intestinal parasites they are going to have the day they arrive at the lot.

The only reason to worm feedlot cattle is to economically improve their performance. The parameters which can be used to measure performance are: 1. feed consumption, 2. weight gain, 3. feed efficiency, 4. morbidity, 5. morbidity and, 6. carcass data. Most feedlots already have this data or can collect it very easily.

What are the Choices?

The feedlot has three choices: 1. worm all the cattle coming into the lot as part of normal health program, 2. do not worm any of the cattle or, 3. selectively worm the cattle. If your recommendation is either of the first two, your job is easy and you only need to talk to the producer once. If you recommend the selective worming of only those cattle in which the return to the owner will be greater than the cost of the treatment, then your role as the veterinarian becomes increasingly important.

Selective Worming

If it is possible to tell the producer which cattle are most likely to respond economically to worming, we need some criteria on which to base our decisions. The three criteria most commonly used to make this decision are: 1. clinical signs seen in the animal, 2. origin of the cattle and, 3. fecal egg counts.

Clinical signs seen in parasitized cattle are diarrhea, dehydration, emaciation, rough hair coat and anemia. While any or all of these signs can be seen in the parasitized cattle, they are also seen with other diseases and are not definitive. Also many cattle can have a sub-clinical infections and not show any of these signs.

A common idea in our area is that cattle raised in the Rocky Mountain Region and the Southwest never have a problem with parasites, whereas cattle from the Southeast are always parasitized. I have done egg counts on ranches in the Rocky Mountain area that are within a few miles of each other where one has a problem and the other does not. I have also had anthelmintic trials in cattle from Mississippi that have not responded to worming.

The only real criterion that has worked for me is fecal egg counts. Although there is no direct correlation between fecal egg counts and the degree of parasitism in the animal, it is the best criterion we have. Angus Dunn is his book, *Veterinary Parasitology*, makes this statement regarding fecal egg counts:

“Most workers approach this method at first with enthusiasm, as one of the few exact techniques in an inexact

subject, later reject it for its inaccuracy, and finally return to it as an advisor whose utterances, provided they are taken with a grain of salt (if the expression is permissible here), are of some value. It is not good, but is the best we have."

Fecal Egg Count

If fecal egg counts are to be used in determining whether or not to worm cattle, they must be done in a manner to provide accurate results and still be economical. In other words, you cannot do fecal egg counts on all the cattle, as the cost and time required would be greater than the treatment cost. In some cases, this is easy while in other cases, it is more difficult. If you are looking at cattle all from one ranch and they are the same age and raised under similar environmental conditions, few samples are required. In general, 5 to 10 samples are sufficient even though there are several hundred animals. The problem becomes more difficult when you are feeding cattle in the same pen from several different sources. In these instances, more fecal samples are required. In general, if you have two or three sources of cattle in the same pen, 10 to 20 samples are sufficient. In most cases, I would only take ten samples.

In doing the fecal egg examination, it is important to do individual egg counts. If you do a composite count, your interpretation of the results will be that all the cattle have the same amount of parasitism. It is also important that the egg recovery technique used be effective. In our lab, we use the Modified Stoll technique. The simple flotation technique, for example, Ovassay, Ovatecor, and Fecalizer just do not do a good job of recovering the eggs.

The fecal examination should help you make the following decision: 1. whether or not to worm, 2. the dose of the anthelmintic to use (if the product being used has two dosage labels) and, 3. how the anthelmintic is to be administered (in feed or treat animals individually).

Anthelmintic Trial

The feedlot where the trial was conducted wormed all the cattle upon entry with Thiabendazole in the feed. This trial was designed to determine if worming heavier yearling cattle improved

Table I
Trial Data
Trial 1

ARRIVAL DATE	4/20/76 TO 5/18/76
ARRIVAL WEIGHT AVERAGE	806 TO 865 LBS
FINISH WEIGHT AVERAGE	1142 TO 1263 LBS
DAYS ON FEED	111 TO 140
NUMBER TREATED	2417 HEAD
NUMBER CONTROLS	2241 HEAD
CATTLE BREED	ANGUS, HEREFORD CHAROLAIS CROSSES
TREATMENT	TBZ 6.6 GM/100 KG IN FEED

feedlot performance. The trial data (1) is summarized in Table I. In this trial, each pen of cattle was assigned upon arrival to a treatment group or control group. Each treatment group and control group was started on feed within one week and each group was replicated six times.

Twenty fecal samples were taken from each pen of cattle prior to any anthelmintic treatment. The fecal egg counts are summarized in Table II.

Table II
Strongyle Egg Counts
Trial 1

GROUP	T/C ^a	NO. OF HEAD	EGG PER GRAM COUNT RANGE	AVERAGE
1	T	392	0-30	15
	C	309	0-70	7
2	T	442	0-100	20
	C	398	0-20	1.5
3	T	496	0-60	7.5
	C	308	0-10	0.5
4	T	337	0-70	20
	C	372	0-70	12.5
5	T	419	0-80	20
	C	395	0-160	14.5
6	T	331	0-60	20
	C	459	0-70	20

^a T = TREATED - C = CONTROL

Feed conversion data is summarized in Table III.

Table III
Feedlot Performance
Trial 1

GROUP	T/C	NO. OF HEAD	FEED CONVERSION
1	T	392	8.44
	C	309	7.62
2	T	442	8.44
	C	398	8.33
3	T	496	7.94
	C	308	8.39
4	T	337	7.92
	C	372	8.44
5	T	419	7.72
	C	395	8.19
6	T	331	7.13
	C	459	7.54

^a T = TREATMENT - C = CONTROL

Statistical analysis for this trial using a paired T-Test at P < .05 showed no significant differences in daily weight gain, feed efficiency, morbidity, or mortality. No carcass data was obtained in the trial.

In trial (2) three anthelmintic treatments: fenbendazole, levamisole, and thiabendazole were compared to controls (no anthelmintic treatment). The trial data for this experiment is summarized in Table IV. The experimental design is summarized in Table V.

Fecal samples were taken from all animals prior to treatment and the egg counts are summarized in table VI.

Table IV
Trial Data 2

CATTLE ARRIVAL	--	SEPTEMBER 16, 1983
TRIAL STARTED	--	SEPTEMBER 20, 1983
TRIAL FINISHED	--	APRIL 18, 1984
ARRIVAL WEIGHT	--	550 AVERAGE
FINISH WEIGHT	--	1108 AVERAGE
DAYS ON FEED	--	209 DAYS
CATTLE SOURCE	--	MISSISSIPPI
CATTLE BREED	--	CROSSBRED STEERS

Table V
Experimental Design
Trial 2

TREATMENT	REPLICATIONS	NO. CATTLE PER PEN	TOTAL NO. CATTLE
1. CONTROL NONE	10	10	100
2. FENBENDAZOLE 5 mg/kg	10	10	100
3. LEVAMIZOLE 6 mg/kg	10	10	100
4. THIABENDAZOLE 5 gm/100lb	10	10	100

Table VI
Pretreatment
Strongyle Egg Counts
Trial 2

TREATMENT	EGGS PER GRAM AVERAGE	COUNT RANGE
CONTROL	147.6	0-1240
FENBENDAZOLE	107.4	0-800
LEVAMIZOLE	156.2	0-3390
THIABENDAZOLE	134.4	0-2950

The feedlot performance is summarized in Table VII.

Table VII
Feedlot Performance
Trial 2

	CON.	FBZ.	LEV.	TBZ.
GAINS, LBS	2.70	2.80	2.82	2.70
F/G	6.53	6.34	6.30	6.45
MORTALITY	0	0	1	0
YIELD GRADE (1)	2.65	2.70	2.68	2.58
QUALITY GRADE (2)	81	81	82	81
DRESSING %	60.9	61.3	61.0	61.2

(1) HIGH = 1 - LOW = 3

(2) PERCENT CHOICE OR HIGHER

The data was analyzed by using a variance of $P < .05$. No significant differences were found in average daily gain, dry matter consumption, dry matter conversion, dressing percentage, yield grade or quality grade.

In the third trial, I summarized the data on cattle that were treated with fenbendazole, levamisole, or ivermectin and compared them to untreated control animals. This trial data is summarized in Table VIII.

Table VIII
Trial Data 3

CATTLE ARRIVAL	--	JUNE 2, 1984
TRIAL STARTED	--	JUNE 7, 1984
TRIAL FINISHED	--	NOVEMBER 27, 1984
ARRIVAL WEIGHT	--	570.5 LBS. AVERAGE
FINISH WEIGHT	--	1110.3 LBS. AVERAGE
DAYS ON FEED	--	174 DAYS
CATTLE SOURCE	--	MISSISSIPPI
CATTLE BREED	--	CROSSBRED STEERS

The experimental design for this is summarized in Table IX.

Table IX
Experimental Design
Table 3

TREATMENT	REPLICATIONS	NO. CATTLE PER PEN	TOTAL NO. CATTLE
1. CONTROL NONE	10	10	100
2. FENBENDAZOLE 5 mg/kg	10	10	100
3. LEVAMIZOLE 6 mg/kg	10	10	100
4. IVERMECTIN 0.2 mg/kg	10	10	100

Fecal samples were again collected from all the cattle prior to starting trial three and the results are listed in Table X.

Table X
Pretreatment
Strongyle Egg Counts
Trial 3

TREATMENT	EGGS PER GRAM AVERAGE	COUNT RANGE
CONTROL	50.6	0-720
FENBENDAZOLE	50.9	0-300
LEVAMIZOLE	51.1	0-450
THIABENDAZOLE	51.0	0-340

Table XI
Feedlot Performance
Trial 3

DAY	CON	FBZ	LEV	IVER
GAINS LBS	2.96	3.19	3.04	3.21
F/G ^a	6.11	5.87	5.99	6.01
F/G ^b	6.14	5.82	6.06	5.99
MORTALITY	2	2	0	0
YIELD GRADE (1)	2.3	2.4	2.3	2.5
QUALITY GRADE (2)	79.7	86.9	90.0	85.5
DRESSING %	61.2	61.7	61.1	61.4

^a = LIVE WEIGHT BASIS (1) HIGH - 1 LOW - 5
^b = CARCASS WEIGHT BASIS (2) PERCENT CHOICE OR HIGHER

Performance for the cattle is summarized in table XI. Analysis of variance shows the following differences: average daily weight gain at $P < .01$ was different for the fenbendazole and ivermectin groups; dry matter consumption

was different for the ivermectin group at $P < .05$; yield grade was better for the control and levamisole groups at $P < .10$ and no significant differences were found in dressing percentage or yield grade between groups.

In conclusion, I am confident that fecal examinations can be used in feedlot cattle to determine if anthelmintic treatment will economically improve feedlot performance. Using the Modified Stoll Technique, I use the following criteria for feedlot cattle:

1. All egg per gram counts below 100, no treatment necessary,
2. If there is any egg per gram count in one of the samples of between 100 and 300 cattle, they should be treated at the lower dose if two are recommended, or the cattle can be wormed in the feed.
3. If there is any egg gram count in any one of the samples of 300 or greater the cattle should be treated with the higher anthelmintic dose and they should be treated individually.

