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Animal Health Fact Sheet

ECONOMICS OF DEWORMING BEEF CATTLE & HERD MONITORING WITH FECAL EGG COUNTS

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Deworming is one of the more expensive procedures producers use on their beef herds. The level of internal parasitism varies in Utah from no effect to clinical disease. Each operation can be different and there are definite variations from year to year, depending on the weather patterns. Can veterinarians help individual producers decide when it is economically worthwhile to deworm, or when to deworm to get the most benefit from the expense? How can veterinarians get the information needed to give good, reliable advice?

Yes, you can give science based, accurate advice IF you will summarize some information about a producer's method of operation AND monitor the herd with specifically timed, fecal egg per gram (epg) (quantitative) counts. As you do this it will help them improve production and reduce costs related to benefits of their program.

BASIC PRINCIPLES OF NEMATODE PARASITISM

1. Moisture is essential for survival, development and transport of nematodes.

2. Concentration of animals increases the concentration of parasite eggs and larvae for ingestion.

3. The larvae must be able to complete their various stages in order to infect cattle. While they are very resistant at certain stages and can stop their development until conditions become favorable, they are also susceptible at other stages and do have a limited life-span.

4. Many of the eggs and some larval stages will survive the cold and freezing of Utah winters. Very few will survive the heat and drying that occur during our summers UNLESS they are ingested prior to that OR they are in an area with adequate moisture (wet meadows, irrigated pastures, around springs, seeps, etc.).

5. Cattle do develop an immunity to nematodes. So, adult cows will seldom shed more than 10 epg's. There is often a rise in egg shedding at the time of calving, during this time of

reduced immune status. Individual cows may shed high numbers if their immunity is compromised for some other reason. New calves seldom shed many eggs until at least mid or late summer just because it takes time for them to get infected and begin shedding. The animals that shed the most eggs are the stocker or replacement animals of 6 to 18 months of age. After this, they have usually developed enough immunity to suppress egg production to 10 or less epg.

6. Egg shedding is related to type of feed intake. When it is lush, the egg count will increase. When the feed is dry and fibrous or the high concentrates of a feedlot ration, the egg shedding will decrease.

7. The level of egg shedding may be related to the number of adult parasites internally—but not always. There may be many arrested or immature larvae present that are not shedding eggs, so the epg is low but the potential for parasitism is great. Or, a few mature females are producing tremendous numbers of eggs and may make the infection appear greater than it really is. The key to this problem is to check fecals from several animals and to do it at three to four times during the year, until the pattern becomes apparent for the operation.

8. Fecal egg counts ARE an indication of the pasture contamination that is currently occurring and thus a measure of concern for the future for that grazing area.

9. Most of the epg counts reported in the literature are based on a modified, Wisconsin, double centrifuge method, using a sugar floatation solution. A study at Cornell found a good correlation of counts with this method and the McMaster slide technique.

   I did a limited study comparing the two methods on cattle with low epg counts. There was good correlation of the two methods BUT the McMaster method gave a count that was 2.3 times higher than that found on the same samples by the double centrifuge method. I believe this is due to the very low egg numbers that we usually find and if there were large numbers present, the two methods should be very comparable. With the McMaster technique a large multiplication factor (25) is used and this accounts for the squewing with small egg numbers.

   The McMaster technique is easier to use for most veterinary clinics. When I use it and the epg is under 100, I divide it by 2.3 in order to compare the epg level with other trials which used the double centrifuge method.

10. Samples can be collected in “sandwich” or “ziplock” bags, or in whirlpaks. They should be put on ice, then refrigerated and can then be kept for up to three weeks while the fecal exams are performed. Samples obtained from the rectum of identified animals is best but acceptable samples can also be collected by following cattle in the corral or pasture and picking up a clean sample from the top of the patty, on the ground, after they defecate.

RESULTS IN “REAL WORLD”

A. Desert and Mountain Grazing in Southern Utah

The cows were grazed on the desert from fall through spring and even calved on the desert. From early June to the end of September they and their calves were grazed on Cedar Mountain in good mountain meadow pastures. Half were used as controls and half were dewormed. Below is the epg count for the cows, combined by group, in early June, late July and

late September.

GROUP	JUNE	JULY	SEPTEMBER
Control	1.1-3.9	0.5-2.9	0.1-1.1
Treated	0.7-4.3	0	0-0.1

The project and epg counting was continued a second year with the same results. There were basically NO eggs present in the calf groups (0–0.6) on any of the dates, either year. There was no benefit in weight gains for cows or calves from deworming.

This indicates to me that in situations like this, throughout Utah, there would be NO economic benefit to be gained from deworming. I think you could make a good decision for the producer by knowing his operation, being aware of any heavy exposure that may occur to change this pattern and then to also check 6–10 fecal samples from cows, in the spring soon after calving. Fecal samples from calves could also be checked in the fall, but it should be recognized that the larvae may be in the arrested stage in the gut at that time, with minimal egg shedding.

B. Grazing Wet Meadow Pastures

A cow-calf herd in Cache county was followed for four summer grazing seasons as they grazed the wet meadows spring and fall. They were wintered on grass and alfalfa hay from December to mid May and calved primarily in March and April. The fecal epg's were followed each summer. A deworming trial was conducted in 1994.

FECAL EPG COUNTS - COWS (Calves)

YEAR	GROUP	MAY	JULY	SEPTEMBER
1992	All Cows	---	1.4 (.02)	0.6 (1.0)
1993	All Cows	1.4 (1.7)	1.2 (2.3)	0.5 (5.1)
1994	Control	8.2 (1.2)	1.4 (0.4)	1.6 (0.2)
1994	Treated	15.1 (1.8)	0.4 (0.4)	0.3 (0.1)
1995	All Cows	8.7	18.1(13.6)	4.5 (6.9)

There was no deworming in 1992 or 1993. This appeared to allow a buildup of nematodes and a deworming trial was conducted in 1994. There was a trend to increased weight gain in both the calves and the cows for the treated groups. But this was confounded by a difference in pastures and this pasture difference was greater than the difference in treatments.

CONCLUSION: On wet meadow grazing, a lack of deworming or slight changes in management may allow nematode parasitism to increase from a non-economic to a marginal and on to an economic problem. These changes can be monitored by fecal epg monitoring and treatment can be instituted to prevent further losses.

Pasture condition and feed values will have a much greater effect on weight gains than will marginal parasitism.

SAMPLE NUMBERS

One source recommended sampling 6 animals from a group of 50 or 6–10 for a group of 100. Work in Australia indicated that the 6–10 per 100 was as good as 20 per 100. The number needed is always related to the amount of variation between the samples.

LIVER FLUKE

Liver fluke are commonly present in animals that graze wet meadows. They take a severe toll on animal production and if present, even in small numbers, measures should be taken to control them. A relatively new kit greatly simplifies the diagnosis of liver fluke by fecal exams for the presence of eggs. A few liver fluke will overwinter in snails, buried in mud. But the majority of infection comes from eggs shed by currently infected cows which are grazing wet pastures, with snails present. Young calves (newly infected) do not shed eggs until late fall.

If animals are dewormed in early fall for fluke, they should be dewormed again later. The products available will miss many of the immature fluke that are still in migration. If it is desired to treat both nematodes and flukes with one treatment, then the treatment should be delayed until 10–12 weeks after a killing frost (about mid to late December).

SOURCES OF SUPPLIES

1. FLUKEFINDER (kit to diagnose liver fluke)

Visual Difference
Richard Dixon
5051C Old Pullman Road
Moscow, ID 83843
208-882-6040

2. McMaster Slides (PARACOUNT-EPG Kit)

Olympic Equine Products
5004-228th Avenue S.E.
Issaquah, Washington 98027
206-391-1169
(for cattle, request the three chamber slides)

3. Double Centrifuge Method for Fecal Exam and epg

a. Mix fecal sample in the bag.
b. Put disposable cup onto scale and add 3 grams feces.
c. Add 7 ml water and mix well, in the cup.
d. Strain into a second cup; stir and press remaining feces.
e. Rinse cup with 2 ml water; pour through strainer; stir and press dry again.
f. Swirl second cup and pour contents into a 15 ml test tube. Rinse the second cup with 3 ml water and our into tube.
g. Centrifuge at 1500 rpm for 10 minutes.
h. Decant the liquid, but save “fines” at the top of solid.
i. Fill tube 1/2 full with sugar solution and mix well by gently wiping with an applicator stick. Severe “stirring” results in increased debris on the slide and great difficulty in reading it; a lack of stirring results in the loss of some eggs.
j. Finish filling to top of tube with sugar solution and provide a small meniscus.
k. Apply coverslip to top of tube.
(If using an anglehead centrifuge, do not fill completely until after centrifuging; then take out of centrifuge, put upright in rack, fill to top with a meniscus, apply coverslip and wait 5 minutes before removing.)
l. Centrifuge at 1500 rpm for 10 minutes.
m. Rinse cups, strainer, tongue blade and spoon.

n. Remove coverslip by lifting straight up. Lay it on a microscope slide.
(Can be left in refrigerator overnight before counting, if time is limited.)

o. Count entire surface of coverslip for eggs at 10X (100 power).

p. Divide the total number by 3 for the egg per gram (epg) count.

4. Saturated sugar solution for use with McMaster Slides or the Double Centrifuge technique.

granulated sugar	1 lb
water	355 ml (12 oz)

Heat water and stir in sugar until dissolved.
Should have a specific gravity of 1.25 to 1.27.
Refrigerate for storage. Can add phenol or formalin for preservative effect.

(The sugar solution gives better egg recovery than zinc sulfate or salt, etc.)

PROTOCOL: MODIFIED WISCONSIN SUGAR FLOTATION METHOD

Materials

Sugar solution (1 lb [454 g] of table sugar mixed with 12 oz [355 ml] of hot water)
Dispensing bottle with attached 15-ml or larger dosing gun
Tea strainers
Taper-bottom test tubes (15 ml)
Two test-tube racks
Standard microscope slides
22 x 22-mm coverslips
Two 5 or 3-oz (150- or 90-ml) paper cups (two cups/sample)
Tongue depressors (one per sample)
Small syringe (to top off test tubes)

Method

1. Measure 3 g of fecal material (about a thimbleful) into a 3-oz paper cup.
2. Add 15 to 17 ml of sugar solution to the fecal matter.
3. Stir the solution and fecal matter until the material has an even consistency.
4. Pour the mixture through the tea strainer into the 5-oz cup.
5. Use a tongue depressor to press as much material through the strainer as possible.
6. Pour the material from the 5-oz cup into the 15-ml centrifuge tube; centrifuge at 800 to 100 rpm for 5 to 7 minutes.
7. Place the test tube in the rack. Top it off with sugar solution until a meniscus bulges over the top of the tube. Cover the tube with the coverslip and set aside for 2 to 4 minutes.
8. Lift the coverslip straight up and place it on a microscope slide.
9. Scan the entire coverslip to count the eggs.

Advantages of the Modified Wisconsin Sugar Flotation Method

- Requires no specialized equipment and can be conducted in a small area.
- Can be used to examine a large number of samples in a short period.
- Is sensitive enough to detect low egg counts (e.g., from adult beef and dairy cattle and from cattle grazing semiarid range allotments or pastures).

- Is sensitive enough to show the difference in egg shedding associated with various dewormers.
- Is sensitive enough to detect eggs from nonprolific worm species (e.g., Trichuris [whipworm] and Nematodirus [threadneck worm]).
- Does not distort worm eggs, thus allowing parasite identification through egg morphology.
- Breaks up tapeworm proglottids, thus allowing tapeworm eggs (Moniezia, Anoplocephala, and Taenia) to float on the sugar solution.
- Is sensitive enough to float coccidia (Eimeria and Isospora) and Cryptosporidium.
- Can be used to float lungworm larvae from fresh rectal fecal samples.
- Does not have to be read immediately—the sugar solution does not crystallize on the prepared slide; slides can be stored in a refrigerator for several days and can be read when it is convenient.

Source: The Compendium (April 1997) Food Animal Supplement, pp. S104-S119)

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