Economic Impact of Parasitism in Dairy Herds

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Summary

This paper is concerned with internal parasite control for dairy herds based on the systematic deworming programs which were developed from studies made in DHI herds in Wisconsin and three other dairy states.

Dairy cows in most herds have subclinical parasitisms and it is generally advantageous that they be treated for worms when they freshen, and again 60-90 days later; they produce more milk. There is economic advantage when cows are dewormed a third time in a lactation, at 120-150 days, but not as much as when they are treated early in lactation.

Despite the greater advantage obtained from deworming individual cows according to their stage of lactation, some dairymen want their cows treated on a herd basis. Cows have the most worms in the fall and in late spring. If the whole herd is to be treated at one time, then treat the herd at fall or spring freshening, or both, and include all replacements as well.

Replacement heifers benefit enormously from deworming. Schedule their treatment in mid-spring, late spring, mid-summer, and early and late fall.

Increased milk production following deworming occurs in 7 or 8 out of 10 herds. Some herds are so well managed and so sanitary, or are held on concrete platforms under desert conditions, that these herds with very few worms have not responded to deworming.

It is generally agreed that worm parasitisms occur within dairy herds, that they are essentially the same all over the U. S., and that the severity of parasitisms varies with management, climate, and age of the host animal. It is generally agreed, also, that older dairy animals have greater capacity to resist worm infection than do calves, and that better fed cows are less affected than poorly fed animals because they can produce more milk when they have worms. Some have held that worm parasitism in northern dairy herds are of no consequence or actually do not exist.

For purposes of economics, parasitism really ought to be considered as a continuous relationship between worms and their hosts. Somehow the notion developed, however, that this continuous relationship was not harmful to the cow, and that indeed cows were immune to worms. Lately, it has been said that cows have a non-sterile immunity, but, that very few worms are in milking cows and the worms lay few or no eggs. Sometimes it is said the worm-eggs cannot be differentiated, but that they can be counted, and that the number of eggs counted can be used to determine whether or not a cow should be treated.

The facts are that most (90%) dairy cows have worm parasitisms in which the worms are producing eggs, that cows receive continuous exposure to infection during spring, summer, and fall, and that the parasitisms increase during late spring, summer and early fall and decline during winter, probably from lack of exposure (1,2,3,4).

Treatment of almost every parasitism in the large animals is now possible as a result of the development of anthelmintics by industrial parasitology over the past 25 years. The actual marketing of anthelmintics resulted in the development of agricultural parasitology and most anthelmintics are sold over the counter. Dairy parasitology has been widely accepted by the feed industry and millions of milking cows have been dewormed. There has been some feeling that treatment of milking cows is not good veterinary practice and does not rest on sound scientific parasitological research. The crux of the matter has been failure to utilize techniques which consistently demonstrate the active parasitism in "normal, healthy" subclinically parasitized dairy cattle, i.e., techniques of worm-egg recovery have not been satisfactory, and in addition, treatment after diagnosis of subclinical parasitism has not been given following statements that only 100 or 300 eggs/gram manure are indicative of economically important parasitism. Neither statement, 100 eggs/gram nor 300 eggs/gram, was derived from actual trials; those numbers are guesstimates!

A comparison of the Wisconsin centrifugal flotation technique for counting worm eggs with two other techniques is shown in Table 1. The Wisconsin system was derived directly from the technique used in the Regional Animal Disease Research Laboratory, Auburn, Alabama, in the late 1940's, and the Regional Laboratory technique had been modified from the Stoll technique.

Actual counts of worm eggs/gram manure found in cows in deworming trials across the country are shown in Table 2. In the first thousand-cow study conducted in Wisconsin (5), cows which averaged 5.2 eggs/g manure responded to deworming with an average increment of 2.2 lb. milk/cow, 8 days after treatment. In the second study, cows averaging 3.2 epg produced 1.2 lb. more milk than non-treated controls for the first 60 days after treatment (6). Cows averaging 2.1 epg and dewormed the day they freshened responded with 423 lb. more milk/lactation (7). Vermont cows averaging 3.0 epg, and dewormed

Table 1: Comparison of Techniques Used for Nematode Egg Counts, Same Manure Sample.

Techniques	Number of Examinations	Number of Positives (%)	Average EPG Among Positives
Wisconsin Sugar Flotation	10	10 (100%)	7.8
Cornell-McMaster	10	2 (20%)	50.0
Fecalyzer	10	3 (30%)	1.0

Table 2. Counts of Worm-Eggs/Gram Manure and Subsequent Milk Production After Deworming

Trial	Farms	Cows	Eggs/Gram Manure (av)	Advantage Lb. Milk (av)
Wisconsin	34	1,028	5.2	2.2/Cow 8 days later
Wisconsin	22	1,003	3.2	1.2/Cow over 60 days
Wisconsin	12	488	2.1	423/Lactation
Vermont	9	267	3.0	534/Lactation
Pennsylvania	9	180	2.6	769/Lactation
N. Carolina	5	170	1.6	1,075/Lactation

on the day they freshened and again 60-90 days later, responded with 534 lb. more milk/lactation. Pennsylvania cows averaging 2.6 epg and dewormed systematically at freshening and over the first 3 months of lactation responded with 769 lbs. more milk/lactation, Table 2. North Carolina cows averaging 1.6 epg and dewormed at freshening and systematically over the first 3 months of lactation responded with 1,075 lb. more milk/lactation.

The average counts of eggs per gram manure, are representative of continuous active subclinical parasitism in herds in four states. Counts vary from herd to herd and animal to animal. In general, first-calf heifers have higher worm-egg counts than cows in their third or fourth lactation. It is not unusual to find 800-1,000 eggs/gram manure in cows in first lactation, but the point is that average counts such as those shown in Table 2 have been found associated with depression of milk production and cows can be treated on the basis of those low average counts.

When milking cows of all ages have been exposed to infective larvae they have developed the same average counts shown in Table 2, and their milk production was reduced (9). Moreover, the relationship between the subclinical parasitism and increased milk and fat production by dairy cows following anthelmintic treatment has been confirmed in New Zealand (10) and Belgium (11).

The studies on relationship of worm infection to milk production originally were undertaken as a support measure for the dairy industry which was undergoing extensive re-organization, decreasing herd numbers but increasing herd size, and encountering more intense market competition from non-dairy products. It was felt that a demonstration of increased milk production after removal of subclinical parasitisms would benefit the industry, lead to more practice of parasitology in herd health programs, and focus attention upon more severe parasitism in replacement heifers. By 1977, deworming programs for milking cows receive great amounts of attention, and it appears that treatment of milking cows now is a legitimate management practice.

There are very few milking cows which do not respond to anthelmintic treatment. On average it has been found economically profitable at better than 3 out of 4 herds. It is agreed that there are herds where worm parasites are not a problem; in general, many dry-lot herds in southern California, and certain herds throughout the United States which have near absolute, near complete sanitation of their environment. By and large, the high-producing herds respond with more milk than low-producing herds.

In the instance of severe worm parasitism in dairy herds, that condition always is accompanied by every management failure possible and those herds should be restored to good management before systematic deworming to increase production is attempted. Such herds can be dewormed, but they cannot increase milk production solely as the result of anthelmintic treatment.

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