

Dairy Herd Parasitology: Current Practices and Future Possibilities

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Internal parasite control in the modern high-production dairy herd is a vital part of a total herd health program. This fact is acknowledged by most producers, but they may differ on when the control program should start and exactly what it should be.

An internal parasite control program should begin the day that the replacement heifer calves are dropped. Internal parasite infection during the highly susceptible period of calthood can shorten the production span of the animal.

The first disease-producing internal parasites that a newborn heifer calf contacts are the coccidia. These are 1-celled organisms commonly found in the soil, in bedding, and in calf barns and pens. They invade the cells of the intestinal lining after being ingested orally. The primary clinical symptom of coccidiosis is a massive bloody scours (often complicated by colibacillosis or salmonellosis) which can cause death quickly. Even if the calf recovers, some of its production potential is often permanently lost because of scarring of the intestinal lining.

Coccidia thrive in filth, and coccidiosis is a disease that results from lax sanitation. Therefore, the enforcement of rigid sanitation programs is the best control. Calves should not be confined in close quarters in groups but rather in individual pens. Unfortunately, even when housed in individual pens, occasionally some calves will show symptoms of coccidiosis. Upon recognition of symptoms (primarily the bloody scours), prompt treatment should be instituted with drugs and replacement fluids. For drug treatment either anprolium or sulfa drugs are my treatment choice. A suspension containing kaolin, sulfa drugs, and neomycin is useful in symptomatic treatment. For replacement of fluids, Gatorade by mouth works exceptionally well to combat the accompanying severe dehydration.

As the replacement heifer calf grows older and is placed on the ground, she is very susceptible to worm parasites. There is a wide array of such parasites, including those that infect the lungs, the abomasum, and the intestines. The life cycle of these worms is the direct kind, that is, infective stages of the parasites will be picked up by the calf from bedding in the stall or from the pasture when the calf first starts nibbling at grass.

However, it is important that all calves be exposed to light infestations of worm parasites so that they can acquire immunity to most of these worms. The secret to controlling worm parasite infection in cattle is to control the degree of

exposure that the animals have when they are calves.

Lung worms are an example. Their life cycle is direct and the eggs of the worms are passed in the manure of infected animals. These eggs hatch quickly and larvae crawl up on grass or other forage. The calf nibbles at the forage, swallows worm larvae with the forage, and infects itself with the lung worms. The susceptible replacement heifer calf (3-9 months of age) can become heavily infected. Infection with adult lung worms produces a pneumonia with the clinical symptoms of coughing, some elevation of temperature and, ultimately, varying degrees of lung consolidation. When a calf has consolidation of the lungs a part of the lung tissue is replaced with scar tissue which remains for the rest of the animal's life. This type of lung damage will stunt the calf as it grows older, its lung capacity does not increase as it normally would.

Control of lung worm infection in replacement heifers is not easy. One important fact is that older animals will usually have a few adult lung worms that will be shedding eggs on the pasture. This is good reason for not mixing groups of animals. It is also important for replacement heifers to be routinely treated with an effective anthelmintic drug. The most effective drug available for use against lung worm is levamisole. Routine treatment times will vary with conditions on a given farm, but during the first 12 months of life a replacement heifer calf should probably be treated at least 3 times with the proper dose of levamisole to control lung worm infection.

A number of worm parasites live in the ruminant's digestive tract, and these small organisms can do a lot of damage to the tract and greatly interfere with its efficiency.

There are several species of worm parasites that invade the lining of the abomasum and leave permanent scars. Fortunately, a degree of immunity is acquired with these infections. However, just as with lung worms, it is important to control the degree of exposure to such parasites so that the animal is not overcome by the infection. Similar infection occurs in the intestines of the replacement heifer, causing nodules and other types of permanent scars on the intestinal lining. All of these irreversible changes will impair the function of the animal's digestive tract for the rest of its life. The methods used for controlling intestinal worm parasites are similar to those used for controlling lung worms and coccidiosis. The first line of defense is sanitation. In actual practice, sanitation takes on many forms such as rotation of pastures, daily removal of soiled bedding from stalls,

dragging of pastures to break up manure, etc. Sanitation is a never-ending battle and should be part of every producer's management routine.

The use of effective anthelmintic drugs in controlling intestinal worm parasites is also extremely important. Everyone is aware of the large amount of advertising to promote the various drugs that are on the market today. Although all of these drugs are effective (because of the close control by the Center for Veterinary Medicine of the Food and Drug Administration), issue is taken with some of the marketing policies and claims for certain of the drugs. Nevertheless, if used at the recommended dosage level along with proper sanitation measures, they will do an excellent job in helping to control parasites. My preference of anthelmintic drugs for dairy heifers, based on experience, are levamisole, thiabendazole, and fenbendazole. These are administered at approximately 2-month intervals until the heifer is breeding age. At that time an every 3 month schedule is followed until freshening time, paying close attention to FDA-approved withdrawal times. The new ivermectin product for cattle (IVOMEC) also looks very promising, but we have had only limited experience with it at this time.

Another new concept for controlling nematode parasites in dairy heifers is the use of a "slow release" technique where the anthelmintic drug is placed in a small stainless steel cylinder, closed at each end with a membrane of known pore size to release the drug at a slow, continuous rate. We have been researching such a device (PARATECT, Pfizer) since 1978 and it may be marketed in the U.S. soon. Its effectiveness lasts for at least 90 days and the drug currently used is morantel tartrate. There are several drawbacks to this method of delivery of anthelmintic drugs, but such a technique will be of great usefulness, once it is perfected.

It has been shown that replacement dairy heifers from all parts of the U.S. and Canada have some degree of internal parasites. For this reason, parasite control is a very essential part of a worldwide total herd health program, and such a program is vital in the production of healthy, high-producing milk cows.

Recently, it has become apparent that liver fluke infection in dairy cattle is becoming a very serious problem. The infection is not limited to Florida or the Gulf Coast region of the U.S., but is also showing up in the Northeast, Midwest, and Northwest. Liver fluke problems occur as far south as the San Joaquin Valley in California and as far east as the Uinta Mountains of Utah and irrigated regions of Colorado. Unfortunately, there is no effective anthelmintic drug that can be used to control all stages of liver fluke infection. The only drug presently available is albendazole. It is effective only against adult flukes, cannot be used in lactating cows, and has a 180-day withdrawal time. There are some new flukeicides soon to be marketed in the U.S. One of these is clorsulon (MSD Agvet) which shows considerable promise, having several advantages over albendazole.

Liver fluke infection of cattle is a rather complex process. The adult parasite lives in the bile ducts of infected cattle and produces eggs which are carried out via the bile ducts to the intestinal tract and ultimately to the environment in the manure. Once outside the animal, the fluke egg must be eaten by the proper type of snail. Inside the snail it hatches and develops into a reproductive form which ultimately releases infective larvae which become encysted on grass or forage. These are infective for the cow and will even occur on hay that is made from such infected pasture forage. The larval fluke is eaten by the cow, penetrates the intestinal wall, reaches the liver, penetrates the liver capsule, and migrates within the liver tissue for as long as 3 or 4 months before taking up residence in a bile duct. During the time of migration, scar tissue forms in the wake of the migrating fluke thus destroying liver tissue which is never replaced. The fluke that lives in the bile duct ultimately causes a blockage of the duct due to the thickening of the walls. Since the cow requires the daily production of a large volume of bile to aid in the digestion of the fatty acids that come from the rumen, impairment of liver function causes serious consequences in the efficiency of the entire ruminant digestive system.

Unfortunately, there is no acquired immunity to liver fluke infection in cattle so that when the infective stages of the fluke are available to be eaten, an individual animal can be infected and reinfected all of its life. A primary control measure is to prevent contact of the cattle with snails that contain the intermediate stages of the fluke. However, this is easier said than done. These snails are amphibious, preferring to live in muddy areas. They are capable of hibernating deep in the soil during the dry season only to surface when moisture is present, thus making chemical control measures (such as use of copper sulfate) relatively worthless. It may be possible to fence marshy places and keep cattle away from snail-infested areas, but this is often difficult when irrigated pastures are used or when high-meadow pastures must be used at certain seasons of the year. Serious liver fluke problems in both dairy and beef cattle have been observed in mountain meadows of northern California at elevations of at least 8,000 feet.

If a satisfactory internal parasite control program was in effect during the time the heifer was maturing, she should have acquired some immunity to both coccidiosis and the internal worm parasites before her entry into the milking herd. In order to keep this acquired immunity at a protective level, a low level parasite population should be maintained which will keep the immune mechanism stimulated. Unfortunately, in dairy cattle the stress of high production may interfere with the immune mechanism so that infection with disease-producing levels of worm parasites may occur. For this reason, it is imperative that some type of worm control be continued during the adult life of the cow.

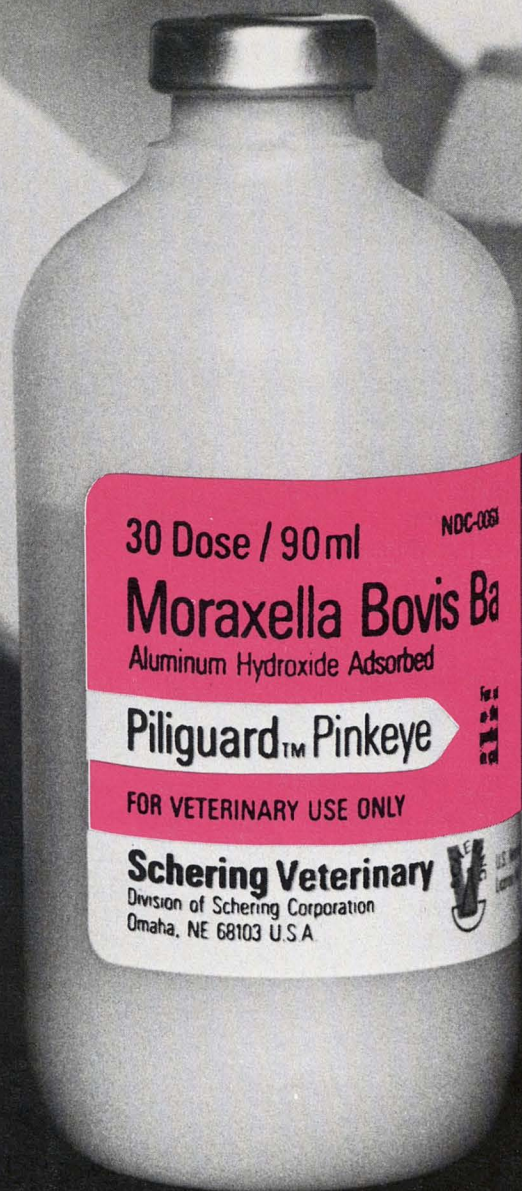
Controlling worm parasites in adult cows presents quite a number of problems. First, there is only one anthelmintic

drug (coumaphos) that is approved for use in lactating dairy cows. This product is being used in different parts of the country with varying reports on its effectiveness.

The only other time when an anthelmintic drug can be used in a control program in lactating cows is during the time that the cow is dry which is usually no more than a period of about 4-6 weeks in the modern producing herd. An anthelmintic drug is recommended for use at the time the cow is turned dry and again (if necessary) when she freshens. The use of anthelmintics plus the management procedures of pasture maintenance and sanitation will effectively prevent lactating cows from having clinical infections with internal parasites.

Summary

The most important time to control internal parasites in a modern, high-producing dairy herd is from the time the replacement heifer calf is dropped until she is introduced into the milking herd. The use of proper sanitary procedures including pasture maintenance to destroy parasites at infective stages or to prevent contact with the infective stages is essential. In addition, proper use of effective anthelmintic drugs is required. When the heifers become adults and join the milking herd the same type of management procedures for controlling exposure to parasites at infective stages is equally important due to severe FDA restrictions on the use of anthelmintic drugs in lactating dairy cows.



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