

## **Cryptosporidiosis**

The interest in regulating animal agricultural operations is fueled in good part by concerns of environmental contamination and spread of zoonotic diseases.

Cryptosporidium is one of the organisms of greatest interest because of its zoonotic potential (affects both animals and humans) and its possible use as a marker for surface water contamination by manure from cattle operations. The U.S. EPA has explicitly warned that inclusion of *C. parvum* into the proposed Enhanced Surface Water Treatment Rule will likely result in new restrictions being placed on the location and management of livestock operations situated within watershed regions.

Dairy producers must be familiar with these issues and serve as an accurate and concerned source of information for the general public and policy makers, in particular. Ignorance of these issues is not excused and serves to contradict the notion of animal agriculturalists ever being perceived as good stewards of the land. This article is the first of a two part series on Cryptosporidium. In this article basic information about the agent will be reviewed and in the follow-up article, controversies concerning environmental contamination and zoonotic risks will be presented.

What is Cryptosporidium ?

Cryptosporidium is a tiny protozoal parasite of the subclass coccidia that includes *Eimeria* and *Isospora*. It was first recognized as a cattle pathogen in 1971 and identified in human cases in 1976.

Is Cryptosporidium species-specific?

Each of the currently recognized species of cryptosporidia infect different hosts. *C. parvum* infects mammals (sheep, goats, pigs and horses), including bovines and humans and wildlife (deer, raccoons, opossums, and rabbits). *C. muris* infects mice and has recently been found in the abomasum of cattle. Other species infect avians and reptiles.

What is the source of *C. parvum*?

There is a large reservoir for *C. parvum* including domestic animals and wild animals, rodents and water. Press reports suggested that dairy farms were a primary source of the *C. parvum* outbreak in Milwaukee in 1993. However, it has subsequently been proven that the subspecies that infected the humans does not infect cattle.

What is the estimated prevalence of Cryptosporidium on dairy farms?

According to the USDA:APHIS:VS National Animal Health Monitoring System's National Dairy Heifer Evaluation Project of 1991-1992, Cryptosporidium occurs in virtually all large and medium-sized herds (that represent nearly 90% of all dairy farms), but a small percent of herds with less than 100 cows may be free of the agent (Figure 1)

What is the prevalence of *Cryptosporidium* in healthy dairy calves?

The same USDA:APHIS:VS study estimated that on any given day, 22 % of preweaned dairy calves, and as many as 50% of dairy calves in the 1 to 3 week age group are shedding *Cryptosporidium*. (Figure 2) Prevalence is higher in the summer than in other months. Although oocysts are shed in greater numbers during the diarrheic phase, the organism has been found in normal feces.

Can *Cryptosporidium* multiply in the environment?

No, reproduction takes place in the intestinal tract. However, the oocyst is very hardy in the environment (may or may not be destroyed by freezing and drying) and is resistant to most disinfectants.

Can *Cryptosporidium* cause disease in cattle by itself or is it secondary disease agent?

Although mixed infections are quite common (since many organisms affect the same age group of calves), *Cryptosporidium* can cause clinical diarrhea in calves in the absence of other pathogens.

How is *C. parvum* diagnosed in dairy animals and what are the clinical signs?

In calves, the predominant sign of infection is diarrhea which may be bloody. Symptoms persist for about 8 days and clinical recovery is the usual outcome. The organism can be found by intestinal biopsy and oocysts can be found on fecal examination. In diarrheic animals, the flotation method is usually adequate to identify oocysts (found on the plane immediately under the coverslip) but they may be confused with yeast. More sensitive tests include acid fast stains and monoclonal antibody tests.

How do you treat cryptosporidiosis in calves?

There is no specific anticryptosporidial treatment currently available, so treatment is limited to supportive care for diarrhea and dehydration.

Are dairy producers aware of the problem?

In the 1991-1992 National Dairy Heifer Evaluation only 2% of the producers thought they has a cryptosporidiosis problem in their herds in the previous 6 months. This response indicates that in general calves infected with *Cryptosporidium* do not show clinical signs.