



The disease-causing cryptosporidia organism can be transferred from animals to humans. Cattlemen urged to be aware.

Story by
TROY SMITH

It was an event like so many others hosted each spring all across cow country. Family and neighbors pitched in to vaccinate and brand a new crop of calves. Along with the more seasoned help, the crew included several youngsters anxious to make a hand. Also present were a handful of city folk a little unsure of what to do but just as eager. After the last calf was worked and while everyone was sharing in a good meal, the novices continued their good-natured argument over proper calf-wrestling technique. The veterans grinned and winked at one another. The crew had enjoyed the big day, and, best of all, the job was finished.

Unfortunately, memories built during this particular branding became tainted in following days, as several crewmembers developed intestinal distress. Some were only mildly affected — just a little off their feed. Others showed symptoms of varying severity, including fever, nausea, vomiting and diarrhea. All parties recovered within a few days, although one individual was hospitalized briefly to receive treatment for dehydration. Tests confirmed the diagnosis: cryptosporidiosis.

In this situation, the afflicted humans most likely became infected with the causative organism as a result of their presence at the branding, through direct contact with calves or their environment. Their experience serves as a reminder of the potential for transmission, from livestock to humans, of disease-causing cryptosporidia. It can happen, and cattle are the usual suspects when an outbreak of cryptosporidiosis occurs among humans. Many times, however, such outbreaks are not associated with livestock.

What it is

Cryptosporidiosis (crypto) is a leading cause of diarrhea in dairy calves, but it can cause scours in beef calves, too. According to veterinarian Geof Smith of the North Carolina State University College of Veterinary Medicine, crypto in calves is caused by the protozoal parasite *Cryptosporidium parvum*. Smith says *C. parvum* oocysts (eggs) are commonly shed in the manure of calves, but especially young calves ranging from five to 30 days of age. Calves normally shed oocysts for three or four days following initial infection, but shedding sometimes continues for up to 10 days. Our branding crew had not observed any sick calves, but

Smith says many calves shed some oocysts without exhibiting clinical signs of disease. However, a severe infection usually results in damage to the intestinal wall and diarrhea.

“Oocysts shed by one calf can contaminate the environment, including feed and water sources. So cryptosporidiosis is most commonly passed from calf to calf, and can occasionally be passed from calf to human,” Smith explains. “To become infected, a calf or a human must ingest crypto oocysts. It’s the only way. It might only take a few oocysts, but there could be hundreds of thousands on the animals and in their environment.”

The disease is generally considered to be self-limiting, meaning shedding by calves stops once the infection has run its course. Cattle do not become chronic carriers or shedders of *C. parvum*. Cattle seem to “outgrow” susceptibility. Adult cattle do shed cryptosporidia but not the species that can cause disease in young calves and humans.

More than one kind

There are numerous species of cryptosporidia that may infect the intestinal tracts of mammals, birds and reptiles. Some are considered host-

specific, and others may be associated with multiple hosts. The species *C. bovis* and *andersoni* are most commonly associated with older cattle, but neither is pathogenic. There is no evidence of transmission to humans. *C. meleagridis*, which is associated with birds, including poultry, is transmissible to humans.

“Cryptosporidiosis once was thought to be caused by a single protozoa that was able to infect many different species. However, we have realized more recently that these organisms are, in fact, a very diverse group with at least 19 different species. Some of these are specific to humans (such as *C. hominis*), others are specific to animals, and some truly are able to cause disease in both animals and humans,” Smith says.

There have been reported outbreaks among children participating in field trips to dairy farms where they touched calves, or after visiting petting zoos. But Smith says the vast majority of crypto in humans is the result of ingesting oocysts through contaminated food or water. He calls crypto the leading cause of intestinal disease associated with recreational water, such as lakes and swimming pools. The organism is resistant to most disinfectants, including chlorine treatments applied to swimming water. There have been

instances where *C. parvum*, which can come from calves, has contaminated municipal water sources. But crypto among humans may be more often caused by *C. hominis*.

As an example, Smith cites the 1993 outbreak of human cryptosporidiosis occurring in Milwaukee, Wis. In the largest outbreak ever reported, an estimated 400,000 people developed diarrhea attributed to contamination of the city's water supply. The event received much media attention, with blame leveled at manure runoff from cattle operations. Evidence would later suggest that cattle probably were not the source of the contamination.

"When researchers looked at samples of Milwaukee water associated with the outbreak, 29 samples were found to be contaminated with cryptosporidial oocysts. Of the contaminated samples, 83% contained *C. hominis*, which is found only in humans. So, in retrospect, it appears that human contamination of Milwaukee's water was more likely to blame," Smith explains.

"At least 60% of crypto outbreaks are associated with *C. hominis*, about 30% with *C. parvum* (which can come from humans as well as calves) and about 10% with *C. meleagridis* (from birds)," he adds. "Human contamination of either city water supplies or swimming pools is a much bigger concern than contamination by cattle."

So, unless crypto in humans is caused by *C. parvum* specifically, there is no link to cattle. And even if *C. parvum* is

the culprit, it may have been spread by humans.

While crypto in humans is seldom life-threatening, Smith says it can be extremely serious for individuals with impaired immune function. Persons at greatest risk would include those with HIV infection or people on long-term immunosuppressive drug therapy. Included in the latter group would be organ transplant recipients or people with immune system diseases such as rheumatoid arthritis. According to Smith, mortality rates among immunocompromised humans range from 50%-70%.

Treating crypto in calves

Mortality among calves with crypto can run high, too. Crypto organisms cause damage to the villi of the small intestine's lining. These tiny finger-like projections serve to absorb fluids or nutrients. Diarrhea develops and may persist for several days, until the calf's immune system clears the infection. Meanwhile, the depressed calf generally stops nursing and becomes dehydrated. To make things worse, the weakened calf is more susceptible to secondary infections.

"One of the more frequent questions I get, from both producers and veterinarians, is what can I do to treat calves with cryptosporidial diarrhea? Unfortunately, we still don't have a good answer for this. Multiple drugs have been studied as potential treatments with varying degrees of success; however, none are currently approved for use on calves in North America," Smith says.

The organism is resistant to most disinfectants, including chlorine treatments applied to swimming water. There have been instances where *C. parvum*, which can come from calves, has contaminated municipal water sources.

Veterinarians generally recommend treatments that focus on administration of fluids to keep calves hydrated until the infection clears and damage to the gut heals. Barring an overwhelming infection, that kind of therapy will see most calves through to recovery.

"If you give a calf fluids and keep them hydrated," Smith adds, "it should improve within four to five days."

Prevention

Attempts to produce a vaccine for immunization against *C. parvum* have yet to be proven consistently effective. And since no specific drugs are effective in killing the organism within the calf, Smith says sound management is the best course to preventing, or at least minimizing, the severity of infection. For once the environment becomes contaminated,

crypto is very difficult if not impossible to eliminate.

An important step is to provide the cleanest calving environment possible. Smith says the Sandhills Calving System can be an effective strategy, since its periodic removal of "heavies" to clean calving grounds helps control transmission of pathogens carried by older calves to newborn calves. Any steps to avoid concentration of calves in close quarters will lessen opportunity for exposure to crypto and other infections. Producers should make sure newborns receive adequate amounts of good-quality colostrum. While that won't prevent crypto infection, it will help guard against secondary bacterial or viral infections.

Caution is advised when buying calves to "foster" on cows that have lost their own calves. The risk of introducing crypto may be greater when buying calves from dairies, but Smith says presence of the organism is fairly common among both dairy and beef herds. The real key to controlling crypto, he adds, is minimizing the number of oocysts to which calves are exposed.

Sanitation and hygiene should be emphasized to minimize chances that cryptosporidia are spread among calves or to humans. It can happen. Smith says he and probably most veterinarians have been infected with crypto at least once. Producers, their families and friends who handle calves should be aware, and be sure to wash up afterward.

