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Calf Note #105 - Prevalence of Cryptosporidium in dairy calves

Introduction

One of the most common problems that occurs in young dairy calves in the first month of life is enteric infection with *Cryptosporidium parvum*. Crypto is a common parasite that infects most dairy farms in the U.S. According to USDA information, most calves will be infected with crypto at some point in their young lives. Some background on the organism can be found in [Calf Note #12](#).

Although *C. parvum* is the most important of the *Cryptosporidium* genus in terms of agricultural importance, there are actually about 13 different species of *Cryptosporidium*. Most are associated with other species of animals and don't affect young calves or people. (As an aside, *C. parvum* is a very important protozoa in human enteric infections and causes diarrhea in humans as well as calves. People that get sick from crypto usually get sick from *C. parvum*).

The two species of *Cryptosporidium* that infect cattle are *C. parvum* (which affects young calves) and *C. andersoni*, which appears to infect the abomasum of juvenile and mature cattle. However, no reports of reduced production have been associated with *C. andersoni*.

Researchers at USDA, the Centers for Disease Control and University of Florida recently reported in the journal *Veterinary Parasitology* (Santín et al., 2004) on a multi-state study that evaluated the prevalence of different species of cryptosporidium on dairy farms. The researchers utilized sophisticated molecular techniques to determine which specific crypto species was present in calves at different ages on farms throughout the U.S. Although the specific techniques are beyond the scope of this Calf Note, the results related to prevalence are important to every calf raiser.

Farms and Sampling

Farms used in the study were located in Pennsylvania (3 farms), Vermont, New York, Maryland, North Carolina and Florida (2 farms each). A total of 971 fecal samples were collected from different calves by collecting feces directly from the calf and determining the specific cryptosporidial species present in the sample (if any). Samples were transported to the laboratory and then evaluated for the presence of oocysts and then the species of the specific organism was determined.

Calves ranged from 5 days of age to 2 months. The fecal samples were collected over a two year period (2002 and 2003). Farms were randomly selected, so they represented a wide variety of management, feeding, housing and biosecurity practices typical of both large and small dairy farms in the Eastern U.S.

Results

The most important observation made during the study was that the researchers found cryptosporidium oocysts in feces of calves on *every farm studied*. This confirms previous reports from various researchers that crypto is a very common enteric organism in calves. Most of the positive samples (73%) were found in preweaned calves (defined in the study as calves less than two months of age). Prior to weaning, most (about 86%) of the crypto observed was *C. parvum*, which is the species that typically causes diarrhea in calves and humans. After weaning, however, very little *C. parvum* was observed (about 1% of samples positive for crypto contained *C. parvum*). Other species of crypto, including *C. Bovine B*, *C. deer-like* and *C. andersoni* were more prevalent in older calves.

The prevalence of calves that had feces containing crypto oocysts is in Figure 1. As you can see, the greatest prevalence occurred in the first two weeks of life and then declined to 8 to 9 months. It's important to note that after two months of age, *C. parvum* (the parasite that causes diarrhea) was not typically found in fecal samples from calves.

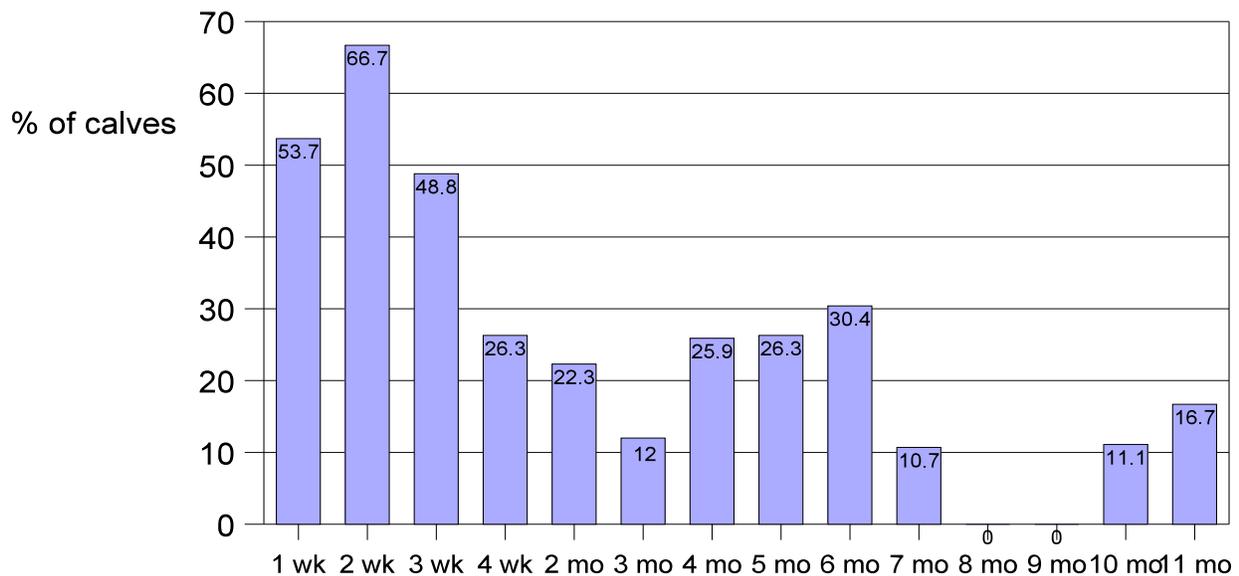
| State | Farm | Prewean | | Postwean | |
|--------------|------|---------|------|----------|------|
| | | +/n | % | +/n | % |
| Vermont | 1 | 18/23 | 78.3 | 7/27 | 25.9 |
| | 2 | 7/23 | 30.4 | 14/30 | 46.7 |
| New York | 1 | 21/45 | 46.7 | 3/32 | 9.4 |
| | 2 | 13/42 | 31.0 | 20/30 | 66.7 |
| Pennsylvania | 1 | 17/37 | 45.9 | 6/49 | 12.2 |
| | 2 | 2/43 | 4.7 | NA | NA |
| | 3 | NA | NA | 3/33 | 9.1 |
| Maryland | 1 | 21/40 | 52.5 | 8/35 | 22.9 |
| | 2 | 15/30 | 50.0 | 2/26 | 7.7 |
| Virginia | 1 | 5/25 | 20.0 | 2/21 | 9.5 |
| | 2 | 14/18 | 77.8 | 1/40 | 2.5 |
| N Carolina | 1 | 16/38 | 42.1 | 16/38 | 42.1 |
| | 2 | 44/61 | 72.1 | 1/35 | 2.9 |
| Florida | 1 | 27/50 | 54.0 | 6/43 | 14.0 |
| | 2 | 15/28 | 53.6 | 3/29 | 10.3 |
| Total | | 253/503 | 50.3 | 92/468 | 19.7 |

+/n = number of positives per number of samples examined. NA = not available.

This study has a lot of practical implications. Since *C. parvum* is the most common pathogen that causes diarrhea in young calves, this report may assist us in management of calves to minimize the effects of infection.

Cryptosporidium was found on every farm tested. It occurred regardless of method of housing (hutches, barns, pens), management or biosecurity practices. However, there were large differences in prevalence among farms – one Pennsylvania had only 4.7% of samples tested positive (2 samples of 43 tested), whereas three farms (one each in Vermont, Virginia, and North Carolina) had more than 70% of samples from calves positive for cryptosporidium. Clearly, there are factors that influence the prevalence of the organism on the farm. Generally, these would include a high degree of sanitation, separation of the calf from the calving environment shortly after birth and separation of management of cows and calves.

Figure 1. Prevalence of cryptosporidium



Also, the presence of crypto on farms prior to weaning does not appear to affect presence after weaning. Two of the farms with the greatest percent of positive samples prior to weaning (see table) had lowest percent positive in samples tested after weaning. However, there does not appear to be other research that suggests a relationship (or lack thereof) of pre-weaning and post-weaning prevalence of crypto.

The data also indicate that although we normally consider cryptosporidium a problem of very young calves, there is the chance that calves will become infected with crypto species (not *C. parvum*) later in life. Indeed, the peak post-weaning prevalence occurred at six months of age in

this study. However, the effects (if any) of these infections later in life with species other than *C. parvum* is not clear.

The Bottom Line

The data in this useful paper reiterate the importance of cryptosporidium, but especially *C. parvum* on the health of young calves. It is most common in very young calves - prior to four weeks of age. After weaning, crypto infections do occur, but implications of these infections is not clear.

The wide differences in prevalence of *C. parvum* in young calves on dairy farms suggests that there are practices that can reduce the risk of infection. However, this particular paper did not set out to determine those factors. On the other hand, other researchers indicate that crypto is found on most, if not all, dairy farms where calves are raised. Calves as young as 2 to 7 days of age have been shown to shed the organism, which indicates that infection occurred very early in life. The maternity area and dam are normally considered reservoirs of infection, which is one reason that diligent sanitation of the calving area and prompt separation of calf from the cow is so important.

The USDA National Animal Health Monitoring System [web site](#) has some excellent background on cryptosporidium and infections on dairy farms. Check out their web site for more information. In addition, several issues of [Calving Ease](#) address the crypto issue.

References:

Santín, M., J. Trout, L. Xiao, L. Zhou, E. Greiner, and R. Fayer. 2004. Prevalence and age-related variation of *Cryptosporidium* species and genotypes in dairy calves. *Vet. Parasitology*. 122:103-117.

Written by Dr. Jim Quigley (21 July 2004)
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