

Prevalence and Risk Factors of Pathogenic *E. coli*, including 0157:H7, in Western Canadian Cow-Calf Herds

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Abstract

There is increasing concern about the potential impact of intensive livestock operations on the environment and the risk that they potentially pose to human health. The purpose of this project was to identify the prevalence of pathogenic *Escherichia coli* in calves at calving and the risk factors associated with infection. Fresh fecal samples were collected from 876 calves on 139 farms in the spring of 2002. The sample collection was a random sample from calves in the calving/nursery area. The fecal samples were scored on a scale of 0 to 3 (0=firm, 3=watery) to identify fecal consistency. Samples were submitted on ice to the laboratory. Data were collected to assess risk factors for shedding, including herd management factors, age, sex, breed, health status/clinical signs and treatment history. The samples were cultured onto MacConkey agar plates at 37°C for 18 hours for isolation of *E. coli*. Five to 10 lactose fermenting, morphologically identical colonies were pooled and identified as *E. coli* using standard biochemical tests. The isolates were examined for presence of shiga-toxin 1 (Stx1), shiga-toxin 2 (Stx2) and EAE (*E. coli* attaching and effacing factor) virulence factors using DNA

hybridization. Positive isolates were O-serotyped by slide agglutination. From the 876 calves, 990 *E. coli* isolates were saved for further testing. Of these 8.7% (86/990) were positive for Stx2, 5.4% (53/990) were positive for Stx1 and 3.6% were Stx1/Stx2 positive. EAE was detected in 4.3% (41/990) of the isolates. Of the 139 farms, 40.3% (56/139) were positive for Stx2, 25.8% (36/139) were positive for Stx1, 20.1% (28/139) were positive for Stx1/Stx2 and 18.7% (26/139) were positive for EAE. Eighty percent (709/876) of the samples were collected from calves 2 to 10 days of age. In calves 2 to 10 days of age, 7.9% (56/709) were positive for Stx2, 4.3% (31/709) for Stx1 and 2.7% for EAE. Preliminary serotype results from 49 samples indicate that 55% (27/49) cannot be typed. Two serotypes associated with human disease were found at a rate of 4.08% (2/49) for 0157, and 2.0% (1/49) for 0103. Serotypes implicated in calf septicemia or diarrhea that were isolated included; 6.1% (3/49) 08, 10.2% (5/49) 088, and 6.1% (3/49) 015. Final serotype results are pending. The association between management factors and the presence of various genotypes and serotypes were evaluated to aid in the development of farm level control strategies.

BVD and Neospora Infection and Reproductive Performance in Beef Cows

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BVD and *Neospora caninum* are both widely recognized causes of abortion and reproductive losses in beef and dairy herds. Several recent projects have examined the role of *N. caninum* in both catastrophic losses and routine reproductive performance in cow-calf herds. BVD is also widely recognized as a leading cause of infectious pregnancy failure.

Veterinarians routinely collect blood samples and analyze for these pathogens during herd investigations

as part of our diagnostic work up. However, the laboratory results from those samples can often leave us with more questions than answers. How do we interpret positive titers for *N. caninum* at the individual animal or herd level? Can we relate these laboratory data to reproductive losses? Why do some herds with evidence of high levels of infection have very little evidence of reproductive problems? Problems also occur in the diagnosis of poor pregnancy rates potentially associated with