

# Microscopic Evaluation of Direct Fecal Smears in the Assessment of Bovine Neonatal Enteritis

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## Introduction

Enteritis, or calf scours, is the most common clinical disease of pre-weaned dairy calves and accounts for nearly 60% of pre-weaned dairy calf mortality. Multiple nutritional factors and infectious agents are associated with calf scours. The lack of agent specific clinical signs makes it difficult to determine presumptive etiologies and prescribe specific treatment. Changes in the fecal microflora and the presence of fecal white blood cells are observed in calves with enteritis. The hypothesis for this study was that alterations in the fecal microflora and/or the presence of fecal white blood cells are related to enteric disease signs in dairy calves and may provide useful clinical information. The objectives of this study were to evaluate fecal direct smears for the presence of enteric microflora and fecal white blood cells and compare this information with the presence of enteric disease signs in dairy calves.

## Materials and Methods

Fresh fecal samples were collected twice weekly from 20 Holstein calves (5 d to 2 wk) over a period of 6 weeks from two dairies. Calves were selected as the 10 youngest heifer calves at each dairy at the time of initiation of the study. During the collection process the calves were examined for clinical signs consistent with enteric disease, including overall mentation and fecal consistency. Gross assessment of each fecal sample was recorded based on color, consistency and the presence of mucus or blood. Each sample was prepared for direct smear microscopic evaluation using three staining techniques; 1) Gram stain, 2) Ziehl-Nielsen acid-fast stain,

and 3) Wright-Giemsa stain. The presence of Gram-negative rods, Gram-positive rods, Gram-positive cocci, *Cryptosporidia* oocysts, and fecal white blood cells was assessed semiquantitatively. Statistical analysis was performed using logistic regression comparing the independent variables of microscopic fecal observations with outcomes of either clinical disease or the presence of fecal white blood cells. Odds ratios (OR) were calculated based on the results of the statistical analysis.

## Results and Conclusions

A wide variation in the bacterial microflora was observed in the calves during the study period. *Cryptosporidia* spp were observed in nearly 65% of the calves on at least one sampling. Fecal white blood cells were present in 50% of the calves on at least one sampling. Calves with gram-positive rod overgrowth were more likely to show signs consistent with enteric disease than calves without overgrowth (OR=1.34, p=0.0001). The presence of fecal white blood cells was also correlated with clinical disease (OR=1.34, p=0.01). Fecal white blood cells may indicate more severe mucosal damage and enteric inflammation. Comparison of fecal microflora populations to the presence of fecal white blood cells demonstrated significant positive correlations for *Cryptosporidia* spp (OR=1.30, p=0.002), Gram-positive rods (OR=1.22, p=0.007), and Gram-positive cocci (OR=1.23, p=0.05); however, there was a negative correlation with Gram-negative rods (OR=0.86, p=0.03). Fecal direct smear evaluation provides information for the assessment of intestinal inflammation and abnormal fecal microflora populations. This information may help direct medical treatment.