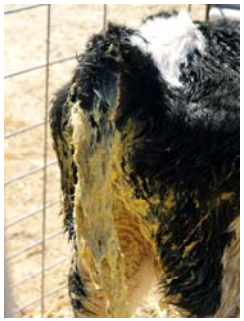
Trouble Shooting Diarrhea in Calves



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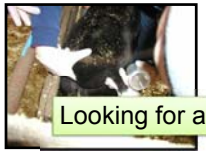
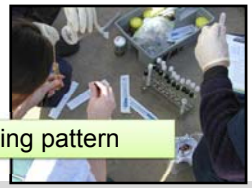
Diarrhea: Agents Involved?

- It is hard to make a diagnosis from diseased calves
- Exposure is usually same for all calves
- Go to the targeted age group
- Sample untreated calves – diarrhea or not



Looking for a shedding pattern



Laboratory Fecal Sample Diagnostics

- Work with your lab for best sample, sample preservation and handling of samples
  - Cultures for *Salmonella*
  - Smears or PCR for *C. parvum*
  - PCR for rota and corona virus
  - Toxin-producing *E. coli*

Calf-Side Fecal Sample Diagnostics

Enterichek® 4 test
Enterichek® Crypto

Evaluation of a commercial rapid test kit for detecting bovine enteric pathogens in feces

Yong-Il Cho, Dong Sun, Vickie Cooper, Grant Dewell, Kent Schwartz, Kyoung-Jin Yoon

Abstract. Recently a commercial antigen-capture enzyme-linked immunosorbent assay kit in the form of a dipstick (Bovine Enterichek®, Biovet Inc.) was made available to bovine practitioners and producers for the rapid detection of *Betacoronavirus 1* (BCV-1), *Rotavirus A* (RV-A), *Escherichia coli* K99, and *Cryptosporidium parvum* in feces from diarrheic calves. The diagnostic performance of Bovine Enterichek was evaluated in comparison with a multiplex real-time polymerase chain reaction assay (mrtPCR). One hundred fecal samples were procured from diagnostic submissions to Iowa State University Veterinary Diagnostic Laboratory and were used for the assessment. The agreement quotient (kappa) in results for each pathogen between Bovine Enterichek and mrtPCR were 0.095 (BCV-1), 0.521 (RV-A), 0.823 (*E. coli* K99), and 0.840 (*C. parvum*). In comparison to mrtPCR, the diagnostic sensitivity of Bovine Enterichek was 60.0%, 42.3%, 71.4%, and

Calf Raiser Fecal Screens Prevalence in 134 Calves

	Day 5	Day 14
Rota	30.6%	43.3%
Corona	2.2%	0.75%
C. parvum	3.0%	74.6%
Salmonella spp.	0%	2.2%

Benchmarks
- ≤20% shedding rota- or corona virus
- ≤20% shedding *Crypto. Parvum*
- No *Salmonella* positive fecals

Exposure in Bedding

- Bedding
  - Maternity Pen
  - Transport vehicle
  - Warming area

  } Shedding before 5 days
- Calf housing } Shedding after 7 days

- Bacterial types and numbers
- *Salmonella* culture

Bedding Analysis

Location	Coliforms	*Salmonella*	Total cfu/ml)
Maternity	1,000	Negative	576,000
Holding pen	500	Negative	150,825
Truck	6,900,000	Positive	6,921,750
Clean hutch	750	Negative	11,500
5-day hutch	1,500	Negative	577,500
Repeat truck	50,000	Positive	4,075,000
Goals:			
Clean pen	< 1,000	Negative	< 5,000
Occupied pen	< 500,000	Negative	< 2,000,000

Environmental Samples

SAMPLE	*SALMONELLA* SPECIES
Cattle Trailer	Negative
Calf Cart	Negative
Post weaning barn – pen 1 water area	Negative
Post weaning barn – pen 1 bedding	Negative
Post weaning barn – pen 2 water area	*Salmonella Dublin*
Post weaning barn – pen 2 bedding	*Salmonella Dublin*
Post weaning barn – pen 3 water area	Negative
Post weaning barn – pen 3 bedding	Negative
8-Week old calf group – feeding/water area	*Salmonella Newport*
8-Week old calf group – bedding pack	*Salmonella Newport*
9-Week old calf group - feeding/water are	*Salmonella Newport*
9-Week old calf group – bedding pack	*Salmonella Newport*
10-Week old calf group – feeding/water area	*Salmonella Newport*
10-Week old calf group – bedding pack	*Salmonella Newport*
>10-Week old calf group – feeding/water area	*Salmonella Newport*
>10-Week old calf group – bedding pack	*Salmonella Newport*

Fecal pH Monitoring
Mix 1 tsp of feces with 15 ml of deionized water

Fecal pH monitoring

- Calves depend on the colon (rather than the rumen) for digestive fermentation
- Nutrients that escape digestion and absorption in SI undergo large bowel fermentation
  - ↑lactate, VFAs, gas and trimethylamine
- Higher lactate and fecal acidity have been associated with diarrhea (Sato 2009, 2010)

Observations so far
- In first 3 days, average between 5.8 and 6.0
- Alkaline feces (>7) in first 3-days could be ETEC
- Fecal pH in normal calves is higher at 14 days (6.4-6.7)
- Acidification or drop in pH may indicate maldigestion, malabsorption or presence of lactic acid

Diarrhea problems can be limited

Removal from calving pen within 10 minutes
Interim housing is "safe"
Colostrum is clean
Avoid long stays in interim housing
High plane of nutrition
Safe milk/milk replacer
Clean equipment and feeders

Rehydration is key!

Clear definitions and protocols

Feed them
Oral electrolyte solution
- Fecal score 2: 2 qt OES once daily
- Fecal score 3: 2 qt OES twice daily

Score 2

Sick Calves Get Antibiotics
High temp (> 103); Low temp (< 100)
Reduced intake or feed refusal
Arched back, hair standing up
More than a streak of blood
Another body system involved – lungs, navel or joints

School of Veterinary Medicine

You have my back!