

Infections causing diarrhea in South Carolina calves from 2012 to 2016

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Neonatal calf diarrhea (scours) causes disease in many dairy and beef herds in South Carolina. There are four major infectious diseases that cause this, rotavirus, coronavirus, *Cryptosporidium spp.*, and *E. coli (K99)*. All four are present on some farms in the State, and disease is more severe in calves with more than one of these infections. Because each of these infections requires a different method of control, knowing which ones are present on your farm will help dairy and beef producers reduce their losses due to calf diarrhea.

To find the prevalence of these infections, we collected fecal samples from 142 young calves from 67 individual dairy or beef farms between January 2012 and December 2016, and tested them using a commercially-available ELISA. Sixty-one percent (86/142) of fecal samples were positive for at least one of the four, and 25% (35/142) were positive for more than one infection. Both dairy (62% positive) and beef (38% positive) calves had at least one of these infections. The number and percentage of samples positive for each pathogen is shown in Table 1 for all calves, beef calves only, and dairy calves only. Interestingly, *E. coli* K99 was found in only dairy calves.

Pathogen	Type of calf		
	All calves (N=142)	Beef calves (N=55)	Dairy calves (N=87)
No pathogens	55/142 (39%)	28/55 (51%)	28/87 (32%)
Rotavirus	67/142 (47%)	19/55 (35%)	47/87 (54%)
Coronavirus	15/142 (11%)	7/55 (13%)	8/87 (9%)
<i>E. coli</i> K99	10/142 (7%)	0	10/87 (11%)
<i>C. parvum</i>	34/142 (24%)	7/55 (13%)	27/87 (31%)

Many calves had more than one type of infection (Table 2).

Table 2. Pathogen combinations from diarrheic calves in South Carolina 2012-2016			
Number of positive fecal samples / total number of fecal samples (Percentage of total fecal samples)			
Pathogen combination*	Type of calf		
	All calves (N=142)	Beef calves (N=55)	Dairy calves (N=87)
No pathogens	56/142 (39%)	28/55 (51%)	28/87 (32%)
Only 1 pathogen	55/142 (39%)	23/55 (42%)	32/87 (37%)
Rotavirus and coronavirus	3/142 (2%)	0	3/87 (3%)
Rotavirus and E. coli K99	5/142 (4%)	0	5/87 (6%)
Rotavirus and C. parvum	14/142 (10%)	1/55 (2%)	13/87 (15%)
Coronavirus and E. coli K99	0	0	0
Coronavirus and C. parvum	2/142 (1%)	1/55 (2%)	1/87 (1%)
E. coli K99 and C. parvum	0	0	0
3 pathogens	7/142 (5%)	2/55 (4%)	5/87 (6%)
4 pathogens	1/142 (1%)	0	1/87 (1%)

*Samples with only 2 pathogens are shown under the appropriate pair; samples with 3 or 4 pathogens are shown in the bottom 2 rows.

If you look at our results on a farm basis, instead of on an individual calf basis, our results were similar but slightly different (Tables 3 and 4).

Table 3. Pathogens on farms with diarrheic calves in South Carolina 2012-2016			
Number of positive farms / total number of farms (Percentage of total farms)			
Pathogen	Type of farm		
	All farms (N=67)	Beef farms (N=46)	Dairy farms (N=21)
No pathogens	30/67 (45%)	22/46 (48%)	8/21 (38%)
Rotavirus	30/67 (45%)	18/46 (39%)	12/21 (57%)
Coronavirus	12/67 (18%)	7/46 (15%)	5/21 (24%)
E. coli K99	6/67	0	6/21

	(9%)		(29%)
C. parvum	19/67 (28%)	7/46 (15%)	12/21 (57%)

Table 4. Pathogen combinations on farms with diarrheic calves in South Carolina 2012-2016 Number of positive farms / total number farms (Percentage of total farms)			
Pathogen combination*	Type of farm		
	All farms (N=67)	Beef farms (N=46)	Dairy farms (N=21)
No pathogens	30/67 (45%)	22/46 (48%)	8/21 (38%)
Only 1 pathogen	20/67 (30%)	19/46 (41%)	1/21 (5%)
Rotavirus and coronavirus	2/67 (3%)	2/46 (4%)	0
Rotavirus and E. coli K99	1/67 (2%)	0	1/21 (5%)
Rotavirus and C. parvum	4/67 (6%)	1/46 (2%)	3/21 (14%)
Coronavirus and E. coli K99	0	0	0
Coronavirus and C. parvum	0	0	0
E. coli K99 and C. parvum	0	0	0
3 pathogens	9/67 (13%)	3/46 (7%)	6/21 (29%)
4 pathogens	1/67 (2%)	0	1/21 (5%)

*Samples with only 2 pathogens are shown under the appropriate pair; samples with 3 or 4 pathogens are shown in the bottom 2 rows.

We also looked at the incidence in various parts of the State (Figure 1), and compared the incidence in beef vs. dairy calves and farms (Figure 2).

Figure 1. Rotavirus/coronavirus/*E. coli* K99/*Cryptosporidium* in fecal samples from South Carolina Calves (2012-2016) by county

Isolates by County

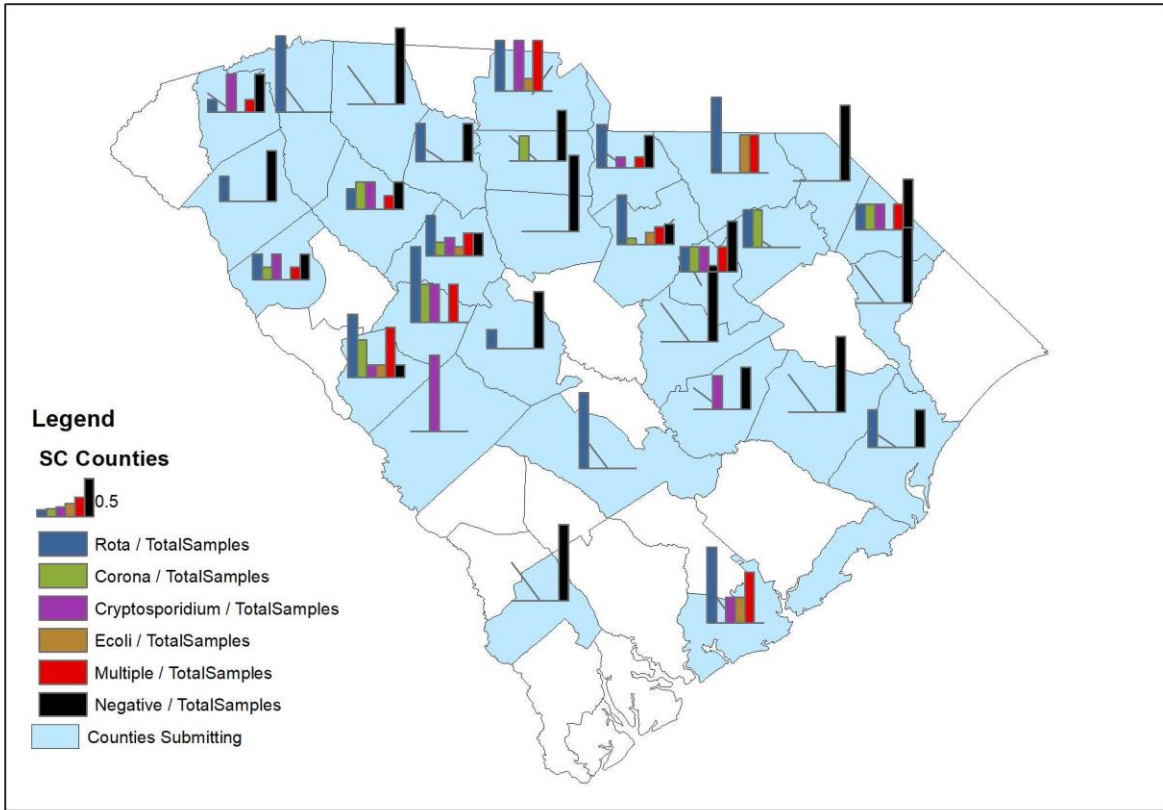
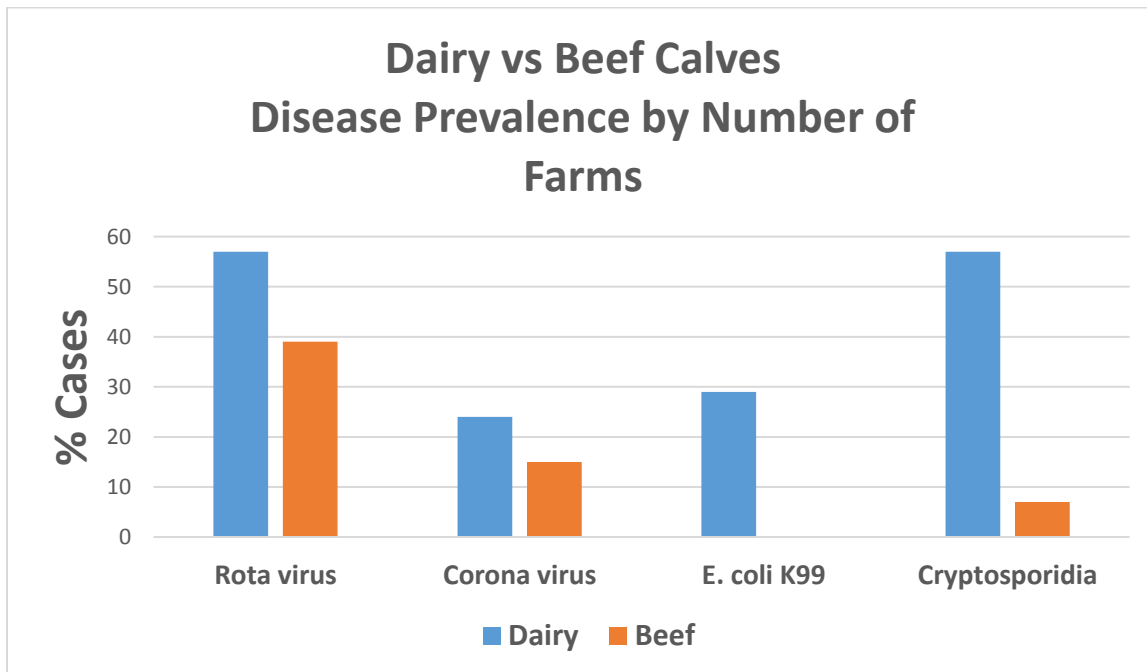
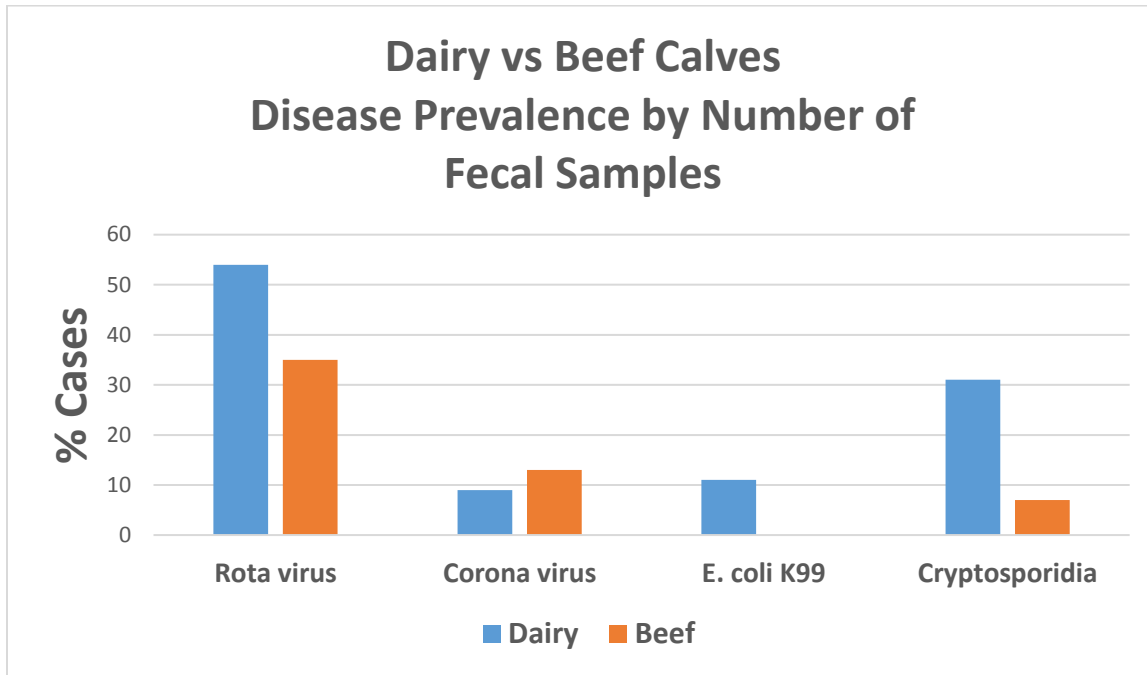


Figure 2. Rotavirus/coronavirus/*E. coli* K99/*Cryptosporidium* from South Carolina Calves (2012-2016)



Here are the major take-away points from our results:

- Each of these infectious agents was found in all parts of South Carolina, and most farms had one or more of these infections (55%).
- In individual calves, Rotavirus was the most common infection (54% of dairy calves tested, and 35% of beef calves tested).
- On a farm basis, Rotavirus was the most frequent infection on beef farms (39%), and *Cryptosporidium* was the most frequent infection on dairy farms (57%).
- *E. coli* K99 was found only on dairy farms, and was present on 29% of the farms tested.
- Multiple infections were found on 26% of the farms tested.
- Just under half of the calves with one or more of these infections had no associated pathology (46%), but were putting out organisms that could serve to spread the infection on that farm.